

Psychonomics International



AMSTERDAM, THE NETHERLANDS

10-12 May 2018

Abstract Book



Psychonomic Society
www.psychonomic.org

VENUE

All sessions (spoken and poster) for the 3rd Psychonomics International meeting (previously the International Meeting of the Psychonomic Society) will be held in the historic Beurs van Berlage.

Beurs van Berlage

Damrak 243
1012 ZJ Amsterdam
The Netherlands

Email: info@beursvanberlage.com

Web: <https://beursvanberlage.com/>

OFFICIAL HOTELS

Beurs van Berlage Hotel service

The Psychonomic Society, through the Beurs van Berlage Hotel service, has arranged special room rates at different hotels, all conveniently located within close walking distance of the venue.

In order to get a reservation at the hotel of your preference, please make your reservation as soon as possible. Please click [Beurs van Berlage Hotel service](#) for hotel availability, rates, and to make your reservation.

Only Book Directly with Beurs van Berlage Hotel service

The Psychonomic Society is not utilizing the services of any housing service for our 2018 Psychonomics International Meeting in Amsterdam except the Beurs van Berlage Hotel service. Reservations for the 2018 meeting should be made directly with the Beurs van Berlage Hotel service via their web reservation system using the links provided here. If you provide your credit card information to any of these unauthorized vendors, your card may be charged but you may not have a reservation when you arrive in Amsterdam. THIS IS A SCAM!

Hotels

The following hotels have been selected for the 2018 Psychonomics meeting. Hotels are listed in order of distance to the meeting venue. Book your room early as they will sell out quickly

Inntel Hotels Amsterdam Centre
Doubletree by Hilton Amsterdam Centraal
Volkshotel Amsterdam Centre
Ramada Apollo Hotel Amsterdam
Westcord Fashion Amsterdam

REGISTRATION LOCATION/HOURS*

Registration is located on the first floor of the Beurs van Berlage in the Beurs Foyer. To avoid long lines onsite, you are strongly encouraged to preregister through the website at www.psychonomic.org/18AMSRegistration.

Wednesday, 9 May 16:00-20:00

Thursday, 10 May 07:30-19:00

Friday, 11 May 07:30-19:15

Saturday, 12 May 07:30-18:30

*Hours subject to change

CERTIFICATE OF ATTENDANCE

Certificates of attendance will be sent via email to all attendees after the conference. Please contact the Secretariat at ps2018@congressbydesign.com with questions.

FAMILY CARE GRANTS

Psychonomic Society Family Care Grants support attendees who incur extra family care expenses necessary to attend the 2018 International Meeting (i.e., extra daycare, babysitting services, elder care, or care of a family member with disabilities). Grants (up to \$500 USD) help defray those expenses. The submission deadline is 15 April 2018.

NURSING MOTHER'S ROOM

The nursing mother's room, named Roland Holst Kamer, is located on the second floor of the Beurs van Berlage. A key will be made available at the Psychonomic Society Registration area. The room is equipped with tables and chairs but no refrigerator. Attendees may not use this room for babysitting purposes.

WI-FI

Wi-Fi Network: **PS2018**

Password: **None required**

KEYNOTE SPEAKERS

John Wixted, University of California, San Diego, USA
Thursday, 10 May, 11:00-12:20, Effectenbeurszaal

Dedre Gentner, Northwestern University, USA
Saturday, 12 May, 2018, 13:40-15:00, Effectenbeurszaal

RECEPTIONS

Welcome Reception

Date: Thursday, 10 May

Place: Grote Zaal/Exhibition Room (Beurs van Berlage)

Time: 17:00-18:40

Friday Reception

Date: Friday, 11 May

Place: Grote Zaal/Exhibition Room (Beurs van Berlage)

Time: 17:00-19:00

COFFEE BREAKS AND LUNCH

Complimentary coffee and tea will be available at:

Thursday: 10:00-11:00, 14:20-15:40

Friday: 9:40-10:40, 15:00-16:00

Saturday: 9:40-10:40, 16:20-17:00

in Grote Zaal/Exhibition Room and the Beurs Foyer.

Box lunches will be available on Thursday through Saturday from 12:00 to 13:30 in the same rooms.

MOBILE APP

A free mobile app for this year's meeting will be available for download in the Apple App Store and Google Play Store a few weeks prior to the International Meeting. All versions include the full program and abstracts. It is recommended that you download the mobile app before you come to the International Meeting.

Sponsored by the University of California Press.



Meeting Information

POSTER SESSIONS

All poster sessions will take place in Grote Zaal/Exhibition Room (Beurs van Berlage).

Session	Set Up Time	Author Present
Thursday	16:00-17:00	17:00-18:40
Friday	16:00-17:00	17:00-19:00
Saturday	11:00-12:00	12:00-13:40

NOTE: Each poster should be 97 cm (approximately 38 inches) wide by 147 cm (approximately 57 inches high). Visit www.psychonomic.org/18AMposters for suggestions on preparing your poster. The extended viewing time will allow all interested persons to see posters of their choice and hopefully reduce the crowded conditions we have sometimes had at the poster sessions. All posters must be removed as soon as the poster session is concluded. Posters that are not removed will be discarded.

EXHIBITORS/HOURS

Attendees are encouraged to visit our exhibitors located in Grote Zaal at the Beurs van Berlage.

Exhibit Hours*

Thursday, 10 May 10:00-18:40
Friday, 11 May 09:30-19:00
Saturday, 12 May 09:30-17:00

*Hours subject to change

Exhibitors (at the time of printing)

Psychology Software Tools, Inc.
Millisecond Software
Springer US
The MIT Press
Sona Systems
Taylor & Francis

Sponsors

University of California Press

PHOTOGRAPHIC RELEASE

As part of your registration for Psychonomics International, the Society reserves the right to use photographs and video taken during the meeting for future marketing purposes. If you do not wish to have your photograph or video used for such purposes, please contact us at the Psychonomic Society Registration Desk

PSYCHONOMIC SOCIETY STATEMENT ON HARASSMENT

The Psychonomic Society is an inclusive and welcoming organization, and our meeting should reflect those values. Conference attendees and visitors should enjoy freedom of speech, freedom of thought, and freedom from harassment of all kinds. Recent events in the media remind us that academic settings are ones where we must be especially vigilant. As a scientific society, we do not want to police behavior, nor do we wish to dampen the professional and personal interactions that are so important to our meeting. But we do encourage members to take into account others' perspectives and consider how a question, comment, or invitation might be received when there is a power differential between parties. No attendee should feel vulnerable to harassment at our meetings, or feel that they are enduring a climate of fear or hostility. Let's all work together to ensure that our values of inclusion, respect, and professionalism are ones that are enjoyed by all of our members and attendees.

GOVERNING BOARD

John Dunlosky, Chair, Kent State University, USA
Aaron Benjamin, Past Chair, University of Illinois at Urbana-Champaign, USA
Laura Carlson, Chair-elect, University of Notre Dame, USA
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Maaïke Dubbeldam, Utrecht University, The Netherlands
Elle van Heusden, Free University Amsterdam, The Netherlands
Aine Ito, Humboldt-Universität zu Berlin, Germany
Eduard Ort, Free University Amsterdam, The Netherlands
Thomas Neerven, Utrecht University, The Netherlands
Linnea Thomander, University of Amsterdam, The Netherlands

**2018 AFFILIATE MEETINGS**

Women in Cognitive Science
Thursday, May 10, 2018
16:00-18:00 (Reception from 18:00-19:00)
Meeting Room: Keurzaal

FUTURE MEETINGS

November 15-18, 2018
59th Annual Meeting
New Orleans, Louisiana, USA
Headquarters Hotel: Hyatt New Orleans

November 14-17, 2019
60th Annual Meeting
Montreal, Quebec, Canada
Hotels: W Montreal & InterContinental Hotel Montreal

November 19-22, 2020
61st Annual Meeting
Austin, Texas, USA
Headquarters Hotel: JW Marriott Austin

November 18-21, 2021
62nd Annual Meeting
San Diego, California, USA
Headquarters Hotel: Manchester Grand Hyatt San Diego

November 17-20, 2022
63rd Annual Meeting
Washington, District of Columbia, USA
Headquarters Hotel: Washington Marriott Wardman Park

November 16-19, 2023
64th Annual Meeting
San Francisco, California, USA
Headquarters Hotel: Hilton San Francisco

November 21-24, 2024
65th Annual Meeting
New York City, New York, USA
Headquarters Hotel: New York Marriott Marquis Times Square

PS MEETING SECRETARIAT

Congress by design
P.O. Box 77
3480 DB Harmelen
The Netherlands
ps2018@congressbydesign.com
+31 88 0898101

SPECIAL EVENTS

An Introduction to Experiment Building with OpenSesame

9 May 2018 | Doubletree by Hilton, Amsterdam, The Netherlands

Registration Fee: €100

Registration includes coffee breaks and lunch.

Limited seats available.



Sebastiaan Mathôt
University of Groningen,
The Netherlands

OpenSesame is a program for developing psychological and neuroscientific experiments. OpenSesame is free, crossplatform (Windows, Linux, Mac OS, and Android), supports many external devices (eye trackers, button boxes, etc.), and combines a modern graphical user interface with Python scripting (a popular programming language). In this workshop, you will learn how to create a simple yet complete experiment from scratch. No prior experience with OpenSesame or Python is required.

Endorsement Disclaimer Reference herein to any specific commercial products, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the Psychonomic Society. The views and opinions of organizers and speakers expressed in this workshop do not necessarily state or reflect those of the Psychonomic Society.

Canal Cruise

Friday 11 May 2018 | Price: €27,-
7:30 p.m. (19:30) (Duration: 1 hour)

Experience Amsterdam from the water. Marvel at the cutting-edge architecture of the Eastern Docklands and soak-up the atmosphere of the historic ring of canals while gliding through the old centre. You will see elegant merchant's mansions, carillon-crowned churches, and warehouses with their rich history from Holland's Golden Age. Relax with a drink and listen to compelling stories about historic Amsterdam.



The Psychonomic Society Announces
the Recipients of the

2018 ACCOMMODATION AWARD

The Psychonomic Society's Scientific Committee selected 25 International Graduate Accommodation Awards based on the quality of the abstracts submitted by Graduate Student Members of the Society for the 2018 Psychonomics International meeting in Amsterdam, The Netherlands. Each recipient receives a three-night hotel accommodation.

Please join the Scientific Committee in congratulating these recipients!

Visit www.psychonomic.org/awards for additional information.



**International Meeting of the
Psychonomic Society**

AMSTERDAM, THE NETHERLANDS • BEURS VAN BERLAGE • 10-12 MAY 2018

Nahian Chowdhury, University of Sydney, Australia
Abstract #2071: Stopping Speed and GABAergic Activity in the Motor Cortex

Ruizhi Dai, Tufts University, USA
Abstract #4069: Age-Related Difference in Using Global Relationships: A Map-Learning Study

Nola Daley, Kent State University, USA
Abstract #3045: Self-Explanatory Feedback Enhances Long-Term Learning

Patrícia Fernanda Ferreira de Matos, University of Minho, Portugal
Abstract #3060: Remember That You've Already Paid the Bill: Finding Prospective Memory Commission Errors

Moshe Glickman, Tel Aviv University, Israel
Abstract #238: A Computational Model for Risky Decisions: Using Eye Movements to Improve Choice Predictions

Seema Gorur Prasad, University of Hyderabad, India
Abstract #329: Value Driven Unconscious Processing: Influence of Reward on Masked Priming

Nina M. Hanning, Ludwig-Maximilians-Universität München, Germany
Abstract #4080: Independent Effects of Eye and Hand Movements on Visual Working Memory

Kelli L. Johnson, Stony Brook University, USA
Abstract #3046: Base-Rate Neglect or Base-Rate Distortion? Effects of Ambiguity

Krisztian Kasos, Eötvös Loránd University, Budapest, Hungary
Abstract #3086: Validity and Feasibility of Obimon, an Open-Source Device for Measuring Electrodermal Activity in Psychological Experiments

Brittany Lee, San Diego State University, USA
Abstract #2006: Activation of English During Recognition of American Sign Language by Deaf and Hearing Bimodal Bilinguals: An ERP Study

Grzegorz Maciejewski, University of Leeds, United Kingdom
Abstract #4047: The Cost of Learning New Meanings for Familiar Words

Katarina Marjanovic, International School for Advanced Studies, Italy
Abstract #1059: Distinguishing Between Semantic and Morpho-Syntactic Language Processing in Sentence Reading

Matthew P. McCurdy, University of Illinois at Chicago, USA
Abstract #1070: Improving the Generation Effect: Fewer Generation Constraints Enhance Relational Processing

Pedro Simão Mendes, University of Minho, Portugal
Abstract #2062: Word Frequency and Judgment of Learning: The Role of (in)Congruent Prompts

Anne Mickan, Radboud University Nijmegen/Max-Planck Institute for Psycholinguistics
Abstract #2009: The Role of Between-Language Competition in Foreign Language Attrition

Kayla Morehead, Kent State University, USA
Abstract #3042: Note-taking Devices in the Classroom

Stephanie Morey, Flinders University, Australia
Abstract #1019: Maintaining Efficiency: Redundant Target Processing is Resistant to Changes in Dual-Task Load

Sasha Nahleen, Flinders University, Australia
Abstract #3033: When More is Not Merrier: Do Shared Stressful Experiences Amplify?

Kimberly Newberry, Kansas State University, USA
Abstract #2033: The Role of Knowledge in Age-Related Changes in Event Segmentation and Memory

Andrea O'Rear, University of Notre Dame, USA
Abstract #2036: Using Location-Based Event Structure to Improve Prospective Memory

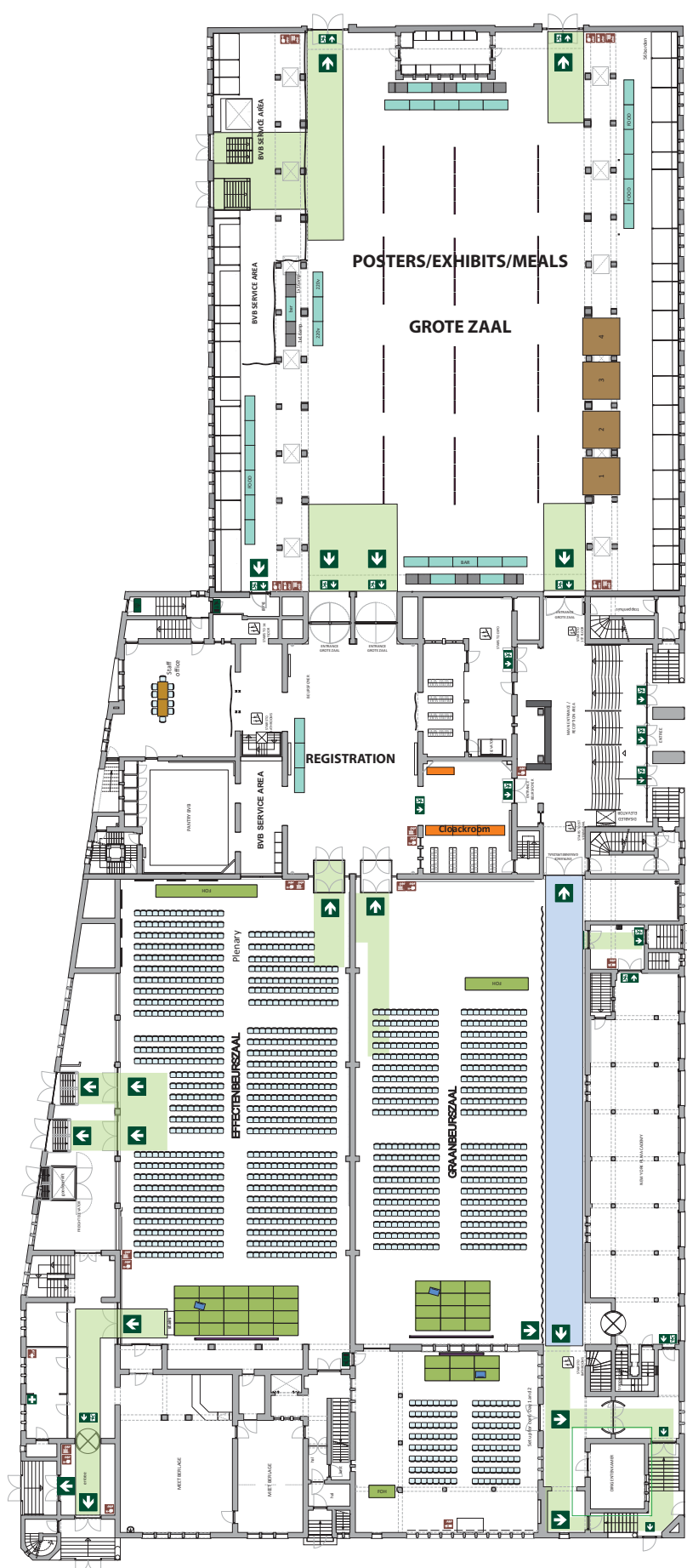
Allison Sklenar, University of Illinois at Chicago, USA
Abstract #4030: The Effect of Similarity to the Self on Impression Memory

Joshua Snell, Aix-Marseille University, France
Abstract #334: Parallel Syntactic Processing in Reading: The Sentence Superiority Effect

Giacomo Spinelli, University of Western Ontario, Canada
Abstract #3026: Conflict Adaptation Under Load: Proportion Congruent Effects Persist When Contingency Learning is Impaired

Amber Witherby, Texas Christian University, USA
Abstract #2058: How Does Mood Influence Monitoring of Learning for Emotional Material?

Irem Yildirim, University of Delaware, USA
Abstract #4066: Anticipatory Memory for Regular and Random Patterns





THURSDAY MORNING, 10 MAY 2018

SYMPOSIUM I: The Limits of Prediction in Language Processing (11-16)	8:40-10:40	Effectenbeurszaal
Cognitive Control I (101-106)	8:40-10:40	Administratiezaal
Decision Making I (107-112)	8:40-10:40	Berlagezaal
Eyewitness Identification (113-117)	8:40-10:40	Graanbeurszaal
Multisensory Perception (118-122)	9:00-10:40	Veilingzaal

THURSDAY AFTERNOON, 10 MAY 2018

Visual Attention I (123-127)	13:20-15:00	Administratiezaal
Complex Cognition I (128-131)	13:20-14:40	Berlagezaal
Discourse Processes (132-134)	13:20-14:20	Effectenbeurszaal
Meaning/Semantics (135-140)	13:20-15:20	Graanbeurszaal
Memory I (141-145)	13:20-15:00	Veilingzaal
SYMPOSIUM II: Tackling the Confidence Crisis with Statistical Scrutiny, Verifiable Credibility, and		
Radical Transparency (21-27)	14:40-17:00	Effectenbeurszaal
Problem Solving (146-150)	15:00-16:40	Berlagezaal
Audiovisual Language Processing (151-155)	15:20-17:00	Veilingzaal
Sensation and Perception (156-160)	15:20-17:00	Administratiezaal
Learning and Memory I (161-165)	15:40-17:20	Graanbeurszaal

THURSDAY AFTERNOON, 10 MAY 2018

POSTER SESSION 1	17:00-18:40	Grote Zaal
(Author present between 17:00-18:40)		

Animal Research (1002-1004)	Music Cognition (1044-1046)
Attention (1005-1019)	Psycholinguistics (1047-1061)
Autobiographical Memory (1020-1029)	Recognition Memory (1062-1072)
Embodied Cognition (1030-1038)	Reward, Motivation and Decision Making (1073-1078)
Implicit Memory (1039-1043)	Vision (1079-1088)

FRIDAY MORNING, 11 MAY 2018

Visual Attention II (201-206)	8:20-10:20	Administratiezaal
Numerical Cognition (207-210)	8:20-9:40	Veilingzaal
Language Production (211-214)	8:20-9:40	Effectenbeurszaal
Letter/Word Processing I (215-220)	8:20-10:20	Graanbeurszaal
Metamemory and Metacognition (221-226)	8:20-10:20	Berlagezaal
SYMPOSIUM III: Learning Words From Experience: The Emergence of Lexical Quality		
(31-36)	10:00-12:00	Effectenbeurszaal
Bilingualism I (227-232)	10:00-12:00	Veilingzaal
Learning and Memory II (233-237)	10:40-12:20	Graanbeurszaal
Decision Making II (238-241)	10:40-12:00	Berlagezaal
Emotion and Cognition I (242-245)	10:40-12:00	Administratiezaal

FRIDAY NOON, 11 MAY 2018

POSTER SESSION 2	12:00-13:40	Grote Zaal
(Author present between 12:00-13:40)		

Bilingualism (2002-2011)	Neural Mechanisms (2065-2072)
Cognitive Aging (2012-2019)	Reasoning and Problem Solving (2073-2079)
Cognitive Control I (2020-2032)	Speech Perception (2080-2086)
Event Cognition (2033-2038)	
Learning and Memory I (2039-2054)	
Metamemory and Metacognition (2055-2064)	



FRIDAY AFTERNOON, 11 MAY 2018

SYMPOSIUM IV: Shaping Attention Selection (41-46).....	13:40-15:40	Effectenbeurszaal
Autobiographical Memory (246-250).....	13:40-15:20	Administratiezaal
Bilingualism II (251-255)	13:40-15:20	Veilingzaal
Letter/Word Processing II (256-259).....	13:40-15:00	Graanbeurszaal
Statistics and Methodology (260-264).....	13:40-15:20	Berlagezaal
SYMPOSIUM V: Evidence and Scientific Knowledge in a “Post-Truth” World (51-56).....	15:20-17:20	Graanbeurszaal
Event and Spatial Cognition (265-269)	15:40-17:20	Berlagezaal
Working Memory I (270-274)	15:40-17:20	Veilingzaal
Memory II (275-280)	15:40-17:40	Administratiezaal
Visual Perception (281-284)	16:00-17:20	Effectenbeurszaal

FRIDAY AFTERNOON, 11 MAY 2018

POSTER SESSION 3	17:20-19:00	Grote Zaal
(Author present between 17:20-19:00)		

Action and Perception (3002-3008)	Learning and Memory II (3058-3064)
Attention and Performance (3009-3019)	Letter/Word Processing (3065-3073)
Cognitive Control II (3020-3032)	Multisensory Integration (3074-3078)
False Memory (3033-3039)	Numerical Cognition (3079-3085)
Human Learning and Instruction (3040-3045)	Statistics and Methodology (3086-3089)
Judgment and Decision Making (3046-3057)	

SATURDAY MORNING, 12 MAY 2018

A Life Span Perspective of Timing (301-306).....	8:20-10:20	Berlagezaal
Pre-lexical Deficits in Acquired Dyslexia (307-310).....	8:20-9:40	Effectenbeurszaal
Cognitive Control II (311-316)	8:20-10:20	Administratiezaal
Associative Learning (317-320).....	8:20-9:40	Veilingzaal
Learning and Instruction (321-325)	8:20-10:00	Graanbeurszaal
SYMPOSIUM VI: What Limits the Capacity of Working Memory? An ‘Adversarial’ Working Memory Symposium (61-66).....	10:00-12:00	Effectenbeurszaal
Attention and Performance (326-331)	10:00-12:00	Veilingzaal
Orthographic Processing and Reading (332-336)	10:20-12:00	Graanbeurszaal
False Memory (337-339)	10:40-11:40	Administratiezaal
Reward, Motivation and Decision Making (340-342).....	10:40-12:00	Berlagezaal

SATURDAY NOON, 12 MAY 2018

POSTER SESSION 4	12:00-13:40	Grote Zaal
(Author present between 12:00-13:40)		

Cognitive Control III (4002-4014)	Recall (4049-4060)
Emotion and Cognition (4015-4030)	Spatial Cognition (4061-4067)
Language Processing (4031-4038)	Working Memory (4068-4083)
Meaning/Semantics (4039-4048)	

SATURDAY AFTERNOON, 12 MAY 2018

SYMPOSIUM VII: Proactive Control: Mechanisms and Deficits (71-75)	15:00-16:40	Effectenbeurszaal
Complex Cognition II (343-346)	15:00-16:20	Berlagezaal
Letter/Word Processing III (347-351)	15:00-16:40	Administratiezaal
Speech Perception (352-355)	15:00-16:20	Veilingzaal
Memory and Technology (356-360).....	15:00-16:40	Graanbeurszaal
Emotion and Cognition II (361-364)	16:40-18:00	Berlagezaal
Working Memory II (365-369).....	16:40-18:20	Veilingzaal
Psycholinguistics (370-374)	17:00-18:40	Effectenbeurszaal
Learning and Memory III (375-379)	17:00-18:40	Graanbeurszaal



Effectenbeurszaal	Graanbeurszaal	Veilingzaal	Berlagezaal	Administratiezaal	Grote Zaal
Thursday, 10 May 2018					
Symposium I: The Limits of Prediction in Language Processing 08:40 - 10:40					Lunch 12:20 - 13:20
Keynote & Welcome 11:00 - 12:20	Eyewitness Identification 08:40 - 10:40	Multisensory Perception 09:00 - 10:40	Decision Making I 08:40 - 10:40	Cognitive Control I 08:40 - 10:40	Poster Session I Viewing/Setup: 16:00 - 17:00
Discourse Processes 13:20 - 14:20	Meaning/Semantics 13:20 - 15:20	Memory I 13:20 - 15:00	Complex Cognition I 13:20 - 14:40	Visual Attention I 13:20 - 15:00	Hospitality: 17:00 - 18:40
Symposium II: Tackling the Confidence Crisis With Statistical Scrutiny, Verifiable Credibility, and Radical Transparency 14:40 - 17:00	Learning and Memory I 15:40 - 17:20	Audiovisual Language Processing 15:20 - 17:00	Problem Solving 15:00 - 17:00	Sensation and Perception 15:20 - 17:00	Author Present: 17:00 - 18:40
Friday, 11 May 2018					
Language Production 08:20 - 09:40	Letter/Word Processing I 08:20 - 10:20				Poster Session II Viewing/Setup: 11:00 - 12:00
Symposium III: Learning Words From Experience: The Emergence of Lexical Quality 10:00 - 12:00	Learning and Memory II 10:40 - 12:20	Numerical Cognition 08:20 - 09:40	Metamemory and Metacognition 08:20 - 10:20	Visual Attention II 08:20 - 10:20	Lunch: 12:00 - 13:40
Symposium IV: Shaping Attention Selection 13:40 - 15:40	Letter/Word Processing II 13:40 - 15:00	Bilingualism I 10:00 - 12:00	Decision Making II 10:40 - 12:00	Emotion and Cognition I 10:40 - 12:00	Author Present: 12:00 - 13:40
Visual Perception 16:00 - 17:20	Symposium V: Evidence and Scientific Knowledge in a "Post- Truth" World 15:20 - 17:20	Bilingualism II 13:40 - 15:20	Statistics and Methodology 13:40 - 15:20	Autobiographical Memory 13:40 - 15:20	Poster Session III Viewing/Setup: 16:00 - 17:00
		Working Memory I 15:40 - 17:20	Event and Spatial Cognition 15:40 - 17:20	Memory II 15:40 - 17:40	Hospitality: 17:00 - 19:00
					Author Present: 17:00 - 19:00
Saturday, 12 May 2018					
Pre-lexical Deficits in Acquired Dyslexia 08:20 - 09:40					
Symposium VI: What Limits the Capacity of Working Memory? An "Adversarial" Working Memory Symposium 10:00 - 12:00	Learning and Instruction 08:20 - 10:00	Associative Learning 08:20 - 09:40	A Life Span Perspective of Timing 08:20 - 10:20	Cognitive Control II 08:20 - 10:20	Poster Session IV Viewing/Setup: 11:00 - 12:00
Keynote Address 13:40 - 15:00	Orthographic Processing and Reading 10:20 - 12:00	Attention and Performance 10:00 - 12:00	Reward, Motivation, and Decision Making 10:40 - 12:00	False Memory 10:40 - 12:00	Lunch: 12:00 - 13:40
Symposium VII: Proactive Control: Mechanisms and Deficits 15:00 - 16:40	Memory and Technology 15:00 - 16:40	Speech Perception 15:00 - 16:20	Complex Cognition II 15:00 - 16:40	Letter/Word Processing III 15:00 - 16:40	Author Present: 12:00 - 13:40
Psycholinguistics 17:00 - 18:40	Learning and Memory III 17:00 - 18:40	Working Memory II 16:40 - 18:20	Emotion and Cognition II 17:00 - 18:00		



THURSDAY MORNING, 10 MAY 2018

8:40-10:40

Spoken Sessions (101-122)

SYMPOSIUM I: The Limits of Prediction in Language**Processing (11-16) Effectenbeurszaal**

8:40-8:55	Ito
9:00-9:15	Staub
9:20-9:35	(WITHDRAWN)
9:40-9:55	Huettig; Guerra
10:00-10:15	Dave
10:20-10:35	Ferreira

Cognitive Control I (101-106) Administratiezaal

8:40-9:00	Wirth; Janczyk; Kunde
9:00-9:20	Bratzke; Bryce
9:20-9:40	Zhao; Gaschler; Roettger; Haider
9:40-10:00	Janczyk
10:00-10:20	Bryce; Bratzke
10:20-10:40	Kiesel; Mittelstädt; Miller

Decision Making I (107-112) Berlagezaal

8:40-9:00	Garcia-Marques; Loureiro
9:00-9:20	Herzog; Analytis; Barkoczi
9:20-9:40	Street; Bischof; Kingstone

9:40-10:00	Schlichting; de Jong; van Rijn
10:00-10:20	Del Missier; Visentini; Bruine de Bruin; Mäntylä
10:20-10:40	Farmer; Hamilton

Eyewitness Identification (113-117) Graanbeurszaal

8:40-9:00	Horry; Fitzgerald; Mansour
9:00-9:20	McCormick; Semmler; Dunn
9:20-9:40	Colloff; Smith; Karoglu; Maltby; Smith; Meissner; Flowe
9:40-10:00	Wilson; Donnelly; Christenfeld; Wixted
10:00-10:20	Greene
10:20-10:40	Pansky; Sheaffer; Gal

Multisensory Perception (118-122) Veilingzaal

9:00-9:20	Madan; Donoff; Singhal
9:20-9:40	Farmer; Ciaunica
9:40-10:00	Mioni; Grondin; Stablum
10:00-10:20	Semin; Kamiloglu; Smeets; de Groot
10:20-10:40	Smeets; Plaisier; Kuling; Brenner

THURSDAY AFTERNOON, 10 MAY 2018

13:20-15:00

Spoken Sessions (123-165)

Visual Attention I (123-127) Administratiezaal

13:20-13:40	Öner; Turan; Gülgöz
13:40-14:00	Nieuwenstein; Kromm
14:00-14:20	Duffy; Smith
14:20-14:40	Servant; Logan; Woodman
14:40-15:00	Smith; Corbett

Complex Cognition I (128-131) Berlagezaal

13:20-13:40	De Neys; Raoulison; Bago
13:40-14:00	van Ravenzwaaij; Brown; Marley; Heathcote
14:00-14:20	Stafford; Pirrone
14:00-14:40	Jenny; Herzog; Goldstein; Hofman

Discourse Processes (132-134) Effectenbeurszaal

13:20-13:40	Garcia-Marco; Beltrán; de Vega
13:40-14:00	Weigelt-Marom; Eshet-Alkalai; Ben-Yehudah
14:00-14:20	Hannon

Meaning/Semantics (135-140) Graanbeurszaal

13:20-13:40	(WITHDRAWN)
13:40-14:00	Borelli; Benuzzi; Lui; Porro; Cacciari
14:00-14:20	Jamieson; Aujla; Cook
14:20-14:40	Ulicheva; Harvey; Aronoff; Rastle
14:40-15:00	Anaki; Kenett; Faust
15:00-15:20	Jouravlev; Mineroff; Bergen; Gibson; Fedorenko

Memory I (141-145) Veilingzaal

13:20-13:40	Woltz; Was
13:40-14:00	Mason; Clarke; Farrell
14:00-14:20	Garcia-Marques; Marques; Lapa; Nunes
14:20-14:40	Ward; Tan
14:40-15:00	Maxcey

SYMPOSIUM II: Tackling the Confidence Crisis with Statistical Scrutiny, Verifiable Credibility, and Radical Transparency (21-27) Effectenbeurszaal

14:40-14:55	Fiedler
15:00-15:15	Kekecs; Aczel; Palfi; Szaszi; Szecsi; Zrubka; Kovacs
15:20-15:35	Wicherts
15:40-15:55	Aczel; Szecsi; Kovacs; Palfi
16:00-16:15	Morey
16:20-16:35	Wagenmakers
16:40-17:00	Dienes

Problem Solving (146-150) Berlagezaal

15:00-15:20	Vladimirov; Ermakova; Makarov; Markina; Smirnikskaya
15:20-15:40	Thompson; Topolinski; King; Mills; Salim
15:40-16:00	Feeney; Travers
16:00-16:20	Hristova; Paliakova
16:20-16:40	Lauterman; Ackerman

Audiovisual Language Processing (151-155) Veilingzaal

15:20-15:40	Brem; Karipidis; Pleisch
15:40-16:00	Alves Francisco; Takashima; McQueen; van den Bunt; Jesse; Groen
16:00-16:20	Groen; Bonte
16:20-16:40	Fraga Gonzalez
16:40-17:00	Bonte; Romanovska; Correia; Vroomen; Keetels; Formisano

Sensation and Perception (156-160) Administratiezaal

15:20-15:40	Valt; Huber; Erhardt; Stürmer
15:40-16:00	Brunsdon; Clark; Ferguson
16:00-16:20	Huygelier; Chamberlain; Van der Hallen; de Wit; Wagemans
16:20-16:40	Huckauf
16:40-17:00	Fostick; Babkoff

**Learning and Memory I (161-165) Graanbeurszaal**

15:40-16:00	Civile; McLaren R; McLaren I
16:00-16:20	Civile; McLaren; Curtis; McLaren
16:20-16:40	Milton; McLaren; Wills

16:40-17:00

Luque; Beesley; Morris; Griffiths; Whitford; Le Pelley

17:00-17:20

Gast; Ruzspel

THURSDAY AFTERNOON, 10 MAY 2018

17:00-18:40

POSTER SESSION 1 (1002-1088)**GROTE ZAAL****Animal Research (1002-1004)**

(1002)	Cleland; Elliot; Wilson; Leising
(1003)	Parron; Montant
(1004)	Montant; Parron

Music Cognition (1044-1046)

(1044)	Ashley
(1045)	Moeck; Peters; Hyman; Takarangi
(1046)	Raman

Attention (1005-1019)

(1005)	Morozov
(1006)	Karabay; Akyurek
(1007)	Takeno; Kitagami; Suzuki
(1008)	Lunn; Sjoblom; Ward; Soto-Faraco; Forster
(1009)	Pearson; Albertella; Le; Porter; Le Pelley
(1010)	Leiva; Andrés; Parmentier
(1011)	Martin; Becker; Pegna
(1012)	Noh; Cho S; Cho Y
(1013)	Ferrante; Patacca; Di Caro; Della Libera; Santandrea; Chelazzi
(1014)	Chamberland; Hodgetts; Vachon; Tremblay
(1015)	Williams; Drew
(1016)	Lanagan-Leitzel
(1017)	Abagis; Jonides
(1018)	Thompson
(1019)	Morey; Thomas; McCarley

Psycholinguistics (1047-1061)

(1047)	Sidhu; Pexman
(1048)	Park; Gagne; Spalding
(1049)	López Zunini; Armstrong; Baart; Samuel
(1050)	Galinsky; Berkhout; Stokes
(1051)	Parker; Kirkby; Slattery
(1052)	De Rosa; Crepaldi
(1053)	Lensink; Verdonshot; Schiller
(1054)	Wong; Chiu; Wang; Wong; Chen
(1055)	Dampurè; Barber
(1056)	Fernandes; Xavier; Raposo
(1057)	Parra-Tatge
(1058)	Dussias; Johns; Winnege
(1059)	Marjanovic; Crepaldi
(1060)	Ferretti; Hong; Skubnik
(1061)	Ruiz-Tada; Baus; Costa

Autobiographical Memory (1020-1029)

(1020)	Kawaguchi; Nakamura; Suzuki
(1021)	Faber; D'Mello
(1022)	Baranova; Kusev
(1023)	Congleton; Berntsen
(1024)	Korcsog; Scoboria
(1025)	Göven; Uzer
(1026)	García-Bajos; Migueles; Aizpurua
(1027)	Barzykowski; Staugaard
(1028)	Manzanero; Scott; Vallet
(1029)	Berntsen

Recognition Memory (1062-1072)

(1062)	Currie; Bodner
(1063)	Wulff; Kuhlmann
(1064)	Raw; Ellis; Sakaki
(1065)	Hockley; Schliwinsky
(1066)	Tinard; Sophia; Fabrice
(1067)	Kroneisen
(1068)	Dunlap; Kazmerski
(1069)	Geurten; Willems; Lloyd
(1070)	McCurdy; Frankenstein; Sklenar; Leshikar
(1071)	Ates; Sharma; Bergström
(1072)	Lunke; Meier

Embodied Cognition (1030-1038)

(1030)	Witchel; Santos; Ranji; Chockalingam
(1031)	Cellini; Mioni; Grondin; Stablum; Sarlo
(1032)	Díez; Alonso; Díez-Álamo; Cairós; Fernandez
(1033)	Garofalo; Bellelli; Marino; Riggio
(1034)	Popović Stijačić; Filipović Đurđević
(1035)	Vitale; Padron; Avenanti; de Vega
(1036)	Thomas; Fernandes
(1037)	Zappa; Frenck-Mestre
(1038)	Vargas; Díez; Albuquerque

Reward, Motivation and Decision Making (1073-1078)

(1073)	Jurczyk; Fröber; Dreisbach
(1074)	Ambrus; Heilman; Kusev
(1075)	Shoval; Eitam
(1076)	de Haan; van den Berg; Woldorff; Aleman; Lorist
(1077)	Liu; Luhmann
(1078)	Bakbani-Elkayam; Zilcha-Mano; Eitam

Implicit Memory (1039-1043)

(1039)	Lee; Chen
(1040)	Vachon; Saint-Aubin; Pozzi; Hébert-Couturier; Marois
(1041)	Meier; Glasser
(1042)	Castellà; Pina; Baqués
(1043)	Pesthy; Janacsek; Nemeth

Vision (1079-1088)

(1079)	Brederoo; Van den Berg; Nieuwenstein; Lorist
(1080)	Thomas; Didierjean; Kuhn
(1081)	Goetschalckx; Wagemans
(1082)	Maier; Frömer; Rost; Sommer; Abdel Rahman
(1083)	Yörük; Boduroglu
(1084)	Purcell; Stewart
(1085)	Daneyko; Stucchi; Zavagno
(1086)	Bhatt; White; Jubran
(1087)	Van Geert; Wagemans
(1088)	Klichowicz; Scholz; Strehlau; Krems



FRIDAY MORNING, 11 MAY 2018

8:20-10:20

Spoken Sessions (201-245)

Visual Attention II (201-206) Administratiezaal

8:20-8:40	Pfeuffer; Aufschneider; Thomaschke; Kiesel
8:40-9:00	Guy; Pertzov
9:00-9:20	van Zoest; Venturini; Heimler; Baruffaldi; Rinaldi; Caselli; Pavani
9:20-9:40	Höfler; Bauch; Gilchrist; Körner
9:40-10:00	Maryam; Jones; Remington
10:00-10:20	Welsh; Yoxon

Numerical Cognition (207-210) Veilingzaal

8:20-8:40	Reike; Schwarz
8:40-9:00	Pinhas
9:00-9:20	Ratcliff; McKoon
9:20-9:40	Lindeman; Wiemers

Language Production (211-214) Effectenbeurszaal

8:20-8:40	Deutsch; Dank
8:40-9:00	Lelonkiewicz; Gambi
9:00-9:20	Ostrand; Ferreira
9:20-9:40	Feldman; Dale; van Rij; Vinson

Letter/Word Processing I (215-220) Graanbeurszaal

8:20-8:40	Elmir
8:40-9:00	Staub; Dodge; Cohen
9:00-9:20	Chetail; Content
9:20-9:40	Mirault; Snell; Grainger
9:40-10:00	Khatteb Abu-Leil; Ibrahim; Eviatar
10:00-10:20	Smith; Russo

Metamemory and Metacognition (221-226) Berlagezaal

8:20-8:40	Koriat
8:40-9:00	Gregory; Nash; Winstone; Ridout
9:00-9:20	Takarangi; Nayda
9:20-9:40	Undorf
9:40-10:00	Ariel; Karpicke; Tauber; Witherby
10:00-10:20	van Loon; Roebers

SYMPOSIUM III: Learning Words From Experience: The Emergence of Lexical Quality (31-36) Effectenbeurszaal

10:00-10:15	Nation
10:20-10:35	Taylor; Davis; Rastle
10:40-10:55	Monaghan; Chang
11:00-11:15	Perfetti; Fang
11:20-11:35	Rodd
11:40-11:55	Cai

Bilingualism I (227-232) Veilingzaal

10:00-10:20	Damian; Ye
10:20-10:40	Yang; Hartanto; Yang
10:40-11:00	Francis; Liaño; Arteaga
11:00-11:20	Prior; Temelman-Yogev; Silawi; Shalhoub-Awwad; Katzir
11:20-11:40	Yang; Sun
11:40-12:00	Henley; Ren; Adams; Li; Guo; Kroll; Botezatu

Learning and Memory II (233-237) Graanbeurszaal

10:40-11:00	Studer-Luethi
11:00-11:20	Wagner; Echterhoff
11:20-11:40	Garrido; Garcia-Marques
11:40-12:00	Hainselin; Bourdin
12:00-12:40	De Houwer; Tanaka; Moors; Tiboel

Decision Making II (238-241) Berlagezaal

10:40-11:00	Glickman; Sharoni; Levy; Usher
11:00-11:20	Usher; Glickman
11:20-11:40	Reyna; Chick; Weldon; Erev; Ponzo; Lu
11:40-12:00	Fechner; Schooler; Pachur

Emotion and Cognition I (242-245) Administratiezaal

10:40-11:00	Struiksma; De Mulder; Bosch; van Berkum
11:00-11:20	Ivanchei
11:20-11:40	Batool; Fatima; Bajwa
11:40-12:00	Dumitru

FRIDAY NOON, 11 MAY 2018

12:00-13:40

POSTER SESSION 2 (2002-2086)

GROTE ZAAL

Bilingualism (2002-2011)

(2002)	Morales; Bajo
(2003)	Tsoukala; Frank; Broersma; Van den Bosch
(2004)	Mor; Prior
(2005)	Garcia Alonso; Dussias
(2006)	Lee; Meade; Mott; Midgley; Holcomb; Emmorey
(2007)	Johns; Dussias
(2008)	Philipp; Koch
(2009)	Mickan; Lemhöfer; McQueen
(2010)	Aernoudts; Dietze; Fernandes
(2011)	Morales; Bajo

Cognitive Aging (2012-2019)

(2012)	Menor; Moris
(2013)	Lacey; Dolan
(2014)	Gallant; Yang
(2015)	Mazerolle; Aimé; Maquestiaux
(2016)	Hosokawa; Tomida

(2017)	Taconnat; Kutasi
(2018)	Menor; Alfonso
(2019)	Vaughan; Beavers

Cognitive Control I (2020-2032)

(2020)	Feng; Graesser
(2021)	Trutti; Sjoerds; Hommel
(2022)	Inan; Atalay; Misirlisoy
(2023)	Khosla; Cadman; Legere; O'Malley; Shedden
(2024)	Prochazkova; Sellaro; Calzato; Hommel
(2025)	Alves Francisco; Horsthuis; Foxe; Molholm
(2026)	Wiradhany; Nieuwenstein
(2027)	Lippelt; Prochazkova; Colzato; Sjoerds; Hommel
(2028)	Van den Driessche
(2029)	Gyurkovics; Rey-Mermet; Levita
(2030)	Jongkees; Steenbergen; Vallesi; Colzato
(2031)	Steenbergen; Sellaro; Stock; Verkuil; Beste; Colzato
(2032)	Tehan; Marrington; Tolan

**Event Cognition (2033-2038)**

- (2033) Newberry; Smith; Bailey
 (2034) Liao; Flecken; Dijkstra; Zwaan
 (2035) Tekcan; Boduroglu; Mutlutürk; Ikizoglu; Sozer; Tünçok
 (2036) O'Rear; Radvansky
 (2037) Garsoffky; Schwan
 (2038) Kim; Hommel

Learning and Memory I (2039-2054)

- (2039) Ogawa; Kitagami
 (2040) Inoue; Yagi; Sato
 (2041) Doss; Ballard; de Wit; Gallo
 (2042) Bennion; Garcia; Kensinger
 (2043) Robson
 (2044) Elmore; Conway
 (2045) Seale-Carlisle; Wetmore; Morgan; Velikova; Banai
 Tizkar; Mickes
 (2046) Kotova
 (2047) Lu; Kang; Penney
 (2048) Graham; Was
 (2049) Frey; Hogrefe; Studer-Luethi; Perrig
 (2050) Ørskov; Beatty
 (2051) Tacconat; Ferrandez; Angel; Bouazzaoui; Borella; Fay;
 Vanneste
 (2052) Martin; Kusev; van Schaik
 (2053) Don; Goldwater; Greenaway; Hutchings; Livesey
 (2054) Ovalle Fresa; Rothen

Metamemory and Metacognition (2055-2064)

- (2055) Scoboria; Mazzoni; Otgaar
 (2056) Hanson; Yan
 (2057) Jang; Lee; Feinberg; Son
 (2058) Witherby; Tauber; Goodrich
 (2059) Rivers; Janes; Dunlosky

- (2060) Tacconat; Pinard
 (2061) Luna; Martin-Luengo; Albuquerque
 (2062) Mendes; Luna; Albuquerque
 (2063) Miyoshi; Kuwahara; Kawaguchi
 (2064) Hong; Bae; Choi; Son; Lee

Neural Mechanisms (2065-2072)

- (2065) Hoogeveen; Schjoedt; van Elk
 (2066) Maraver; Gómez-Ariza; Borella; Cerutti; Franzese; Bajo
 (2067) León; Rodrigo; Quiñones; Byrne
 (2068) Chen; Yang; Chen
 (2069) Gordon; Lewandowsky; Quadflieg; Brooks; Ecker
 (2070) Schubert; Nunez; Vandekerckhove
 (2071) Chowdhury; Livesey; Harris
 (2072) Townsend; Legere; O'Malley; von Mohrenschildt;
 Shedden

Reasoning and Problem Solving (2073-2079)

- (2073) Frischkorn; Schubert; Hagemann
 (2074) Stephan; Waldmann
 (2075) Tonkovic; Tomas; Vranic
 (2076) Zhao; Roskos
 (2077) Chistopolskaya; Lazareva
 (2078) Kaszowska; Wan; Panetta; Messner; Taylor
 (2079) Loginov; Kurgansky

Speech Perception (2080-2086)

- (2080) Charoy; Samuel
 (2081) Ishida; Arai; Kashino
 (2082) Jager; Witteman; McQueen; Schiller
 (2083) Baart; Vroomen
 (2084) Tarabehi-Ghanayim; Lavner; Banai
 (2085) Zobel; Freyman; Sanders
 (2086) Shilowich; Biederman

FRIDAY AFTERNOON, 11 MAY 2018

13:40-15:40

Spoken Sessions (246-284)**SYMPOSIUM IV: Shaping Attention Selection (41-46)****Effectenbeurszaal**

- 13:40-13:55 Theeuwes
 14:00-14:15 Todd
 14:20-14:35 Le Pelley
 14:40-14:55 Schubö
 15:00-15:15 Self
 15:20-15:35 Chelazzi

Autobiographical Memory (246-250) Administratiezaal

- 13:40-14:00 Mazzoni
 14:00-14:20 Gülgöz; Öner
 14:20-14:40 Demiray; Mehl; Martin
 14:40-15:00 Coleman; Janssen; Belli
 15:00-15:20 Littell; Kenemans; Baas; Logemann; Remijn;
 Rijken; Hassink; Tinga; van den Hout;
 Engelhard

Bilingualism II (251-255) Veilingzaal

- 13:40-14:00 Bhandari; Mishra; Prasad
 14:00-14:20 Degani; Kreiner; Ataria; Khateeb
 14:20-14:40 Filipović Đurđević; Feldman
 14:40-15:00 Declerck; Snell; Grainger
 15:00-15:20 Timmer; Christoffels; Costa

Letter/Word Processing II (256-259) Graanbeurszaal

- 13:40-14:00 Hasenäcker; Schroeder
 14:00-14:20 Bermúdez-Margaretto; Shtyrov; Domínguez;
 Cuetos
 14:20-14:40 Schmalz; Borelli; Zoccolotti; Laudanna;
 Mulatti
 14:40-15:00 Mousikou; Beyersmann; Ziegler; Grainger;
 Schroeder

Statistics and Methodology (260-264) Berlagezaal

- 13:40-14:00 Vincent; Rainforth
 14:00-14:20 Anderson
 14:20-14:40 Kalish; Cox
 14:40-15:00 Kilic
 15:00-15:20 Hoekstra; Vugteveen; Warrens; Kruijen

SYMPOSIUM V: Evidence and Scientific Knowledge in a "Post-Truth" World (51-56) Graanbeurszaal

- 15:20-15:35 Schmid; Betsch
 15:40-15:55 Merola; Lyons; Reifler
 16:00-16:15 Walton
 16:20-16:35 van der Linden; Roozenbeek
 16:40-16:55 Taylor; Kowalski
 17:00-17:15 Lewandowsky; Swire; Ecker



Event and Spatial Cognition (265-269) Berlagezaal

15:40-16:00	Dolins
16:00-16:20	Newberry; Smith; Bailey
16:20-16:40	Fu; Roskos-Ewoldsen
16:40-17:00	Roskos; Mendoza; Ewoldsen
17:00-17:20	Radvansky; Fisher

Working Memory I (270-274) Veilingzaal

15:40-16:00	Poirier; Saint-Aubin
16:00-16:20	Redick
16:20-16:40	Shepherdson
16:40-17:00	Service; Lahti-Nuuttila; Smolander; Arkkila; Porokuokka; Laasonen
17:00-17:20	Morey; Hadley; Buttelmann; Koenen; Meaney; Auyeung; Karbach; Chevalier

Memory II (275-280) Administratiezaal

15:40-16:00	Halamish
16:00-16:20	Rabinowitz; Woolley; Huang
16:20-16:40	Kan; Gilboa; Verfaellie; Lafleche
16:40-17:00	Hanczakowski; Krogulska; Zawadzka
17:00-17:20	Ortiz-Tudela; Jiménez; Bruce; Lupiáñez
17:20-17:40	Corbin; Crawford; Landy

Visual Perception (281-284) Effectenbeurszaal

16:00-16:20	Van der Burg; Cass; Olivers
16:20-16:40	Schwarz; Pfister; Kluge; Weller; Kunde
16:40-17:00	Costa; Moors; Wagemans
17:00-17:20	Van der Stigchel; Van der Stoep; Schut

FRIDAY AFTERNOON, 11 MAY 2018

17:20-19:00

POSTER SESSION 3 (3002-3089)

GROTE ZAAL

Action and Perception (3002-3008)

(3002)	Gamble; Song
(3003)	Böffel; Müsseler
(3004)	Fournier; Taddese; Richardson
(3005)	Schloesser; Kello
(3006)	Dayer; Wagman
(3007)	Pastötter; Dignath; Kiesel; Frings
(3008)	Molina; Parmentier

Attention and Performance (3009-3019)

(3009)	Cane; Ferguson
(3010)	Kharlamov; Schmidt; Kaszowska
(3011)	De Lillo; Brunsdon; Bradford; Ferguson
(3012)	Pelagatti; Binda; Vannucci
(3013)	Martín-Signes; Paz-Alonso; Chica
(3014)	Steindorf; Rummel
(3015)	Dias da Silva; Postma-Nilsenová
(3016)	Blalock
(3017)	Kim; Lee; Sohn
(3018)	Maquestiaux; Ruthruff; Chauvel
(3019)	Becker; Williams; Pick; Rheem

Cognitive Control II (3020-3032)

(3020)	Arduino; Eleuteri; Jansari; Di Paola
(3021)	van Schie; Anderson
(3022)	Marsh; Barker; Hodgetts; Campbell
(3023)	Friedli; Meier
(3024)	Mairesse; Hughes; Neu; Van Den Bussche
(3025)	Aguerre; Bajo; Gómez-Ariza
(3026)	Spinelli; Krishna; Perry; Lupker
(3027)	Pieczkolan; Huestegge
(3028)	Riechelmann; Pieczkolan; Horstmann; Herwig; Huestegge
(3029)	Huestegge; Hoffmann; Pieczkolan
(3030)	Gonzalez; Koshino; Clapper
(3031)	Bonmassar; Pavani; van Zoest
(3032)	Foerster; Wirth; Kunde; Pfister

False Memory (3033-3039)

(3033)	Nahleen; Dornin; Takarangi
(3034)	Tkatch; Pansky; Chan
(3035)	Morgan; Mickes; Seale-Carlisle; Tamminen
(3036)	Bağcı; Bırhan Çavuşoğlu; Tekman

(3037) Cairós; Hernández; Alonso

(3039) Cadavid; Suarez; Beato

Human Learning and Instruction (3040-3045)

(3040)	Wiley; Rapp
(3041)	Chow; Colagiuri; Livesey
(3042)	Morehead; Dunlosky; Rawson
(3043)	Ludorf
(3044)	Schuetze; Eglington; Kang
(3045)	Daley; Rawson

Judgment and Decision Making (3046-3057)

(3046)	Johnson; Luhmann
(3047)	Prike; Arnold; Williamson
(3048)	Naor-Ziv; King; Glicksohn
(3049)	Castro; Garcia-Fernandez; Gugliotta; Doncel; Esiman; Padilla; Crundall
(3050)	Tcypysheva; Kusev
(3051)	Andriyanova; Bakuleva; Petrov; Golovanova
(3052)	Zeng; Tse
(3053)	Yamamoto; Fukuda
(3054)	Mavromoustakos-Blom; Bakkes; Spronck
(3055)	Park; Kim; Son
(3056)	Grown; Martire
(3057)	Ribeiro; Tangen; McKimmie

Learning and Memory II (3058-3064)

(3058)	Cottini; Basso; Palladino
(3059)	McBride; Flaherty
(3060)	Matos; B. Albuquerque; H. Santos
(3061)	McDonough; Mendoza; Pody; Lee; Kim M; Kim M
(3062)	Skinner
(3063)	Mendoza; Newman; Rehberg; Burchardt; Roskos
(3064)	de la Hera

Letter/Word Processing (3065-3073)

(3065)	Zheng; Sroka
(3066)	Ciaccio
(3067)	Williams; Kempe; Panayotov
(3068)	Sauval; Chetail
(3069)	Santos; Domínguez
(3070)	Massol; Vergara-Martinez; Marcet; Gomez; Perea
(3071)	Mirault; Grainger



(3072) Barzy; Black; Williams; Ferguson
(3073) Tejero; Insa; Roca

Multisensory Integration (3074-3078)

(3074) Kvasova; Soto Faraco
(3075) Jertberg; Levitan; Sherman
(3076) Ehret; Post; Ruess; Thomaschke
(3077) Dickerson; Duff; Moser; Olsen; Gerhardstein
(3078) Pandi; Townsend; von Mohrenschildt; Shedden

Numerical Cognition (3079-3085)

(3079) Zaks-Ohayon; Pinhas; Tzelgov
(3080) Chiang; Chen

(3081) Katzin; Salti; Henik
(3082) Fitousi
(3083) Jang; Hyde
(3084) Thomas; Peterkin
(3085) Vande Velde; Content

Statistics and Methodology (3086-3089)

(3086) Kasos; Zimonyi; Szekely
(3087) Scherbaum
(3088) Field; van Ravenzwaaij; Wagenmakers; Ernst; Hoekstra; Kiers
(3089) Bakos; Zrubka; Szecsi; Kovacs; Aczel

SATURDAY MORNING, 12 MAY 2018

8:20-10:20

Spoken Sessions (301-342)

A Life Span Perspective of Timing (301-306) Berlagezaal

8:20-8:40 Baudouin; Vanneste
8:40-9:00 Baudouin; Vanneste
9:00-9:20 Mioni; Rattat; Capodieci; Cornoldi
9:20-9:40 Provasi; Carchon; Alamargot; Morin; Frey
9:40-10:00 Lamotte
10:00-10:20 Câmara-Costa; Labrell; Mikaeloff; Perdry; Kieffer; Dellatolas

Pre-lexical Deficits in Acquired Dyslexia (307-310)

Effectenbeurszaal

8:20-8:40 Siéoff
8:40-9:00 Ptak
9:00-9:20 Daini
9:20-9:40 Starrfelt

Cognitive Control II (311-316) Administratiezaal

8:20-8:40 Türkoğlu; Erdeniz; Atalay
8:40-9:00 Rey-Mermet; Gade
9:00-9:20 Misirlisoy; Atalay
9:20-9:40 Nicholls; Aniluis; Thomas; Churches; Lawrence; Clode
9:40-10:00 Hommel; Wiers
10:00-10:20 Taatgen

Associative Learning (317-320) Veilingzaal

8:20-8:40 Lee; Lovibond; Hayes; Navarro
8:40-9:00 Campbell; Chen; Orr
9:00-9:20 Holloway; Nández, Sr.
9:20-9:40 Los; Kruijne; Meeter

Learning and Instruction (321-325) Graanbeurszaal

8:20-8:40 Zawadzka; Hanczakowski
8:40-9:00 Yan; Thai; Mansolf
9:00-9:20 Kliegl; Bäuml
9:20-9:40 Cortis Mack; Cinel; Davies; Harding; Ward
9:40-10:00 Pyc; de Belle

SYMPOSIUM VI: What Limits the Capacity of Working Memory? An 'Adversarial' Working Memory Symposium (61-66) Effectenbeurszaal

10:00-10:15 Logie; Doherty; Jaroslawska
10:20-10:35 Cowan; Rhodes; Naveh-Benjamin
10:40-10:55 Awh
11:00-11:15 Barrouillet; Clement; Camos
11:20-11:35 Oberauer
11:40-11:55 Engle

Attention and Performance (326-331) Veilingzaal

10:00-10:20 Askelund; Ryckman; Lambert
10:20-10:40 Tibboel
10:40-11:00 Colzato; Finisguerra; Jongkees
11:00-11:20 Prasad; Mishra
11:20-11:40 Makovski
11:40-12:00 Wijnen; Van den Brink; Van Boxtel; Van Luijtelaar; Eilander; Nieuwenhuis

Orthographic Processing and Reading (332-336)

Graanbeurszaal

10:20-10:40 Meeter; Snell; Grainger
10:40-11:00 van Heuven; Dijkstra
11:00-11:20 Snell; Grainger
11:20-11:40 Siew
11:40-12:00 Schroeder; Eilers; Tiffin-Richards

False Memory (337-339) Administratiezaal

10:40-11:00 Gift Cabalo; Iani; Bilge; Mazzoni
11:00-11:20 Palma; Garcia-Marques
11:20-11:40 Neil; Higham; Fox

Reward, Motivation and Decision Making (340-342) Berlagezaal

10:40-11:00 Sidarus; Palminteri; Chambon
11:00-11:20 Mathôt; Fratescu; Pittarello
11:20-11:40 Szekely; Kotyuk; Bircher; Vereczkei; Balota; Sasvari-Szekely; Ronai



SATURDAY NOON, 12 MAY 2018

12:00-13:40

POSTER SESSION 4 (4002-4083)

GROTE ZAAL

Cognitive Control III (4002-4014)

- (4002) van Dooren; Sellaro; Hommel
- (4003) Mekern; Sjoerds; Hommel
- (4004) Heijnen; Sellaro; Hommel
- (4005) Nicholson; Verbruggen; McLaren; Lawrence; Burgess
- (4006) Parmentier; Yañez; Andrés
- (4007) Lee; Cho
- (4008) Kozlik; Neumann; Plessow; Fischer
- (4009) Palfi; Gyurkovics; Kovacs; Aczel
- (4010) Morales; Plaza; Morales; Gómez-Ariza
- (4011) Lim; Cho
- (4012) Gade; Paelecke
- (4013) Dignath; Kiesel
- (4014) Hartanto; Toh; Tan; Yang

Emotion and Cognition (4015-4030)

- (4015) Pryakhina; Ovsyannikova
- (4016) Dijkstra; Verkoeijen; Bal
- (4017) Yang; Kwon; Lee
- (4018) Agudelo-Orjuela; Beltrán; de Vega
- (4019) Herrero; Rodríguez; León; Hernández; Quiñones
- (4020) Lee J; Lee D; Sohn
- (4021) van den Berg; van Breen; Spears; Lorist
- (4022) Tinga; Nyklicek; Jansen; De Back; Gallati; Shepherd; Jain; Rembold; Louwerse
- (4023) Bridgland; Green; Oulton; Takarangi
- (4024) Yuvruk; Kapucu; Turan
- (4025) Turkileri; Field; Ellis; Sakaki
- (4026) Balter; Aldred; Drayson; Higgs; Raymond; Veldhuijzen van Zanten; Bosch; Hulsken
- (4027) Kobayashi; Otake
- (4028) Kozhukhova; Suchkova
- (4029) Özkılıç Kartal; Kapucu; Amado
- (4030) Sklenar; McCurdy; Frankenstein; Leshikar

Language Processing (4031-4038)

- (4031) Favier; Meyer; Huettig
- (4032) Lukics; Lukács
- (4033) Araújo; Fernandes; Huettig
- (4034) Klaus; Schuter
- (4035) Blasko; Kazmerski; Dawood; Misterovich; Leslie; Owens-Bailey
- (4036) Madden-Lombardi; Dejardin; Dominey
- (4037) Helder; Perfetti
- (4038) van Moort; Koornneef; van den Broek

Meaning/Semantics (4039-4048)

- (4039) Antal; de Almeida
- (4040) Morera; García-Marco; Beltrán; Rolán; de Vega; Ibáñez; García
- (4041) Meade; Holcomb
- (4042) Levy; Bullinaria; McCormick
- (4043) Nadalini; Bottini; Marelli; Crepaldi
- (4044) Verheyen; Egré
- (4045) Heyman T; Heyman G
- (4046) Vankrunkelsven; Bruninx; Heyman; De Deyne; Storms; Voorspoels
- (4047) Maciejewski; Rodd; Mon-Williams; Klepousniotou
- (4048) Muraki; Heard; Pexman

Recall (4049-4060)

- (4049) Turhan; Moon; Mewaldt
- (4050) Wallner; Bäuml
- (4051) Rothen; Ovalle Fresa
- (4052) van den Broek; Dikmans; Klatter-Folmer
- (4053) Abel; Umanath; Shaffer; Wertsch; Roediger, III
- (4054) Wirth; Bäuml
- (4055) Coppens; De Jonge; Kester; Van Gog
- (4056) Fernandes; Guram; Tapper; Saunders
- (4057) Miller; Kim; Wang; Savelli
- (4058) Bouazzaoui; Fay; Guerrero-Sastoque; Isingrini; Taconnat
- (4059) Csik; Fisher; Radvansky
- (4060) Romero Arias; Forcato; Alonso Rodríguez

Spatial Cognition (4061-4067)

- (4061) Jabbari; Mohrenschildt; Shedden
- (4062) Primativo; Clark; Yong; Firth; Nicholas; Alexander; Warren; Rohrer; Crutch
- (4063) Kubik; Zimmermann; Del Missier; Frick; Mäntylä
- (4064) Gokce; Memiş; Güney
- (4065) Head; Stojanovic
- (4066) Yildirim; Intraub
- (4067) Ploran; Anderson; Diamond; Volpe; Aranow; Mackay

Working Memory (4068-4083)

- (4068) Bartsch; Loaiza; Oberauer
- (4069) Dai; Oppenheim; Taylor; Thomas
- (4070) Fechner; Oberauer; Singmann; Shepherdson; Vandekerckhove; Schmiedek
- (4071) de Bruïne; Jolles; van den Broek
- (4072) Catan; Roodenrys; Miller
- (4073) Atkinson; Waterman; Baddeley; Hitch; Allen
- (4074) Mathy; Friedman
- (4075) Forsberg; Johnson; Logie
- (4076) Tehan
- (4077) Rosselet-Jordan; Abadie; Camos
- (4078) Bayliss; Dolin
- (4079) Slana Ozimič; Repovš
- (4080) Hanning; Deubel
- (4081) Kandemir; Wolff; Stokes; Akyürek
- (4082) Zhou; Yeh; Chen
- (4083) Chevalère; Camos



SATURDAY AFTERNOON, 12 MAY 2018

15:00-16:40

Spoken Sessions (343-379)

SYMPOSIUM VII: Proactive Control: Mechanisms and Deficits

(71-75) Effectenbeurszaal

15:00-15:20	Braver
15:20-15:40	Usher; Davelaar
15:40-15:55	Verguts
15:55-16:10	Kalanthroff
16:10-16:25	Chevalier

Complex Cognition II (343-346) Berlagezaal

15:00-15:20	Koehler; Pennycook
15:20-15:40	Cordes; Patalano
15:40-16:00	Tversky; Zrada-Bradley; Liu
16:00-16:20	Goedert

Letter/Word Processing III (347-351) Administratiezaal

15:00-15:20	Lemhöfer; Egger; McQueen
15:20-15:40	Huetting; Hervais-Adelman; Borges
15:40-16:00	Holcomb; Midgley; Meade; Grainger; Emmorey
16:00-16:20	Pattamadilok; Planton; Bonnard
16:20-16:40	Rimzhim; Fowler

Speech Perception (352-355) Veilingzaal

15:00-15:20	Mitterer
15:20-15:40	Bosker
15:40-16:00	Mattys; Ferguson; Heinrich
16:00-16:20	Bortfeld

Memory and Technology (356-360) Graanbeurszaal

15:00-15:20	Benjamin; McKinley
15:20-15:40	Gilbert
15:40-16:00	Frame; Lopez; Boydston
16:00-16:20	Dunlosky; Morehead; Rawson
16:20-16:40	Higham; Coria

Emotion and Cognition II (361-364) Berlagezaal

16:40-17:00	Lyusin; Mohammed
17:00-17:20	't Hart; Struiksma; van Boxtel; Van Berkum
17:20-17:40	Pittino; Kliegl; Huckauf
17:40-18:00	Eder; Erle; Krishna

Working Memory II (365-369) Veilingzaal

16:40-17:00	Kessler; Rac-Lubashevsky
17:00-17:20	Li
17:20-17:40	Röer; Bell; Buchner
17:40-18:00	Neath; Chubala; Surprenant; Quinlan
18:00-18:20	Akyurek; Wolff

Psycholinguistics (370-374) Effectenbeurszaal

17:00-17:20	Eerland; Sherrill; Magliano; Zwaan
17:20-17:40	Hsu
17:40-18:00	Chen; Keuleers
18:00-18:20	Micheli; Henke; Weber
18:20-18:40	Meyer; Hoedemaker

Learning and Memory III (375-379) Graanbeurszaal

17:00-17:20	Sasson; Schiff
17:20-17:40	Racionero-Plaza; Ansorena-Urchequi; Puigvert-Mallart; Gómez-Baya; Martín-Gómez
17:40-18:00	Bowen; Kensinger
18:00-18:20	Van Loon; Roebbers; Tsalas
18:20-18:40	Lander



SYMPOSIUM I: The Limits of Prediction in Language Processing
Effectenbeurszaal, Thursday, 8:40-10:40

Chaired by Falk Huettig, Max Planck Institute for Psycholinguistics

(11)

When Does the Brain Predict Specific Words During Language Comprehension? AINE ITO, *University of Oxford* (Presented by Aine Ito) — Recent models of language processing propose that prediction plays an important role during comprehension. While prediction can facilitate comprehension, available evidence suggests that whether predictions occur is dependent on the situation where people comprehend language. Exploring under what circumstances predictions occur will help us shed light on how much of a role prediction plays in natural language comprehension. In this talk, I will present experiments that investigated predictions of phonological/orthographic word form and semantic information. The results suggest that prediction of word form occurs under particularly limited circumstances compared to prediction of semantic information. I argue that, during natural language comprehension, people may rarely predict specific words, while they may more readily predict broader, less detailed information about upcoming language.

Email: Aine Ito, aine.ito@ling-phil.ox.ac.uk

(12)

Do Readers Make Specific Predictions of Upcoming Words? Three Lines of Eye Movement Evidence Say No. ADRIAN STAUB, *UMass Amherst* (Presented by Adrian Staub) — A word's predictability, as determined by cloze probability, typically has an effect on how long a reader's eyes spend on the word. I will discuss recent research from my lab establishing that the predictability effect on early eye movement measures (first fixation duration, gaze duration) is eliminated when the reader lacks valid parafoveal preview. I argue that predictability influences primarily the earliest stages of orthographic processing, and that when early perceptual evidence is very clear, as when a word is first encountered in foveal vision rather than in the parafovea, predictability has little or no effect. I discuss the apparent paradox raised by the fact that the N400 effect of predictability is obtained in RSVP, where each word is initially encountered in foveal vision. I suggest that the resolution is to recognize that the eye movement and ERP effects of predictability may reflect distinct underlying mechanisms.

Email: Adrian Staub, astaub@psych.umass.edu

(13)

(Withdrawn) Is Prediction Production? La Bocca della Verità. MARTIN CORLEY and ELEANOR DRAKE, *University of Edinburgh* (Presented by Martin Corley) — Listening to another person speaking is accompanied by speech-motor activation in the listener; this has been taken as support for the view that the language production system is implicated in prediction (e.g., Pickering & Garrod, 2007). We present a series of experiments in which participants were led to anticipate a specific word through the acoustic presentation of high-cloze sentence-stems, but were presented with an alternative item to name. In this way prediction and production competed. We employed ultrasound speech imaging to investigate articulator activity. Ultrasound analysis shows that speech-motor movements are systematically affected by predicted words, and that, contra standard theories of production, these effects are found well before acoustic word onset. Contra prediction-as-production theories, however, the

perturbations in articulation are not sensitive to phonetic detail of what is predicted. This suggests that the speech motor system is predicting when it must speak, as opposed to what it might hear.

Email: Martin Corley, Martin.Corley@ed.ac.uk

(14)

Effects of Speech Rate, Preview Time of Visual Context, and Participant Instructions Reveal Strong Limits on Prediction in Language Processing. FALK HUETTIG, *Max Planck Institute for Psycholinguistics*, ERNESTO GUERRA, *Universidad de Chile* (Presented by Falk Huettig) — In three eye-tracking experiments participants listened to simple Dutch sentences while viewing four objects. We used the identical visual stimuli and the same spoken materials but varied speech rates, preview time, and participant instructions. Target nouns were preceded by definite gender-marked determiners, which allowed participants to predict the target object. In Experiment 1, participants had four seconds preview and sentences were presented either in a slow or a normal speech rate. Participants predicted the targets as soon as they heard the determiner in both conditions. Experiment 2 was identical except that participants were given only a one second preview. Participants predicted the targets only in the slow speech condition. Experiment 3 was identical to Experiment 2 except that participants were explicitly told to predict. This led only to a small prediction effect in the normal speech condition. These findings are problematic for theoretical proposals that assume that prediction pervades cognition.

Email: Falk Huettig, falk.huettig@mpi.nl

(15)

Disentangling Experience-Based Effects on Predictive Language Processing in Children. SHRUTI DAVE, *Northwestern University* (Presented by Shruti Dave) — Highly educated and healthy older adults have a wealth of both reading experience and semantic knowledge, and are therefore likely to maximize use of heuristic, i.e., probabilistic internal models when processing incoming content. Prediction has been described in exactly these terms: incrementally generated pre-activations of specific items across unfolding context. Using a self-report paradigm, we separately assessed neural indices (ERPs) associated with prediction accuracy and plausibility. Relative to young adults, older readers showed reduced N400 facilitation for both predicted and plausible information, and instead relegated their neural resources to post-N400 contextual updating processes. Critically, this pattern was exacerbated in the older adults with the highest vocabulary and verbal fluency scores, suggesting that readers with high knowledge stores, access to that knowledge, and a lifetime of strategies for effective reading are less reliant on anticipatory mechanisms than prevailing frameworks of prediction would suggest.

Email: Shruti Dave, shr.dave@gmail.com

(16)

Prediction Versus Newness. FERNANDA FERREIRA, *UC Davis* (Presented by Fernanda Ferreira) — The comprehender's ability to anticipate words and structures during language processing arises from at least three sources of information: (1) the presence of multi-word sequences in the input, which create dependencies between earlier and later elements; (2) grammatical and conceptual rules,



conventions, or taxonomies known to listeners and speakers; and (3) propositional overlap resulting from mechanisms that coordinate the exchange of information in discourse and dialogue. These information sources may facilitate the task of identifying content that is old or redundant, which in turn enable comprehenders to focus their efforts on new information. On this view, the comprehender's goal isn't to predict; instead, the goal

is to acquire information, and prediction is simply a mechanism that facilitates processing, including identification of what is given and new. Theories of comprehension must emphasize that a fundamental purpose of language is to exchange information, and information, by definition, is non-predictable and non-redundant.
Email: Fernanda Ferreira, fferreira@ucdavis.edu

Cognitive Control I

Administratiezaal, Thursday, 8:40-10:40

Chaired by Andrea Kiesel, University of Freiburg

8:40-9:00 (101)

Effect Monitoring In Dual Task Performance. ROBERT WIRTH, *University of Würzburg*, MARKUS JANCZYK, *University of Tübingen*, WILFRIED KUNDE, *University of Würzburg* (Presented by Robert Wirth) — Actions aim to produce effects in the environment. To accomplish this properly, we not only have to recruit the appropriate motor patterns, but also we must be able to monitor whether an intended effect has ultimately been realized. We investigated the impact of such effect monitoring on performance in multitasking situations: Multitasking basically means to produce and monitor multiple actions and effects in fast succession. We show that effect monitoring cannot run in parallel, without causing processing decrements, with a second task. Also, monitoring of effects that are spatially incompatible to a response seems to take longer than the monitoring of spatially compatible action effects. We further argue that effect monitoring is essential toward learning of response-effect associations, as it captures not only anticipated action effects, but also unpredictable occurrences in the environment.

Email: Robert Wirth, Robert.Wirth@uni-wuerzburg.de

9:00-9:20 (102)

Introspection About Task Switching And Memory Search. DANIEL BRATZKE and DONNA BRYCE, *University of Tübingen* (Presented by Daniel Bratzke) — In multitasking situations, two types of reaction time (RT) costs can be typically observed: dual-task costs and switch costs. Dual-task costs arise when people try to perform more than one task at the same time, whereas switch costs arise when people perform different tasks in close succession. Previous dual-task research has demonstrated that trial-by-trial estimates of objective RTs (i.e. introspective RTs) are usually distorted in such a way that participants appear to be unaware of their dual-task costs. In contrast, recent results from an introspective task-switching study suggest that people are aware of their switch costs. In the present study we assessed introspective RTs in a task-switching paradigm, which combined a digit classification and a memory search task. A previous study using this paradigm showed that concurrent timing (i.e. time production) was affected by memory load but not by task switching demands. In our study introspective RTs reflected both the memory load effect and the switch costs. Taken together, these results suggest that introspective RTs are not based on concurrent timing but rather reflect retrospective inference about task performance based (at least partly) on other information than time.

Email: Daniel Bratzke, daniel.bratzke@uni-tuebingen.de

9:20-9:40 (103)

Sequence Knowledge Influences Across-Task Congruency. FANG ZHAO and ROBERT GASCHLER, *Fern University in Hagen*, EVA ROETTGER and HILDE HAIDER, *University of*

Cologne (Presented by Fang Zhao) (Sponsored by Fang Zhao) — This study aims to answer the question, how sequence knowledge influences the impact of across-task congruency effect. Prior studies (Koch, 2007; Deroost & Soetens, 2006) have found that explicit sequence knowledge can lead to the formation of motor chunks, which can be protected from incongruent S-R mapping in single tasking. To this end, we designed a combination of a randomly sequenced two choice Serial Reaction Time task with a four-choice task with a repeating simple sequence. Two Experiments were conducted (Exp. 1 with 26, Exp. 2 with 30 participants). Consistent with the findings about the impact of sequence knowledge on congruency effects within a task (e.g., Koch, 2007), sequence knowledge can moderate the cross-task congruency effect. In line with findings on verbalized predictions (Kemper et al., 2016), we find adaptation to the lack of conflict in (explicit) sequence knowledge.

Email: Fang Zhao, fang.zhao@fernuni-hagen.de

9:40-10:00 (104)

Sequential Modulations Of Between-Task Crosstalk. MARKUS JANCZYK, *Eberhard Karls University of Tübingen* (Presented by Markus Janczyk) — In multitasking, the backward crosstalk effect (BCE) means that Task 1 performance is influenced by characteristics of Task 2. For example, (1) RT1 is shorter when the two responses are made on the same (compatible trial) compared with opposite sides (incompatible conflict-trial), and (2) RT1 is longer when Task 2 is no-go compared with a go-trial. Across several experiments, I investigated the impact of recently experienced trial and conflict history on the size of such BCEs. Similar to the Gratton effect in standard conflict tasks, clear sequential modulations were observed for the two kinds of BCEs, which were only present following (1) compatible trials and (2) go-trials. This shows a strong impact of the trial history and experienced conflict on multitasking performance, and the present study informs theories of multitasking and adds evidence that the cognitive system flexibly regulates control even in multitasking settings to adapt to current environmental demands.

Email: Markus Janczyk, markus.janczyk@uni-tuebingen.de

10:00-10:20 (105)

Reconceptualising The Introspective Blind Spot In Dual Tasks. DONNA BRYCE and DANIEL BRATZKE, *University of Tübingen* (Presented by Donna Bryce) — We closely examine the glaring gap in participants' introspection regarding their own reaction time costs in a concurrent dual-task context. This so-called introspective blind spot has been attributed to the fact that while attention is occupied by one task, people cannot consciously perceive another stimulus presented in that time. In a series of introspective Psychological Refractory Period experiments, evidence inconsistent with this prevailing idea was obtained and individual differences in the awareness of dual-task costs

were discovered. We outline an alternative explanation for the introspective blind spot – that the particular demands of a typical PRP trial render the participant unable to monitor the trial. With some small alterations to the experimental context, participants can monitor more successfully and therefore become aware of their dual-task costs. This model of the conditions required to monitor our performance may have far-reaching consequences for monitoring and introspection across a range of tasks.

Email: Donna Bryce, donna.bryce@uni-tuebingen.de

10:20-10:40 (106)

Exploring The Relation Of Switch Costs And Task Choice In Self-Organized Task Switching. ANDREA KIESEL and VICTOR MITTELSTÄDT, *University of Freiburg*, JEFF MILLER, *University of Otago* (Presented by Andrea Kiesel) — In voluntary

task switching, participants respond more slowly when switching than repeating tasks and they tend to choose task switches less often than task repetitions. In a new variant of the voluntary task-switching procedure, we explored whether participants adapt to individual task-switching performance limitations (switch costs) when deciding whether to repeat or switch tasks. Critically, the stimulus belonging to the chosen task appears delayed in the next trial and this delay increases with the number of task repetitions. Here, we explored whether participants trade off switch costs against the increasing waiting time for the stimulus needed for a task repetition. To vary switch costs, we manipulated the interval between trials (RSI), because switch costs are known to increase at shorter RSI. The larger the switch costs, the less often participants switched tasks. This is in line with the assumption that participants considered their individual switch costs when selecting tasks.

Email: Andrea Kiesel, kiesel@psychologie.uni-freiburg.de

Decision Making I

Berlagezaal, Thursday, 8:40-10:40

Chaired by Harry Farmer, *University of London, London; University of Bath, Bath*

8:40-9:00 (107)

A Deeper Form Of Base-Rate Neglect. TERESA GARCIA-MARQUES and FILIPE LOUREIRO, *ISPA-Instituto Universitário, William James Center of Research* (Presented by Teresa Garcia-Marques) — Research has established the base-rate neglect effect; so named because people often support their decisions in stereotypical individuating information, neglecting base-rates. Here we document a deeper form of this effect, showing it to occur when individual's see themselves as endorsing base-rate thinking. Results from 3 experiments show that: "base-rate neglecting" occurs when participants acknowledge sample distributions; preference for base-rate information leads participants to perceive base-rates as more diagnostic and to be less confident in their individuated based responses; and that posterior probabilities (assigned after all relevant information is considered) do not predict the individuating-based responses for those who show preference for base rate information. These results document a deeper form of base-rate neglect: it occurs even for those who report to prefer base-rate information, define individuating information as non-diagnostic, and their posterior probabilities do not suggest individuating-based responses.

Email: Teresa Garcia-Marques, gmarques@ispa.pt

9:00-9:20 (108)

Social Learning Strategies For Matters Of Taste. STEFAN M. HERZOG, *Max Planck Institute for Human Development*, PANTELIS ANALYTIS, *Cornell University*, DANIEL BARKOCZI, *Linköping University* (Presented by Stefan M. Herzog) — Most choices people make are about "matters of taste" on which there is no universal, objective truth. Nevertheless, people can learn from the experiences of individuals with similar tastes who have already evaluated the available options—a potential harnessed by recommender systems. We mapped recommender system algorithms to models of human judgment and decision making about "matters of fact" and recast the latter as social learning strategies for "matters of taste." Using computer simulations on a large-scale, empirical dataset, we studied how people could leverage the experiences of others to make better decisions. We found that experienced individuals can benefit from relying mostly on the opinions of seemingly similar people. Inexperienced individuals, in contrast, cannot reliably estimate similarity and are better off picking the mainstream option despite differences

in taste. Crucially, the level of experience beyond which people should switch to similarity-heavy strategies varies substantially across individuals and depends on (i) how mainstream (or alternative) an individual's tastes are and (ii) how much the similarity of the individual's taste to that of the other people in the population differs across those people.

Email: Stefan M. Herzog, herzog@mpib-berlin.mpg.de

9:20-9:40 (109)

(Withdrawn) Perspective Taking And Theory Of Mind In Hide And Seek. CHRIS NH. STREET, *University of Huddersfield*, WALTER F. BISCHOF and ALAN KINGSTONE, *University of British Columbia* (Presented by Alan Kingstone) — Does theory of mind play a significant role in where people choose to hide an item or where they search for an item that has been hidden? Adapting the "Hide-Find Paradigm" of Anderson et al. (2014, AP&P), participants viewed homogenous or popout visual arrays on a touchscreen table. Their task was to indicate where in the array they would hide an item, or to search for an item that had been hidden, by either a friend or a foe. Critically, participants believed that their sitting location at the touch-table was the same as - or opposite to - their partner's location. Replicating Anderson et al. participants tended to (1) select items nearer to themselves on homogenous displays, and this bias was stronger for a friend than foe; and (2) select popout items, and again, more for a friend than foe. These biases were observed only when participants believed that they shared the same physical perspective as their partner. Collectively the data indicate that theory of mind plays a significant role in hiding and finding, and demonstrate that the hide-find paradigm is a powerful tool for investigating theory of mind in adults.

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9:40-10:00 (110)

Robustness Of Individual Differences In Temporal Interference Effects. NADINE SCHLICHTING, RITSKE DE JONG, HEDDERIK VAN RIJN, *University of Groningen* (Presented by Nadine Schlichting) — The perceived duration of a specific event has been shown to be influenced by other dimensions of the very same event. In a previous experiment participants were presented with two stimuli consisting of blue dots appearing and disappearing dynamically on the screen for different intervals. Using a MLE procedure we estimated to what extent temporal

and numerical information was taken into account in making judgments on either time or numerosity. Results showed that 1) judgments on time were more likely to be affected by numerosity, and 2) there are large individual differences in the magnitude of these interference effects (i.e., some participants mainly relied on information of the relevant dimension). In the current study, we tested how stable these congruency effects are over time and over different tasks. Participants attended two sessions separated by 6-8 days. During each session participants performed the described dynamic magnitude task, a numerical Stroop task in session 1 and a duration discrimination task in session 2. We show that MLE estimates are stable over time and predict performance in the duration discrimination task. Further, magnitude of temporal interference is not correlated with magnitude of Stroop effects.
Email: Nadine Schlichting, n.schlichting@rug.nl

10:00-10:20 (111)

Cognitive Underpinnings Of Decision-Making Competence. FABIO DEL MISSIER, *University of Trieste-Stockholm University*, MIMÌ VISENTINI, *University of Trieste*, WÄNDI BRUINE DE BRUIN, *University of Leeds, Carnegie Mellon University*, TIMO MÄNTYLÄ, *Stockholm University* (Presented by Fabio Del Missier) — People of all ages face important decisions. Decision-making competence refers to skills needed to make good decisions. The few studies that examined the cognitive underpinnings of decision-making competence focused mainly on the role of fluid cognitive ability. We report the cumulative results of a research program on the wider cognitive underpinnings of decision-making competence in age-diverse community samples as well as clinical samples (with schizophrenia and ADHD). We used a wide range of decision-making tasks from the heuristics and biases program, including the Adult Decision Making Competence battery. Findings from 8 studies (with $n > 1800$) showed that decision-making competence is

not a unitary construct. Rather, across samples, we distinguished three distinct categories of decision-making tasks, namely those: (1) relying more on working memory and executive control resources, with performance declining with age and in clinical populations; (2) relying more on semantic knowledge and showing no age-related decline; (3) requiring divergent thinking skills, with only some aspects of performance declining with age. Implications of our findings for theories of decision making and for applied interventions will be discussed.
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10:20-10:40 (112)

Minimal Group Identity Influences Aesthetic Preference Shifting. HARRY FARMER, *University of London, University of Bath*, ANTONIA F DE C. HAMILTON, *University of London* (Presented by Harry Farmer) — Previous research has established that people often shift their preferences to be in line with those of others. Less clear is the role of social identity in this process. Izuma and Adolphs (2013) showed that viewing the preferences of emotionally charged groups (sex offenders vs university students) led participants to shift their preference towards the in-group and away from the out-group. Our study investigated whether this effect held for more minimally defined social groups. 41 participants were randomly assigned into 2 minimal groups and were instructed to judge a series of paintings after which they received feedback on how either in-group or out-group participants judged the picture. They then rated all paintings again allowing us to measure their preference shifting. We found that preference shifting was modulated by group identity with participants showing a shift away from paintings that the out-group liked. Future research should focus upon defining the degree of group identification at which an attitudinal shift occurs over all conditions.
Email: Harry Farmer, h.farmer@ucl.ac.uk

Eyewitness Identification

Graanbeurszaal, Thursday, 8:40-10:40

Chaired by Ainat Pansky, University of Haifa

8:40-9:00 (113)

"Only Your First Yes Will Count": The Impact Of Instructions On Sequential Lineup Decisions. RUTH HORRY, *Swansea University*, RYAN FITZGERALD, *University of Portsmouth*, JAMAL MANSOUR, *Queen Margaret University* (Presented by Ruth Horry) — In eyewitness identification tasks, witnesses are presented with a lineup that includes a suspect (who may be guilty or innocent) and several fillers. Several recent studies have reported higher discriminability for simultaneous than sequential lineups. We investigated whether the instructions provided to witnesses in these studies – which indicated that only their first “yes” would count – systematically undermined the effectiveness of the sequential lineup. Participants viewed a videotaped staged crime and were randomly allocated to view a target-present or target-absent lineup. Three types of lineups were used: a simultaneous lineup, a sequential lineup with a “first yes counts” caution, and a sequential lineup without such a caution. The suspect either appeared early in the lineup (position 2) or late in the lineup (position 5). We explored the impact of the first yes counts on sequential lineup decision making, and on the simultaneous-sequential difference in discriminability and probative value.
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9:00-9:20 (114)

Eyewitness Identification: A Test Of Continuous And Discrete State Accounts. KYM MCCORMICK and CAROLYN SEMMLER, *University of Adelaide*, JOHN DUNN, *University of Western Australia* (Presented by John Dunn) — Recent research has employed signal detection models to understand the effects of different factors on eyewitness identification. These models presuppose that the underlying memory is continuous. An alternative model, often implicitly assumed, is that memory is discrete – either the culprit is recognized or a guess is made. We conducted a test of these two accounts using a ranking task. A group of 2,008 online participants viewed a video of a theft and were then presented with a 6-member line up. Memory strength was manipulated by varying the duration of the video and the length of time that the culprit was visible. At test, participants were asked to first identify the culprit if they believed the person to be present (standard line up instructions). They then ranked the members of the line up in order of likelihood that they were the culprit. The crucial test of continuous and discrete state models is based on that developed by Kellen and Klauer (2014, *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 40(6), 1795-1804). We discuss the results in relation to models of memory and the relationship between ranking and selection tasks in eyewitness identification.
Email: John Dunn, john.dunn@uwa.edu.au

9:20-9:40 (115)

Can A Novel Interactive Lineup Procedure Attenuate The Own-Race Bias? MELISSA F. COLLOFF, *University of Birmingham*, LISA SMITH, *University of Leicester*, NILDA KAROGLU, *University of Kent*, JOHN MALTBY, *University of Leicester*, HARRIET M.J SMITH, *Nottingham Trent University*, CHRISTIAN A. MEISSNER, *Iowa State University*, HEATHER D. FLOWE, *University of Birmingham* (Presented by Melissa Colloff) — We tested whether a novel interactive lineup—wherein witnesses could rotate the lineup faces into any pose—could attenuate the own-race bias in face recognition. We used a 2 (perpetrator race: Caucasian, South Asian) x 2 (subject race: Caucasian, South Asian) x 2 (lineup procedure: interactive, static) x 2 (lineup: target-present, target-absent) between-subjects design. Over 6,000 subjects watched a mock-crime video, and were tested with a lineup. Our results suggest that identification performance could be improved by allowing witnesses to view lineup faces from multiple angles and have important implications for other-race identification decisions made in the Criminal Justice System. Email: Melissa Colloff, m.colloff@bham.ac.uk

9:40-10:00 (116)

Making Theoretical Sense Of Sequential Lineups. BRENT M. WILSON, KRISTIN DONNELLY, NICHOLAS J.S. CHRISTENFELD, and JOHN T. WIXTED, *University of California, San Diego* (Presented by Brent M. Wilson) — Even though ~30% of law enforcement agencies in the United States have adopted the sequential lineup procedure, it is still not well understood at a theoretical level. The sequential lineup presents a unique signal detection problem because the exact criterion used affects whether or not an eyewitness has an opportunity to make a suspect identification. With other signal detection tasks, if responding becomes more liberal, the hit rate necessarily increases. However, with the sequential lineup, if responding becomes more liberal, the hit rate can actually decrease because the eyewitness is likely to make a foil identification prior to seeing the suspect. This structural constraint of the sequential procedure can create situations where empirical discriminability (area under the ROC curve) decreases despite underlying discriminability (d') increasing. Email: Brent M. Wilson, b6wilson@ucsd.edu

10:00-10:20 (117)

An Episodic Specificity Interview Reduces Failures Of Eyewitness Memory Under High Perceptual Load. CIARA M. GREENE, *University College Dublin* (Presented by Ciara

Greene) — High perceptual load has previously been shown to impair eyewitness memory and to enhance susceptibility to leading questions. Here, 80 participants were assigned to view either a high perceptual load or low perceptual load version of a video depicting a theft in an office. After a 5 minute filler task, participants engaged in either an episodic specificity interview, which employed mental imagery to elicit specific details of the video, or a control interview that solicited general impressions of the video. Finally, participants completed a written questionnaire which contained either neutrally phrased questions or leading questions designed to implant misinformation about the video. Participants' ability to identify a peripheral character in the scene from a photo line-up was impaired under high load, as was their memory for various items present in the scene. These impairments were reduced or eliminated for participants who took part in the specificity interview. The specificity interview also reduced false memories arising from leading questions, and many effects were still observable after 1 week. The results have theoretical implications for perceptual load theory, and practical implications for eyewitness testimony.

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10:20-10:40 (3038)

Resisting Misinformation Via Discrepancy Detection: The Effects Of Unaware Exposure To Suspicion Cues. AINAT PANSKY, RONA SHEAFFER, and ROTEM GAL, *University of Haifa* — Previous studies have shown that contaminating effects of misinformation can be reduced by consciously raising eyewitnesses' awareness to the discrepancy between the misinformation and the original information. We tested whether similar effects could be obtained implicitly (without awareness), by drawing on the metaphorical connection between fishy smells and suspicion (Lee & Schwarz, 2012) to invoke suspicion and increase discrepancy detection. In Experiment 1, we established the generality of this metaphoric connection by replicating previous findings (obtained in English) in a language (Hebrew) in which the smell associated with suspicion is unspecified. In Experiment 2, we examined the metaphor's long-term effects on memory using the misinformation paradigm. Forty-eight hours after viewing an event, participants received misinformation in a room sprayed with either a fishy or a neutral smell. As expected, unaware exposure to the fishy smell (compared to the neutral smell) increased discrepancy recollection and resistance to misinformation, eliminating misinformation interference and lowering suggestibility on the final test.

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Multisensory Perception

Veilingzaal, Thursday, 9:00-10:40

Chaired by Jeroen Smeets, Vrije Universiteit Amsterdam

9:00-9:20 (118)

Is The Edinburgh Handedness Inventory A Test Of Handedness Or Movement Imagery? CHRISTOPHER R. MADAN, *University of Nottingham*, CHRISTOPHER M. DONOFF and ANTHONY SINGHAL, *University of Alberta* (Presented by Christopher Madan) — The Edinburgh Handedness Inventory (EHI) has become a staple measure of handedness. However, when comparing the items that comprise the EHI with tests of movement imagery, the similarities are readily apparent. Specifically, the EHI can be described as asking participants to imagine tool-related interactions, and make subjective judgments of how the participant would interact with the object—as opposed to, for instance, measuring skill in overt movements. In a large

sample of nearly 4000 young adults (aged 17-25), we examined the responses to individual items in the EHI. We further asked a subset of these participants to complete several movement imagery questionnaires. Here we demonstrate that in addition to indexing handedness, the EHI also serves as a measure of inter-individual ability in movement imagery.

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9:20-9:40 (119)

Investigating The Effect Of Depersonalisation Experiences On Visuotactile Processing Of Self And Other. HARRY FARMER, *University College London*, *University of Bath*, ANNA CIAUNICA,



University College London, University of Porto (Presented by Dr Harry Farmer) — Depersonalisation (DP) is an altered form of consciousness which typically manifests as a disruption of bodily self-awareness. People experiencing DP report feelings of being “estranged”, cut-off from oneself and surroundings and often talk about “being in a bubble”. The current study investigated how trait DP affects visuotactile processing using the Visual Remapping of Touch (VRT) paradigm in which seeing a touch on a picture of a face (especially one’s own) leads participants to more accurately detect touch applied to their face. We tested healthy participants with high and low numbers of DP experiences and found that those with high DP showed a reduced VRT effect possibly due to disruption in their integration of multisensory somatic signals. We also found that high DP participants showed a reduction in self bias even when this general lower performance was taken into account. A better understanding of the relationship between high experience of DP and the multisensory representation of self and other helps to develop a better theoretical and empirical understanding of the neurocognitive processes that underlie DP as well as helping to develop interventions to treat those suffering from clinical levels of DP.
Email: Dr Harry Farmer, h.farmer@ucl.ac.uk

9:40-10:00 (120)

Using tRNS To Investigate The Different Role Of Parietal And Frontal Areas In Temporal Processing. GIOVANNA MIONI, *University of Padova*, SIMON GRONDIN, *Laval University*, FRANCA STABLUM, *University of Padova* (Presented by Giovanna Mioni) — We investigate the different role of parietal and frontal areas in temporal processing using tRNS. Participants performed time bisection tasks, with empty interval marked by visual and auditory stimuli. Participants were asked to judge temporal intervals as more similar in duration to the standard short (300ms) or to the standard long (900ms) previously learned. Forty participants were stimulated over right parietal cortex and 40 participants were stimulated over right frontal areas. Participants were divided into 4 sub-groups depending on the modality of the markers that we used to define the temporal intervals (visual-visual; visual-auditory; auditory-visual; auditory-auditory). No effect of stimulation was observed when participants were stimulated over frontal area but shorter perceived duration was observed when participants were stimulated over parietal area. The study confirms and extends previous findings indicating the role of parietal cortex in temporal processing and when multi-modalities are used.
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10:00-10:20 (121)

Fear Odors Facilitate Detection Of Fear Expressions Over Other Negative Expressions. GÜN R. SEMIN, *Instituto Universitário*, ROZA G. KAMILOĞLU, *University of Amsterdam*, MONIQUE A.M. SMEETS and JASPER H.B. DE GROOT, *Utrecht University* (Presented by Gün R. Semin) — In a double-blind experiment, participants were exposed to facial images of anger, disgust, fear and neutral expressions under two body odor conditions: fear and neutral sweat. They had to indicate the valence of the gradually emerging facial image. Two alternative hypotheses were tested. If fear odor: (1) induces a general negative evaluative state, then all negative facial images should be identified faster; (2) recruits a discrete emotional state, then only the facial images of fear should be identified faster. Results revealed that fearful faces were processed faster in the fear odor condition compared to the neutral odor condition, while the reaction times were not different for the other negative facial images across the two odor conditions. Our data support the discrete emotion account for facial affect perception primed with fear odor. This study provides a first demonstration of perception of discrete negative facial expressions using olfactory priming.
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10:20-10:40 (122)

How Long Does It Take To Decide How Heavy An Object Feels While Picking It Up? JEROEN SMEETS, MYRTHE PLAISIER, IRENE KULING, and ELI BRENNER, *Vrije Universiteit Amsterdam* (Presented by Jeroen Smeets) — When lifting an object, it takes time to decide how heavy it is. In this time, one combines indirect visual information (e.g. size, material) with direct haptic information. We monitored the temporal development of the judgment of an object’s weight by examining when providing visual size information induces a size-weight illusion. We found that providing only a short glimpse (200 ms) of size information before the onset of lifting is sufficient for a full-strength size-weight illusion to occur. Surprisingly, the illusion also occurred if the glimpse was provided well after the onset of lifting: although direct haptic information about the object’s weight was already available, heaviness judgements were strongly influenced by the visual size. Only glimpses that were more than 300 ms after lift-off did not influence the judged weight, suggesting that it takes about 300 ms to reach a decision about the weight.
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Visual Attention I

Administratiezaal, Thursday, 13:20-15:00

Chaired by Philip Leigh Smith, *University of Melbourne*

13:20-13:40 (123)

Vigilant Attention Under Anxiety: Evidence From A Change Detection Task. SEZİN ÖNER, *Kadir Has University*, EYLÜL TURAN and SAMİ GÜLGÖZ, *Koç University* (Presented by Sezin Öner) — Emotionality has been shown to influence how fast and accurate individuals respond to their environments. In the current study, we tested the role of anxiety in vigilant attention using a dual-task paradigm. Data were collected from 85 college students who were asked to indicate whenever they detected any change in the background stimuli while simultaneously confirming accuracy of arithmetic operations presented continuously. We examined whether the level of state anxiety influenced change detection for words and pictures. Performance on change detection task

and arithmetic operations was computed considering the speed-accuracy tradeoff. Overall, change in the pictorial stimuli were detected better. Individuals with high state anxiety performed better than less anxious individuals in change detection and particularly when background consisted of word stimuli. Discussion over the findings focuses on the mechanisms underlying the interference of anxiety with the articulatory suppression in working memory.
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13:40-14:00 (124)

Visual Memory: The Price Of Encoding Details. MARK R. NIEUWENSTEIN and MARIA KROMM, *University of Groningen* (Presented by Mark R. Nieuwenstein) — While studies on

eyewitness testimonies show that people are poor at remembering visual details, a recent study found that people can remember thousands of pictures at a highly detailed level after viewing each picture for 3 seconds (Brady et al., 2008). To elucidate this paradox, we used the attentional blink to investigate the processing demands associated with memorizing visual details. Specifically, participants were asked to memorize a picture of an object and to identify a trailing masked letter. In different blocks, memory for the object was tested at the level of gist or visual details. Results showed that the requirement to encode details was associated with an increased allocation of attention during perceptual encoding, a longer period of vulnerability to retroactive interference, and a larger attentional blink. We conclude that encoding visual details imposes attentional and temporal demands that will limit performance under conditions of time pressure or divided attention.

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14:00-14:20 (125)

On The Category Adjustment Model: Another Look At Huttenlocher, Hedges, And Vevea (2000). SEAN DUFFY and JOHN SMITH, *Rutgers University-Camden* (Presented by John Smith) — Huttenlocher, Hedges, and Vevea (2000) [Why do categories affect stimulus judgment? *Journal of Experimental Psychology: General*, 129, 220-241] introduce the Category Adjustment Model (CAM), which posits that participants imperfectly remember and reproduce stimuli in serial judgment tasks. In order to maximize accuracy, CAM holds that participants use information about the distribution of the stimuli to improve their judgments. CAM predicts that judgments will be a weighted average of imperfect memories of the stimuli and the mean of the distribution of stimuli. Huttenlocher, Hedges, and Vevea (2000) report on three experiments and the authors conclude that CAM is “verified.” We attempt to replicate Experiment 3 from Huttenlocher et al. (2000). We analyze the data using judgment-level data rather than analyzing averaged data. We find evidence of a bias toward a set of recent stimuli rather than a bias toward the running mean. We also do not find evidence that the participants learned the distribution of stimuli. According to our judgment-level analysis, the judgments in our dataset are not consistent with CAM.

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14:20-14:40 (126)

How Memory Representations Control Attention In The Face Of Interference. MATHIEU SERVANT, GORDON D. LOGAN, and GEOFFREY F. WOODMAN, *Vanderbilt University* (Presented by Geoffrey F. Woodman) — To understand how attention is controlled, we have developed a visual search paradigm in which we cue subjects to search for a target on each trial, and measure the event-related potentials (ERPs) elicited by the cue. These cue-elicited ERP components allow us to measure the target representations in both working memory and long-term memory on a trial-by-trial basis. Here we tested the hypothesis that the working memory representation the current target prevents interference from the long-term memories of previous targets. We found that search was slowed when a distractor appeared that had previously elicited large amplitude long-term memory ERPs when it was a target. Our findings demonstrate that our long-term and working memory representations interact to control attention, with working memory representations of the current task set fighting against interference from previously stored long-term memories when these representations are in conflict.

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14:40-15:00 (127)

Speeded Multielement Decision Making As Diffusion In A Hypersphere: Theory And Application To Double-Target Detection. PHILIP L. SMITH, *University of Melbourne*, ELAINE A. CORBETT, *Trinity College Dublin* (Presented by Philip Leigh Smith) — We generalize the circular 2D diffusion model of Smith (2016) to provide a new model of speeded decision-making in multi-element displays. We apply the model to the double-target deficit paradigm of Duncan (1980) in which participants judge whether briefly-presented four-element displays contain one or two digit targets among letter distractors. We model decision making in this task as a 4D evidence accumulation process within a hypersphere whose diameter represents the decision criterion for the task. The model correctly predicts distributions of response times and response accuracy as a function of task difficulty in single-target and double-target versions of the task. The estimated drift rate parameters from the model imply that the mental representation of the decision alternatives, which we term the “decision template” for the task, encodes both configural and local stimulus properties.

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Complex Cognition I

Berlagezaal, Thursday, 13:20-14:40

Chaired by Mirjam Jenny, Max Planck Institute for Human Development, Harding Center for Risk Literacy

13:20-13:40 (128)

Second-Guess: Testing The Specificity Of Error Detection In The Bat-And-Ball Problem. WIM DE NEYS, *CNRS and Paris Descartes University*, MATHIEU RAOELISON, *CNRS & Paris Descartes University*, BENICE BAGO, *Paris Descartes University* (Presented by Wim De Neys) — In the last decade conflict detection studies in the reasoning and decision-making field have suggested that biased reasoners who give an intuitive response that conflicts with logico-mathematical principles can often detect that their answer is questionable. In the present studies we introduced a second guess paradigm to test the nature and specificity of this error or conflict signal. Participants solved the infamous bat-and-ball problem and were allowed to make a second guess after they had entered their answer. Three studies in which we used a range of second guess elicitation methods show that biased reasoners

predominantly give second guesses that are smaller than the intuitively cued heuristic response (“10 cents”). Findings indicate that although biased reasoners do not know the exact correct answer (“5 cents”) they do correctly grasp that the right answer can only be found downstream of the intuitively cued “10 cents” answer. This implies that reasoners are savvy about their errors than traditionally assumed. Implications for the conflict detection, meta-reasoning, and dual process literature are discussed.

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13:40-14:00 (129)

Accumulating Advantages: A New Conceptualization Of Forced Choice Response Time Tasks. DON VAN RAVENZWAAIJ, *University of Groningen*, SCOTT D. BROWN, *University of Newcastle*, ANTHONY MARLEY, *University of Victoria*,



ANDREW HEATHCOTE, *University of Tasmania* (Presented by Don van Ravenzwaaij) — Accumulator models have a relatively long history of application to choice and response time, especially for binary choice. Recent work (Teodorescu & Usher, 2013) suggests accumulator models can be classified as follows: (1) independent race (e.g., LBA); (2) feed-forward input competition (e.g., DDM); (3) response competition (e.g., LCA, MMN). The authors argue that only the third class of models provides a satisfactory account of four types of data typically encountered in forced choice response time tasks. The types of data involve (1) prime congruency; (2) additive versus multiplicative changes to input values; (3) strong versus weak distractors; and (4) Hick's law data. Here we show how drift rates in independent race models can be conceptualized as input competition, both for the simple two-alternative case (e.g., the regular LBA) and for the more complex multi-alternative case. The model that arises from the latter conceptualization is coined the advantage LBA. We show how all four previously mentioned data types are naturally accounted for by the regular LBA (for two-alternative data) and the advantage LBA (for multi-alternative data).

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14:00-14:20 (130)

Quantifying The Benefits Of Modeling Decision Making Over Measuring Speed And Accuracy Alone. TOM STAFFORD, *University of Sheffield*, ANGELO PIRONE, *University of Peking* (Presented by Tom Stafford) — Across diverse subfields experimentalists collect reaction time and accuracy data. Inter-subject and inter-group speed-accuracy trade-offs (SATO) are a well-known possibility which are often inadequately addressed. Many experiments focus on a single variable (e.g. psychophysics paradigms analysing accuracy alone), or involve a post hoc analytic correction (e.g. dividing accuracy by reaction time). Models of

decision making, such as the drift diffusion model (DDM), provide a principled account of the decision making process, allowing the recovery of SATO-unconfounded parameters from observed variables. For plausible parameters of a typical between-groups experiment we simulate experimental data, for both real and null group differences, and for both systematic and null SATOs, and fit the DDM. This exercise allows us to make a number of concrete recommendations for experimentalists: we show, in terms of reduction of required sample size, how decision modelling allows more efficient data collection for set statistical power; we confirm and depict the non-linear speed-accuracy relation; we show the relative sensitivity of accuracy and reaction time for a typical experiment.

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14:00-14:40 (131)

Eliciting Low Probability Risk Estimates: Frequency Formats Vs. Rates. MIRJAM ANNINA JENNY and STEFAN MICHAEL HERZOG, *Max Planck Institute for Human Development*, DAN GOLDSTEIN and JAKE HOFMAN, *Microsoft Research* (Presented by Mirjam Jenny) — Risk estimates vary substantially based on response formats (Fischhoff & MacGregor 1983; Lichtenstein, 1978), leaving open an important question: What is the best way to elicit small (< 1%) probabilities from laypeople? We explore which response formats produce the most reliable estimates through a 528 person experiment. We find that participants assigned to respond in frequency formats (absolute number affected, 1 in X affected, or X in Y affected) outperformed both those assigned to and those who opted into rate formats (decimal proportion, percentage, or probability). Frequency formats were in addition most preferred, further suggesting their use in elicitation.

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Discourse Processes

Effectenbeursaal, Thursday, 13:20-14:20

Chaired by Brenda Hannon, Texas A&M University - Kingsville

13:20-13:40 (132)

How We Understand Time As Motion. ENRIQUE GARCIA-MARCO, *Instituto Universitario de Neurociencia*, DAVID BELTRÁN, *Instituto Universitario de Neurociencia*, IUNE, MANUEL DE VEGA, *Instituto Universitario de Neurociencia* (Presented by Enrique García-Marco) — We demonstrate that spatial perspective taking occurs incidentally during ordinary comprehension, relying on previous knowledge and on the available linguistic markers (García-Marco, 2016; de Vega, 2015). Using sentences with deictic verbs such as come and go, we found that readers rely on a geographical perspective. Specifically, that ERP's N400 component and behavioural measures (RT and coherence judgements), were sensitive to coherence with the story protagonists' or the reader's own geographical perspective. For instance, [coming to a distant place] enhanced n400 when compared to [coming to close place]. On the other hand, metaphors of time as grounded on spatial representation have been largely described (Jackendoff, 1983; Santiago, 2007; Casasanto, 2008). We have shown that deictic verbs can induce temporal perspective indexed by ERP and behavioural measures and with an extended variety of stimuli. For instance, [June is Coming] was considered less coherent than compared to [April is Coming]

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13:40-14:00 (133)

Does Narration Improve Reading Processes? Eye-Movement Behavior In Higher-Education Students With And Without Dyslexia. HAYLEY WEIGELT-MAROM, YORAM ESHET-ALKALAI, and GAL BEN-YEHUDAH, *The Open University of Israel* (Presented by Gal Ben-Yehudah) — Adults with developmental dyslexia report that listening to narrated text helps them to overcome decoding difficulties and improves comprehension. Yet, the Cognitive Load theory claims that using two sensory channels (visual, auditory) simultaneously may impair the quality of information processing. Using eye-tracking technology, we examined whether reading occurs while listening to text narration and how it influences comprehension of dyslexic adults with and without attentional disorders (ADHD). The participants were 57 higher-education students: 27 with dyslexia (of them 12 with ADHD) and 30 controls. Two expository texts were presented: with and without narration, followed by comprehension questions. Results showed that during narration all of the participants read the text, though each group had different patterns of eye-movements. Surprisingly, in the dyslexia-only group narration did not significantly improve text comprehension; while in the dyslexia+ADHD group narration reduced comprehension. These findings question the benefits of simultaneous use of multiple channels for reading.

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14:00-14:20 (134)

Home Literacy Activities Influence Comprehension Processes In Preschoolers. BRENDA HANNON, *Texas A&M University-Kingsville* (Presented by Brenda Hannon) — This study shows that home literacy activities positively influence kindergarten children's higher-level comprehension processes, namely text processing and knowledge integration. Measures assessing the literacy skills of 122 kindergarten children were administered and their performances on these measures were correlated with their home literacy activities, which were assessed via a parental questionnaire. The results revealed that home literacy activities, especially question

asking during parent-child shared storybook reading, positively influenced text processing and knowledge integration, which are two strong predictors of language and reading comprehension. The results also show that although previous research suggests the influences that the home literacy environment exerts on language comprehension is direct (Senechal & LeFevre, 2002), the influences that the home literacy activities exert on language comprehension are actually indirect, mediated via the higher-level comprehension processes (home literacy activities → comprehension processes → language comprehension).

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Meaning/Semantics

Graanbeurszaal, Thursday, 13:20-15:20

Chaired by Olessia Jouravlev, *Carleton University; Massachusetts Institute of Technology*

13:20-13:40 (135)

(Withdrawn) P-Curving The Action-Sentence Compatibility Effect. STEPHEN D. GOLDINGER, *Arizona State University*, MEGAN H. PAPESH, *Louisiana State University* (Presented by Stephen D Goldinger) — The *action-sentence compatibility effect* (ACE) is a hallmark finding in embodied cognition, implicating the motor system in language comprehension whenever linguistic content overlaps with intended movements or response effectors. It has been 15 years since Glenberg and Kaschak (2002) reported the ACE, and numerous studies have seemingly replicated and extended their findings. García and Ibáñez (2016) recently reviewed 108 ACE experiments, attempting to reconcile a noisy literature and develop a unifying theory. Before the literature can be synthesized, however, it is imperative to assess whether ACE effects are truly reliable. In the present study, we conducted separate p-curve analyses on 38 movement-based ACE experiments, and 20 effector-based ACE experiments. Movement ACE effects are spurious: The p-curve is exactly as expected from chance. Although effector-based ACE effects appear more robust, we note numerous shortcomings in reported studies, including key observations regarding experimental designs and analyses. Indeed, the entire ACE literature appears problematic, requiring closer scrutiny than p-curve analyses can provide.

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13:40-14:00 (136)

Behavioral And Neural Correlates Of Pain-Related Language. ELEONORA BORELLI, FRANCESCA BENUZZI, FAUSTA LUI, CARLO A. PORRO, and CRISTINA CACCIARI, *University of Modena and Reggio Emilia* (Presented by Eleonora Borelli) — Pain perception is modulated by cognitive variables and its neural counterpart may be activated by innocuous stimuli when associated with pain. Although pain is ultimately defined by verbal reports, only few studies investigated the effects of pain-related words on pain perception. Moreover, experiences such as social loss/rejection/exclusion are often described as 'painful', leading researchers to investigate if they may activate pain-related neural networks. We used words associated with physical and social pain to assess: (1) whether they modulate the aversive response in an affective compatibility paradigm differently from negative, pain-unrelated words, and (2) to what extent their reading triggers pain-related areas once the negative valence is taken into account. Our results suggest that especially social pain-related words specifically modulate the affective compatibility effect. In addition, a fMRI study showed that pain word comprehension activates areas involved in pain-related emotional processing.

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14:00-14:20 (137)

Using Semantic Memory Theory To Examine The Psychological Database. RANDALL K. JAMIESON, *University of Manitoba*, HARINDER AUJLA, *University of Winnipeg*, MATTHEW T. COOK, *University of Manitoba* (Presented by Randall Jamieson) — For the past 50+ years, psychologists have deduced formal expressions of how people perceive, learn, remember, think, and know. That effort has led to impressive progress for understanding human cognition. However, the theories are rarely applied outside the aim of theoretical debate. We present a semantic search engine that leverages computational expressions of human cognition to match documents by meaning. We apply the tool to documents from the psychological record. The method offers a new and informed method to search a database and deduce its structure.

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14:20-14:40 (138)

Skilled Readers' Sensitivity To Meaningful Regularities In English Writing. ANASTASIA ULICHEVA and HANNAH HARVEY, *Royal Holloway University of London*, MARK ARONOFF, *Stony Brook University*, KATHLEEN RASTLE, *Royal Holloway, University of London* (Presented by Anastasia Ulicheva) — The relationship between spelling and meaning in alphabetic writing systems is less understood than that between spelling and sound. We present a computational analysis of English writing in which we develop new constructs to describe the understudied spelling-to-meaning correspondence. Diagnosticity captures meaningful information in a spelling, whereas specificity estimates the dispersion of meaning across different spellings for a particular sound. Using these constructs, we demonstrate that suffix spellings have become *reserved* for particular functions. Using the eye tracking during sentence reading paradigm, we then present results of a new experiment showing that this form of regularity between spelling and meaning influences the behaviour of skilled readers. Further, the degree of this behavioural sensitivity mirrors the strength of spelling-to-meaning regularities in the writing system. We close by arguing that English spelling may have become fractionated in such a way that the high degree of spelling-sound inconsistency maximises the transmission of meaningful information.

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14:40-15:00 (139)

Differential Modulation Of The N400 By Low- And High-Creative Individuals Supports The Role Of Semantic Memory In Creative Processes. DAVID ANAKI, *Bar-Ilan University*, YOED KENETT, *University of Pennsylvania*, MIRIAM FAUST,



Bar-Ilan University (Presented by David Anaki) — The associative theory of creativity posits that high creative individuals have a flexible semantic memory structure that enables novel semantic combinations. In an ERP study, we examined the effect of semantic distance on low- and high-creative (LC/HC) individuals. Participants were presented with word-pairs and judged whether the pairs were related. Pairs' relatedness was operationalized as the number of steps traversed from prime to target word in a semantic network (range 1-15 steps). Findings showed that semantic distance modulated the N400 amplitude, which became more negative as distance grew. In addition, HC individuals were more sensitive to semantic distance, indicated by the gradual enhancement of N400 negativity, while for the LC group, N400 negativity was undifferentiated across most of the path length levels. The results support the notion of semantic memory structure differences between LC and HC individuals, and underscore the importance of controlled retrieval from memory in creative processes.
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15:00-15:20 (140)

The Nature Of The Pragmatic (Communicative) Impairment In Autism Spectrum Disorders (ASD). OLESSIA JOURAVLEV, *Carleton University and Massachusetts Institute of Technology*,

ZACHARY MINEROFF, *Massachusetts Institute of Technology*, LEON BERGEN, *Stanford University*, EDWARD GIBSON, *Massachusetts Institute of Technology*, EVELINA FEDORENKO, *Massachusetts Institute of Technology, Harvard Medical School, Massachusetts General Hospital* (Presented by Olessia Jouravlev) — Individuals with ASD are often said to be impaired in pragmatic language processing. Pragmatic language, however, encompasses many types of pragmatic inferences. In Study 1, using a battery of 20 tasks, across 11 types of pragmatic phenomena, we explored how they pattern in the typical population. To this end, we ran the battery of pragmatic language, along with tests of non-pragmatic abilities and psychiatric phenotypes, in the sample of 520 MTurkers. Four latent factors emerged from this data: (a) understanding of social norms, (b) of world knowledge, (c) of prosodic stress, and (d) of the role of context. In Study 2, we explored which kinds of pragmatic inferences might pose problems for individuals with ASD. We found no group differences for tasks loading highly on factors related to understanding of prosody and role of context. Understanding of social norms and world knowledge, on the other hand, was significantly impaired in the patient group. This research sheds light on the structure of mental processes relevant to communication and indicates that there are certain types of pragmatic inferences that are spared in individuals with ASD.
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Memory I

Veilingzaal, Thursday, 13:20-15:00

Chaired by Ashleigh M. Maxcey, Ohio State University

13:20-13:40 (141)

Memory Processes Underlying Long-Term Semantic Priming. DAN J. WOLTZ, *University of Utah*, CHRISTOPHER A. WAS, *Kent State University* (Presented by Christopher A. Was) — Early models of cognition suggested a single mechanism to explain priming at short and long lags. Later models proposed that different mechanism are necessary to account for different duration of priming effects. Two alternatives explanations of long-term semantic priming effects have been proposed in the extant literature. The first explanation is that long-term semantic priming effects rely upon the incremental strengthening of abstract semantic memory representations. The second explanation is that long-term priming is the result of memory for prior cognitive operations. In two experiments, we used different semantic content – word meaning vs. category membership – to investigate the mechanisms accountable for long-term semantic priming. Evidence from the two experiments suggests that long-term semantic priming effects are due to different memory processes for different semantic content. Long-term semantic priming of word meanings was dependent on semantic memory and persistent priming of category membership was dependent on memory for prior cognitive operations.
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13:40-14:00 (142)

Prioritisation And Temporal Contiguity In Free Recall. ALICE MASON, OLGA CLARKE, and SIMON FARRELL, *University of Western Australia* (Presented by Alice Mason) — Previous work has shown that people are able to prioritise memory for particular, important information (Castel et al., 2002). Here, we ask how such behaviour can be accounted for in contemporary models of free recall. In particular, we focus on situations where information to be prioritised is scattered across a list. This is challenging for models of free recall which—based on data from free recall

studies—assume temporal contiguity: people are more likely to follow recall of one piece of information by other information that was seen or heard nearby in time. Participants were instructed to recall words paired with point values under two conditions, either selective recall—where participants were to focus on recalling words paired with high values—or standard free recall. Even when high-priority information was not temporally clustered in the list, participants still recalled according to temporal contiguity. This suggests that temporal contiguity is a “core” property of verbal free recall. Simulation results are shown to suggest how prioritisation might be accomplished in models of free recall.
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14:00-14:20 (143)

Benefits And Drawbacks Of Repeated Part-List Cueing. LEONEL GARCIA-MARQUES and PEDRO MARQUES, *Universidade de Lisboa*, ANA LAPA, *Universidade de Lisboa*, LUDMILA NUNES, *Purdue University* (Presented by Leonel Garcia-Marques) — Divergent accounts have been proposed to explain the effects of part-list cueing on the recall of noncued items. Here, we introduce a new paradigm that may contribute to further test these alternative accounts of this effect and to explore its limits. In our paradigm a list of unrelated, mid-frequency words are presented for study to all Ps once. At repeated testing, in the first 4 tests, Ps either free recall the presented words, receive always the same set of words or received different sets of words (the words are always drawn from the study list) as cues. In one experiment, all words are presented as cues and in another some words are never presented as cues across all conditions. In the last test, all Ps recall the study words with no cues. A disruption of strategy account would predict that performance to be more impaired when cueing is less predictable (different cues condition) whereas occlusion accounts would predict that repeatedly receiving the same cues across tests would increase occlusion. Initial results

favor the former account. Furthermore in 5th test (without par-list cues), we propose a parallel between part-list cueing and retrieval inhibition paradigms for the set of words never cued.

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14:20-14:40 (144)

Examining The Role Of Inter-Item Associations In Rehearsal, Free Recall, And Cued Recall. GEOFF WARD, *University of Essex*, LYDIA TAN, *City, University of London* (Presented by Geoff Ward) — Three experiments examined the role of inter-item associations during the study, rehearsal, and recall of words in free and cued recall. Of particular interest was whether rehearsal was underpinned by specialist mechanisms (as suggested by classic short-term and working memory accounts) or whether the same mechanisms underpin both rehearsal and recall. In Experiment 1, participants performed free recall of categorised and uncategorised lists of 32 words (8x4 lists, i.e., 8 categories x 4 exemplars) using the overt free recall method. In Experiments 2 and 3, participants performed free recall and category cued recall with overt rehearsal using five different types of lists: 3x8, 6x8, 8x8, 8x6, 8x3, thereby varying the number of categories, exemplars and list lengths. Free recall, cued recall and rehearsals were similarly affected by

serial position effects and the specificity of inter-item associations, suggesting that rehearsal and recall might use common memory mechanisms.

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14:40-15:00 (145)

The Ubiquity Of Forgetting During Learning. ASHLEIGH M. MAXCEY, *Ohio State University* (Presented by Ashleigh M. Maxcey) — Forgetting has been shown to be a negative consequence of accessing memories, as in recognition-induced forgetting of pictures. Here I sought to examine the ubiquity of this forgetting effect by asking whether recognition-induced forgetting occurs for words, and whether recognition-induced forgetting requires explicit recognition? In the first experiment, I found that recognition-induced forgetting occurs for words, indicating that both verbal and visual long-term memories are prone to this effect. In the second experiment, I found that recognition-induced forgetting does not require explicit recognition practice, rather simply presenting a subset of the images for further study (i.e., restudy) leads to forgetting of related items. I will discuss the implications of this ubiquitous forgetting, including the likelihood that it is occurring in other paradigms, and how these findings impact models of forgetting.

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SYMPOSIUM II: Tackling the Confidence Crisis with Statistical Scrutiny, Verifiable Credibility, and Radical Transparency Effectenbeurszaal, Thursday, 14:40-17:00

Chaired by Balazs Aczel, ELTE Eotvos Lorand University

(21)

Strengthening the Bond Between Theory and Evidence. SUSANN FIEDLER, *Max Planck Institute For Research On Collective Goods* (Presented by Susann Fiedler) — The replication crisis in psychology has led to a fruitful discussion about common research practices and research institutions. We present a set of measures that aim at making science more efficient and research results more reliable by fostering a strategic alignment and the interlocking of all parts of the research process. The recommended changes address individuals as well as institutions and concern theory, empirical methodology, and accumulation of evidence. The ideas put forward in this talk aim to improve the foundation for efficient research by fostering: (a) precise theory specification, critical theory testing, and theory revision; (b) a culture of openness to evidence and subsequent theory revision and (c) the establishment of interconnected databases for theories and empirical results, which are continuously updated in a decentralized manner.

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(22)

Taking Research Credibility to the Next Level, an Initiative for Verifiable Credibility. ZOLTAN KEKECS, *Lund University*, BALAZS ACZEL, *ELTE Eötvös Loránd University*, BENCE PALFI, *University of Sussex*, BARNABAS SZASZI, PETER SZECSEI, MARK ZRUBKA, and MARTON KOVACS, *ELTE Eötvös Loránd University* (Presented by Zoltan Kekecs) — In the midst of the credibility crisis, scientists and clinicians are looking for ways to discern trustworthy from untrustworthy studies, and guidance on how to perform good research. Recent initiatives offer strategies and solutions to tackle some of the issues related to trustworthiness of research. However, these approaches still leave us with significant blind spots. That is, the study process and data collection themselves are still performed in the dark, leaving room

for sloppy protocol execution, unreported protocol deviations, questionable research practices, or outright fraud. We need to establish best-practice methodologies that would empower researchers to conduct highly credible studies through verifiable trustworthiness. A combination of techniques will be described that can ensure as-intended protocol delivery, fully transparent data collection process, and scientific inference that are acceptable to the majority of the stakeholders on the field. These approaches are now being crash-tested in a large-scale multi-lab study.

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(23)

Researcher Degrees of Freedom. JELTE WICHERTS, *Tilburg University* (Presented by Jelte Wicherts) — The designing, collecting, analyzing, and reporting of psychological studies entail many choices that are often arbitrary. The opportunistic use of these so-called researcher degrees of freedom aimed at obtaining statistically significant results is problematic because it enhances the chances of false positive results and may inflate effect size estimates. In this talk, I present an extensive list of 34 degrees of freedom that researchers have in formulating hypotheses, and in designing, running, analyzing, and reporting of psychological research. The list can be used in research methods education, and as a checklist to assess the quality of preregistrations and to determine the potential for bias due to (arbitrary) choices in unregistered studies.

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(24)

Assessing the Properties of Psychological Research from Collections of Results. BALAZS ACZEL, BARNABAS SZECSEI, and MARTON KOVACS, *ELTE Eötvös Loránd University*, BENCE PALFI, *University of Sussex* (Presented by Balazs Aczel) — If psychological research is what psychological researchers do then



an obvious way to learn about it is to examine what researchers did in the past. It is thought that collections of statistical findings extracted from published articles provide representative samples of many decades of publication and research practices. It is also assumed that descriptive properties of the field (such as the *typical sample sizes* or the *magnitude of the measured effects*) and its biases (such as miscalculations, overestimations or publication biases) are reflected in these giant data sets. Nevertheless, there are recurring questions regarding the appropriateness of these collections. In our talk, we will compare text-mined results with different estimations and demonstrate their possibilities and limitations regarding their ability to describe the properties of the field.

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(25)

The P Curve Is Not What You Think It Is. RICHARD MOREY, *Cardiff University* (Presented by Richard Morey) — As the psychological scientific community has become aware of the methodological problems that plague the field, a class of meta-analytic statistical methods have arisen that attempt to 1) detect various sources of bias, and 2) correct for these sources of bias. One of the methods is “p curve” or “p uniform” (Simonsohn, Nelson, & Simmons. 2014; van Assen, van Aert, & Wicherts, 2015), which use sets of p values gleaned from the literature to assess the “evidential value” of that set. I will show that the p curve procedure does not do what is claimed by its users and proponents, furthermore, due to the way it was derived, p curve can lead to dramatically mistaken inferences.

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(26)

The Case for Radical Transparency in Statistical Reporting. ERIC-JAN WAGENMAKERS, *University of Amsterdam* (Presented by Eric-Jan Wagenmakers) — Most researchers are new to radical transparency in statistical reporting. Radical

transparency means that data and analysis code are provided in a public repository, such that others can re-analyze and possibly critique the results; it means that different statistical models are explored to probe the robustness of the conclusions; it also means that statistical reporting is inclusive, in the sense that the same question is examined using multiple statistical paradigms that may yield conflicting conclusions; finally, radical transparency means that all analysis efforts are reported openly and comprehensively. In particular, analyses that produce unwanted outcomes are fully acknowledged. In order to encourage such radical transparency, it is essential that publication decisions do not hinge on the outcome, but depend solely on the scientific quality of the question and the rigor of the experimental and statistical methodology. Real-life examples will demonstrate the theoretical and pragmatic advantages of the proposed approach.

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(27)

Principles for Teaching and Using Bayes Factors. ZOLTAN DIENES, *University of Sussex* (Presented by Zoltan Dienes) — Given credibility that something exists, one can ask “how much?”; given doubt whether something exists, one can ask “does it exist?” The latter case is one where Bayes factors are useful. Sometimes estimation is all that is needed, but then one has to be careful to not slip into treating an estimate as evidence against an existential claim (or into treating Bayesian estimation as showing that something does exist). Bayes factors address the existential claim. To be useful to a field, the way H1 and H0 are modeled in calculating a Bayes factor should be based on publicly available reasons for their relevance to the scientific context (in that way they are objective). Then one makes a judgment that the representation is adequate for the scientific context (in that way they are subjective). This approach, walking the line between objective and subjective, encourages relating theory to data.

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Problem Solving

Berlagezaal, Thursday, 15:00-16:40

Chaired by Rakefet Ackerman, Technion—Israel Institute of Technology

15:00-15:20 (146)

Insight Problem Solving As A Destruction, Not A Construction. ILYA YU VLADIMIROV, TATIANA N. ERMAKOVA, IGOR N. MAKAROV, POLINA N. MARKINA, and ANASTASIA V. SMIRNITSKAYA, *Demidov Yaroslavl State University* (Presented by Ilya Yu. Vladimirov) — The paper presents a series of studies showing that the key mechanism in insight problem solving is overcoming an impasse. This process involves the destruction of initial incomplete problem representation which hinders the solving process. It was shown that to destroy the representation provoking the state of an impasse, it is necessary to relax the control resources that keep such representation in working memory. In two experimental series it was shown that interrupting the solving process at the stage of an impasse with various tasks increases the efficiency of the insight problem solving. The third series, which involved the registration of subjective and procedural impasses emergences in solving process, confirmed a cyclic nature of overcoming the impasse (incorrect representation can be formed and destroyed more than once). The fourth psychophysiological series, used the dual task and ERP paradigms (secondary tasks were used as triggers for the ERP) showed a lower level of control functions loading when the insight problem was successfully

solved in comparison with the non-insight task. The totality of the results allows us to talk about overcoming the impasse as a key step in the insight problem solving. RSF 16-18-10030.

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15:20-15:40 (147)

Judgments Of Solvability In An Anagram Task. VALERIE A. THOMPSON, *University of Saskatchewan*, SASCHA TOPOLINSKI, *University of Cologne*, CARLY KING, JAMES MILLS, and NITASHA SALIM, *University of Saskatchewan* (Presented by Valerie Thompson) — Judgments of Solvability (JOS) are quick, initial impressions regarding whether a problem is solvable or not. We know little about how people make these judgments or about how reliable they are. We proposed that JOS, like other metacognitive judgments are cue-based and that the reliability of JOS would vary with the diagnosticity of the cues. In four experiments, people were shown 5-letter anagrams (e.g., droab) for a brief period (.5 sec) and then asked for a JOS. They also indicated whether or not they had already solved the problem. They were then allowed 30 sec to solve each of the anagrams. Anagrams varied according to their pronouncability (droab vs bdoar); the solution words varied according to terms of correspondence to English spelling and whether they were, indeed,

solvable. As predicted, pronounceable anagrams were judged to be more solvable (Topolinski, 2016), but were in fact, more difficult to solve (Novick & Sherman, 2003). Surprisingly, people were also able to discriminate between solvable and unsolvable anagrams, despite controlling the bi-gram frequency of the anagrams. Thus, JOS, like other metacognitive judgments, are based on cues that can be misleading (pronounceability) or useful (solvability).

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15:40-16:00 (148)

Is Intuitive Knowledge Available To Scientific Reasoning Processes Before Formal Knowledge? AIDAN FEENEY, *Queen's University Belfast*, EOIN TRAVERS, *University College London* (Presented by Aidan Feeney) — According to an explanatory co-existence hypothesis, people hold competing intuitive and formal understandings of a range of scientific phenomena. Evidence for this hypothesis comes from reaction time studies showing that people are slower to verify claims which are consistent with one type of explanation but not the other. It is not clear, however, if both types of knowledge are retrieved at the same time during reasoning, or if intuitive knowledge is recruited quickly, and later overridden by formal knowledge. We applied mouse tracking to two tasks where these kinds of knowledge conflict, and found that both fast initial hand movements and ultimate responses were driven by a combination of both kinds of knowledge, that the influence of both kinds of knowledge on behaviour emerged at similar points in time, and that scientific knowledge interferes with intuitive reasoning just as much as intuitive knowledge interferes with scientific reasoning. These results are inconsistent with dual process accounts for explanatory co-existence, and suggest that both intuitive and scientific knowledge may be theoretical in nature.

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16:00-16:20 (149)

Analogies May Not Be As Cognitively Demanding As Previously Assumed: Evidence From A Dual-Task Paradigm With Gradually Increasing Cognitive Load. PENKA HRISTOVA and KATERINA PALIAKOVA, *New Bulgarian University* (Presented by Penka Hristova) — Analogical reasoning is considered to depend on executive functions, including working memory (Holyoak, 2012). We examined the role of the central executive in solving

pictorial cross-mapping problems while generating random digits ranging 1-3 for one group of subjects, and 1-9 for another. We induced a relational mind-set through Raven's Matrices in order to boost performance on the analogy task. We used an index of informational redundancy (R) and a self-report measure to assess the effect of the concurrent task (Towse, 1998). As expected, subjects perceived the task to be harder with 9 alternatives ($t(50) = -2.67$, $p = .01$) and distributed responses less equally as measured by R ($t(38) = -4.3$, $p < .001$). Surprisingly, although the manipulation of working-memory load was successful, no difference was observed in the number of relational responses to the cross-mapping task, suggesting that analogies may not be as cognitively demanding. Moreover, neither the relational nor the superficial choices differed reliably across conditions, indicating that the same mode of thinking was used. This challenges the finding that relational reasoning depends on working memory based on a comparison of an active to an inactive group (Waltz et al., 2000).

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16:20-16:40 (150)

Judgement Of Solvability Regarding Non-Verbal Problems. TIRZA LAUTERMAN and RAKEFET ACKERMAN, *Technion-Israel Institute of Technology* (Presented by Rakefet Ackerman) — Meta-Reasoning refers to the processes that monitor problem-solving activities and regulate effort investment. Monitoring begins with an initial Judgment of Solvability (iJOS)—solver's first impression whether the problem is solvable or unsolvable. The scarce research of iJOS neglected the non-verbal problems. We used Raven Matrices to study iJOS in non-verbal problems and its correlation with effort investment in solving attempts. Unsolvability matrices were generated by switching locations of elements in original Raven matrices, to breakdown the rules while keeping the original components. Participants gave quick (4s) iJOS for all matrices and afterwards solved them. Participants discriminated to some extent between solvable and unsolvable problems after a quick glance. However, discrimination was more reliable for matrices built of namable shapes (e.g., rectangular, arrow). iJOS predicted solving times—addressing a gap in Meta-Reasoning research. This study highlights the role of non-verbal factors in Meta-Reasoning processes and their role in directing effort investment.

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Audiovisual Language Processing Veilingzaal, Thursday, 15:20-17:00 Chaired by Milene Bonte, Maastricht University

15:20-15:40 (151)

Audiovisual Integration Of Print And Speech In Preschool Children: Insights From A Multimodal Neuroimaging Study. SILVIA BREM, *University of Zurich*, ILIANA I. KARIPIDIS and GEORGETTE PLEISCH, *University Hospital of Psychiatry Zurich* (Presented by Silvia Brem) (Sponsored by Silvia Brem) — Learning the correspondences of speech sounds and letters represents a core problem of poor reading children and especially of children with developmental dyslexia. Following a short training, in which preschool children learned associations between natural speech sounds and artificial letters, we tracked the development of audiovisual integration processes with multimodal neuroimaging. The ERP and BOLD data not only revealed differences in processing congruent and incongruent audiovisual information after the training in the developing brain but these differences were also modulated by children's learning rate. Moreover, performance in

the artificial letter-speech sound training and the corresponding brain activity may provide valuable predictors of children's future reading outcomes.

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15:40-16:00 (152)

Adult Dyslexic Readers Benefit Less From Visual Input During Audiovisual Speech Processing: fMRI Evidence. ANA ALVES FRANCISCO, *Albert Einstein College of Medicine*, ATSUKO TAKASHIMA, *Donders Institute for Brain, Cognition, and Behaviour*, JAMES M. MCQUEEN, *Donders Institute for Brain, Cognition, and Behaviour*; *Max Planck Institute for Psycholinguistics*, MARK VAN DEN BUNT, *Radboud University*, ALEXANDRA JESSE, *University of Massachusetts Amherst*, MARGRIET A. GROEN, *Radboud University* (Presented by Ana Alves Francisco) — The aim of this fMRI study was to



investigate whether typical and dyslexic adult readers differed in the neural correlates of audiovisual speech processing. We tested for BOLD activity differences between the groups as they processed written and spoken stimuli. When processing written stimuli, dyslexic readers showed reduced activity in the supramarginal gyrus, but only when they processed strings of consonants. During the speech perception tasks, dyslexic readers were slower than typical readers in the visual speech condition. Additionally, dyslexic readers showed reduced neural activation in the auditory, the visual, and the audiovisual conditions. The groups also differed in terms of superadditivity, with dyslexic readers showing decreased neural activation in the regions of interest. An additional analysis showed diminished activation for the dyslexic readers in a fusiform gyrus cluster. Our results suggest the presence of an audiovisual speech deficit in dyslexia. This deficit might be explained by difficulties in processing the unisensory components of audiovisual speech, more specifically, dyslexic readers may benefit less from visual information during audiovisual speech processing than typical readers.

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16:00-16:20 (153)

Do You See What I'm Saying? Audiovisual Learning And Its Importance For Reading. MARGRIET A. GROEN, *Radboud University*, MILENE L. BONTE, *Maastricht University* (Presented by Margriet A. Groen) — Learning to read involves the gradual formation of new neural associations between visual and spoken language. Studying this neural convergence in individuals with a developmental reading disorder (dyslexia) provides a unique window onto experience-dependent brain plasticity. Behavioral and neuroimaging studies have reported deficient processing of letter-sound associations as well as deficient speechreading skills in struggling readers, but the origins of these deficits remain debated. Traditionally being studied in fields as diverse as educational psychology and speech perception, in this talk, we will present a new perspective on audiovisual learning and its relevance to reading. This will set the scene for four talks in which recent efforts using innovative learning paradigms in combination with cognitive neuroscience methods to address the dynamic and individually variable relationship between audiovisual learning and reading success, will be presented.

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16:20-16:40 (154)

Artificial Letter-Sound Mappings To Study Executive Functions And Associative Learning. GORKA FRAGA GONZALEZ, *University of Amsterdam* (Presented by Gorka Fraga Gonzalez)

— Establishing letter-speech sound associations is an essential cognitive step in the development of fluent reading. Indeed, behavioral and neuroscientific evidence suggests that a failure to efficiently integrate letters and speech sounds may be a key deficit reading impairments in dyslexia. Besides a more widely studied phonological component, the cognitive mechanisms related to associative learning may play a role in dyslexics' letter-speech sound binding deficit. These mechanisms pertain to bottom-up processes involved in implicit learning as well as top-down processes related to explicit learning. The latter include the executive functions of error monitoring and feedback processing. Our current project investigates these mechanisms using a feedback learning task in which new symbols become associated with speech sounds. I will discuss performance and electrophysiological (neural and heart rate) responses that can be derived from this task to reflect different stages of learning. These data could be used to develop a dynamic assessment that measures the learnability of letter-speech sound associations to detect reading difficulties and responsiveness to training.

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16:40-17:00 (155)

Audiovisual Plasticity Recalibrates Speech Representations In Auditory Cortex. MILENE BONTE and LINDA ROMANOVSKA, *Maastricht University*, JOAO CORREIA, *Maastricht University and Basque Center of Brain Cognition and Language*, JEAN VROOMEN and MIRJAM KEETELS, *Tilburg University*, ELIA FORMISANO, *Maastricht University* (Presented by Milene Bonte) — Learning to read requires the formation of efficient neural associations between written and spoken language. Whether these associations influence the auditory cortical representation of speech remains unknown. In this talk we will illustrate reading-induced audiovisual plasticity by combining multivariate functional MRI analysis and a newly-developed 'text-based recalibration' paradigm. In this paradigm, the pairing of visual text and ambiguous speech sounds shifts (i.e. recalibrates) the perceptual interpretation of the ambiguous sounds in subsequent auditory-only trials. Our results show that it is possible to retrieve the text-induced perceptual interpretation from fMRI activity patterns in the auditory cortex. Furthermore, this short-term audiovisual learning involved regions in the bilateral inferior parietal lobe. Our findings demonstrate that culturally acquired associations between written and spoken language recalibrate auditory cortical representations of speech in experienced readers. Finally, we will present ongoing fMRI work examining developmental changes in this plasticity in children with varying reading skills including dyslexic, typical and excellent readers.

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Sensation and Perception

Administratiezaal, Thursday, 15:20-17:00

Chaired by Leah Fostick, Ariel University

15:20-15:40 (156)

Internal And External Signal Processing In Patients With Panic Disorder: An Event-Related Potential (ERP) Study. CHRISTIAN VALT and DOROTHEA HUBER, *International Psychoanalytic University Berlin*, INGIRD ERHARDT, *Technical University Munich*, BIRGIT STÜRMER, *International Psychoanalytic University Berlin* (Presented by Christian Valt) (Sponsored by Birgit Stürmer) — Self-absorption describes a pathological tendency towards the internal mental world (internalization) that often conflicts with the accurate monitoring of the external

world. We conducted an event-related potential (ERP) experiment in the context of performance monitoring to analyse whether a pathological focus towards internal signals hinders the accurate processing of external signals. Patients with panic disorder and healthy control participants performed a response-choice task where informative or uninformative feedback followed each response. Contrary to the expectation of withdrawal from the external world, patients showed enhanced processing of both internal and external signals, as indexed by the larger error-related negativity (Ne/ERN) and vertex positive potential (VPP),

respectively. These results call for a reinterpretation of the concept of self-absorption, where internalization does not distract from the external world, and offer a broader perspective on the functional deficits in panic disorder.

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15:40-16:00 (157)

Does Social Experience Modulate The Human Mirror Neuron System? An EEG Study. VICTORIA EA. BRUNSDON, AIDEN CLARK, and HEATHER FERGUSON, *University of Kent* (Presented by Victoria E. A. Brunson) — The human mirror neuron system (hMNS) has an important role in social interactions as it helps us to understand other people's actions and intentions. We examined how shared social experiences shape the activation of the hMNS using mu suppression as an EEG marker for the hMNS. A pair of participants completed an action observation task at the same time. In this task, participants watched 3s video clips that were either social or non-social stimuli. Crucially, participants saw a cue before each video to indicate that they could both see the same video (shared condition), or a cue to indicate that only one of them could see the video (non-shared condition). We examined whether there was an increase in hMNS activity when the social stimuli were shared as compared to not shared with the other person, and whether this effect was absent for the non-social stimuli.

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16:00-16:20 (158)

The Leuven Embedded Figures Test (L-EFT): Measuring Perception, Intelligence Or Executive Function? HANNE HUYGELIER, *University of Leuven*, REBECCA CHAMBERLAIN, *Goldsmiths University of London*, RUTH VAN DER HALLEN, *Erasmus University Rotterdam*, LEE DE-WIT, *University College London*, JOHAN WAGEMANS, *University of Leuven* (Presented by Johan Wagemans) — Performance on the Embedded Figures Test (EFT) has been interpreted as a reflection of local/global perceptual style, weak central coherence and/or field independence, as well as a measure of general intelligence and executive function. In order to clarify the construct validity, we correlated performance on the newly developed Leuven Embedded Figures Test (L-EFT), a computerised matching-to-sample EFT with a well-controlled stimulus set, with measures of general intelligence, executive functions and estimates of local/global perceptual styles, as well as with the original Group EFT, in three studies with relatively large samples ($N = 62, 132, 167$ participants). In general, performance on the L-EFT did not correlate strongly with estimates of local/global perceptual style, intelligence or executive functions. In addition, performance on the L-EFT correlated only moderately with the original Group EFT, which was, in turn, impacted by individual differences in memory span to a greater extent than the

L-EFT. In sum, these results suggest that the L-EFT reflects a more narrow construct of disembedding, instead of a general perceptual or cognitive style/ability.

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16:20-16:40 (159)

Pupil Size Changes As Embodied Attentional Mechanism. ANKE HUCKAUF, *Ulm University* (Presented by Anke Huckauf) — Pupil size changes which can be perceived in fact-to-face interaction seem to be an important mechanism for human-human interaction. There are many findings indicating that affective and cognitive processes are reflected in pupil size changes. In another line of research it is also known that, at least for viewing at close distances, pupil size changes are closely connected to accommodation and vergence. The coupling of these three embodied mechanisms ensures adjusting the visual system to the viewing distance; with other words, it optimizes depth acuity. Taken these two lines of research together, one important question of interest is how changes in pupil size affect perception. One plausible assumption is that changes in pupil size lead to changes in depth perception. Summarizing studies of our group on depth perception, on induced pupil size changes, and on actively evoked pupil size changes, arguments pro and con the assumption that pupil size changes control the visual input in a way that has already been proposed as attentional mechanism will be presented. In addition, there will be former steps outlined on how to elaborate on the current findings.

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16:40-17:00 (160)

The Role Of Tone Duration In Temporal Order Judgments By Aging Adults. LEAH FOSTICK, *Ariel University*, HARVEY BABKOFF, *Bar-Ilan University* (Presented by Leah Fostick) — Aging adults have difficulties in processing temporal information, especially when stimulus durations are short and presented rapidly (short inter-stimulus-intervals, ISI). In previous studies, we showed that for young adults, tone duration and ISI were inter-changeable in temporal order judgments. Consequently, stimulus onset asynchrony (SOA) thresholds were similar across different tone durations. We hypothesized that since aging adults have difficulty in processing brief sounds, tone duration and ISI may not be interchangeable. Short duration tones will require relatively longer ISIs than long durations to successfully judge order. In the current study, 120 adults, aged 60-75 years, performed dichotic temporal order judgments with tone durations of 10, 20, 30, or 40msec. ISI varied between 5-240msec. SOA thresholds for stimulus durations of 30 and 40msec were similar, but were longer for 20msec and for 10msec. The results suggest that for aging adults, stimulus duration is more than just another way to manipulate ISI.

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Learning and Memory I

Graanbeurszaal, Thursday, 15:40-17:20

Chaired by Anne Gast, Universität zu Köln

15:40-16:00 (161)

Perceptual Learning, tDCS, And Inversion Effects: How To Switch Off Perceptual Learning. CIRO CIVILE, ROSSY MCLAREN, and I.P.L. MCLAREN, *University of Exeter* (Presented by Ciro Civile) — There is good evidence that an inversion effect can be obtained that depends on perceptual learning for its existence. Using artificial checkerboard stimuli, we have shown that an inversion effect is obtained only if the checkerboards are drawn

from a familiar category, and only if that category is defined by a prototype. In these circumstances, the N170 effect typical of face inversion can also be obtained with checkerboards. The analogy with the face inversion effect is clearly strong, but falls short of demonstrating that they both share the same causal mechanism. We have now found a way to establish a causal link between these two effects, by demonstrating that Anodal transcranial Direct Current Stimulation (tDCS) to Fp3 abolishes the inversion effect



in our checkerboard preparation without impairing learning to control (non-preexposed) stimuli. If a similar effect can be found with face inversion, then the link between these two inversion effects will be proven.

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16:00-16:20 (162)

Perceptual Learning, tDCS, And The Face Inversion Effect: How To Make Someone Temporarily Prosopagnosic. CIRO CIVILE, ROSAMUND MCLAREN, ADAM CURTIS, and IPL MCLAREN, *University of Exeter* (Presented by IPL McLaren) — It's been known for some time that exposure to or experience with a set of stimuli drawn from a prototype defined category can lead to a type of inversion effect with artificial stimuli that is analogous to that found in faces. We are now able to establish that this contributes to the inversion effect in faces. We report the result of a number of tDCS experiments that: 1. show that Anodal tDCS to Fp3 selectively eliminates the inversion effect seen in highly controlled experiments with artificial stimuli (checkerboards), and 2. The same stimulation significantly reduces the face inversion effect without abolishing it completely. This suggests that perceptual learning provides one component of the face inversion but leaves room for another specific to faces; and that by eliminating the component due to perceptual learning we are, in effect, able to induce a partial analogue of prosopagnosia in our participants.

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16:20-16:40 (163)

The Effect Of Pre-Exposure On Overall Similarity Categorization. FRASER MILTON and IAN MCLAREN, *University of Exeter*, ANDY WILLS, *University of Plymouth* (Presented by Fraser Milton) (Sponsored by Ian McLaren) — This work examines the effect that prior exposure to perceptual stimuli has on the prevalence of overall similarity (family resemblance) categorization. Experiment 1 demonstrated that participants who had previously encountered stimuli produced more overall similarity sorting when asked to free classify them than participants who were pre-exposed to different stimuli to those they later classified. Experiments 2a and 2b showed that this effect occurs for stimuli that are perceptually easy to discriminate but not for stimuli that are perceptually difficult to discriminate. Experiment 2b also showed that pre-exposure increased the discriminability of the perceptually easy stimuli but not the perceptually difficult stimuli. Experiment 3 established that pre-exposure elevated overall similarity sorting when the dimensions were integrated into a coherent object but not when they were spatially separated. Similarly, there was an increase in the perceptual discriminability of the spatially integrated stimuli after pre-exposure but not for the spatially separate stimuli. In sum, these results demonstrate that pre-exposure can elevate overall similarity sorting and provide insight into the conditions under which the effect will occur.

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16:40-17:00 (164)

Goal-Directed And Habit-Like Modulations Of Stimulus Processing During Reinforcement Learning. DAVID LUQUE, *Universidad de Malaga*, TOM BEESLEY, *University of New South Wales*, RICHARD W. MORRIS, OREN GRIFFITHS, THOMAS J. WHITFORD, and MIKE E. LE PELLEY, *University of New South Wales Sydney* (Presented by David Luque) (Sponsored by Miguel Angel Vadillo) — Animals and humans learn how to act in order to obtain rewards. Such reinforcement learning is supported by two different systems: A goal-directed system which represents outcomes and their values separately, and a habit system which caches the value of the stimulus-response association (S-R). This latter S-R representation leads to fast (but inflexible) responses given detection of the relevant S. Recently, it has been shown that perceptual processing of stimuli predicting reward is prioritized once they are associated with rewards, even when rewards are no longer available. It has been proposed that such reward-related attention bias is conceptually similar to an 'attentional habit'. Recording ERPs in humans during reinforcement learning, we show evidence in favor of this hypothesis. Resistance to outcome devaluation (the defining feature of a habit) was shown by the stimulus-locked P1 component. Analysis at longer latencies revealed a positive component (P3b) sensitive to outcome devaluations. These results demonstrate that cortical responses to both cached and current reward value occur in the same learning episode, suggesting that reinforcement learning engages both attentional habits and goal-directed processes in parallel.

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17:00-17:20 (165)

Evaluative Conditioning Is Sensitive To Memory Reactivation Of The US. ANNE GAST and BORYS RUSZPEL, *Universität zu Köln* (Presented by Anne Gast) — Evaluative conditioning is a valence change of a stimulus (CS) that is due to previous pairings with positive or negative stimuli (USs). We tested whether the acquired valence is mentally represented as an overall summary valence or in individually accessible learning episodes. In the learning phase of Experiment 1, CSs were paired either with positive or negative USs. In the measurement phase, one positive and one negative stimulus was presented along with each measured CS. In order to trigger retrieval of specific learning episodes, in one condition, one of these valent stimuli was identical to the USs that was paired with the CS before. As predicted, EC effects were stronger in this condition. In Experiment 2, this was replicated in a design where the CSs were first paired with both positive and negative USs. These results suggest that valence resulting from an EC paradigm is represented in individually accessible episodes.

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Visual Attention II

Administratiezaal, Friday, 8:20-10:20

Chaired by Timothy Welsh, *University of Toronto*

8:20-8:40 (201)

Eye Movements Reveal The Temporal Dynamics Of Time-Based Location And Task Expectancies. CHRISTINA U. PFEUFFER, STEFANIE AUFSCHNAITER, ROLAND THOMASCHKE, and ANDREA KIESEL, *University of Freiburg* (Presented by Christina

U. Pfeuffer) — Humans form time-based expectancies and use them for response and task preparation. When a time interval predicts a response or an upcoming task, participants perform better in trials with expected rather than unexpected combinations of interval and response/task. Here, we investigated the temporal

dynamics of time-based expectancy by assessing the time course of eye movements towards tasks appearing, with 90% validity, at a left or right location depending on a preceding short or long time interval. Participants were significantly faster to respond to frequent than infrequent interval-task combinations, indicating that they had formed time-based task expectancies. Moreover, without having any explicit knowledge of the interval-task combinations, within a trial, participants first moved their eyes to the task location of the short interval and then saccaded towards the task location of the long interval (if no stimulus had been presented yet). Our findings thus demonstrate that eye movements can reveal temporal shifts in time-based expectancies and provide further information regarding the mechanisms underlying time-based location and task expectancies.

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8:40-9:00 (202)

Individual Variability In Visual Exploration Of Faces Explained By Personality Traits. NITZAN GUY and YONI PERTZOV, *The Hebrew University of Jerusalem* (Presented by Yoni Pertzov) — Previous research have primarily focused on two main factors involved in selecting gaze position: the visual properties of the stimulus and the observer's task. We focus on an additional, mostly neglected, factor that influences visual exploration: individual traits. Although there is no debate that individuals exhibit idiosyncratic behavior, little is known about idiosyncrasies in visual exploration. Even less is known about the factors responsible for such individual differences. Following a recent study that showed reliable individual differences in the amount of time observers fixate on the eyes, we investigated if one's personality traits as assessed by the "Big-Five" model, can predict this behavior. To that end, we used two types of stimuli with a different approximation to real social interactions: color static images as well as interactive short clips. More emotionally stable observers were found to focus more on the eyes of static and dynamic faces. However, only interacting with dynamic talking faces revealed that extroverts also tend to fixate more on the eyes. We conclude that personality traits play important factor in idiosyncratic visual exploration.

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9:00-9:20 (203)

Developmental Changes In The Processing Of Gaze-Direction: The Case Of Deaf Adults And Children. WIESKE VAN ZOEST and MARTA VENTURINI, *University of Trento*, BENEDETTA HEIMLER, *Hebrew University of Jerusalem*, FRANCESCA BARUFFALDI, *Ente Nazionale Sordi*, PASQUALE RINALDI and MARIA CRISTINA CASELLI, *Consiglio Nazionale delle Ricerche*, FRANCESCO PAVANI, *University of Trento* (Presented by Wieske van Zoest) — Deaf observers were presented with the gaze-cue paradigm to investigate the influence of a permanent absence of audition on social attention. The location of a peripheral target was cued uninformatively by the gaze direction of a centrally presented face. Unlike hearing controls, deaf adults responded equally fast to the target regardless of cue validity. The absence of the gaze-cue effect in deaf adults was specific to the type of cue: the validity effect in response to non-social uninformative arrow cues was comparable between deaf and hearing adults. In contrast to deaf adults, deaf children revealed a gaze-cue effect that was twice as large as the hearing control children. The tendency of deaf adults to disregard the gaze-cue seems learned over time. Much more than

deaf children, deaf adults are in control of the processing of salient social visual stimuli which may illustrate an adaptive mechanism to enhance general selectivity in information processing.

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9:20-9:40 (204)

(Withdrawn) Changing Item Relevance-Changing Search Behaviour? Relevance Effects In Repeated Visual Search. MARGIT HÖFLER, *Danube University Krems*, SEBASTIAN A. BAUCH, *University of Krems*, IAIN D. GILCHRIST, *University of Bristol*, CHRISTOF KÖRNER, *University of Graz* (Presented by Margit Höfler) — When searching repeatedly, not all items relevant in the current search might be relevant in a future search. We tested whether information about a search target's colour in a future search affects oculomotor behaviour in the current search already. Participants searched a display with pink and blue items twice for different targets while their eye movements were recorded. In the first search, the target could be of either colour; in the second search, the target colour was always the same. During the first search we probed an item of either a prospectively relevant or irrelevant colour. Saccadic latencies to this probe did not differ with regard to future relevance. However, participants fixated more relevant than irrelevant items already during the first search and saccadic latencies were longer when participants switched between colours. These findings indicate that future item relevance can affect a current search to some degree.

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9:40-10:00 (205)

Participant Beliefs Determine Whether VSTM Items Capture Attention Or Not. ZIAEI MARYAM, ELISA JONES, and ROGER W. REMINGTON, *The University of Queensland* (Presented by Stefanie I Becker) — One of the hotly debated questions is whether attention and visual short term memory (VSTM) represent a common resource or separate resources. The results are mixed, with some studies indicating that items stored in VSTM can automatically attract attention, and others demonstrating independence. In the present study, participants had to memorise a colour that could appear as an irrelevant distractor in a subsequent RSVP stream. Our results show that the memorised colour only attracts attention when participants believe that it predicts the target colour. A memorised colour that in fact predicts the target colour does not attract attention (not even in noticers). A subsequent fMRI study found significant differences in BOLD activity between conditions participants believed to be predictive vs. non-predictive, and a set of different brain regions responsive to memory vs. no-memory conditions. These results demonstrate a high neural specificity of attention and VSTM tasks, and highlight the importance of instructions.

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10:00-10:20 (206)

"Where You Look, I Won't Follow": Gaze Cues Influence The Temporal But Not Spatial Characteristics Of Aiming Movements. TIMOTHY WELSH and EMMA YOXON, *University of Toronto* (Presented by Timothy Welsh) — Locations that are the focus of a person's attention typically follow the focus of another person's gaze (joint attention). It has been suggested that such eye gaze cueing may be controlled by a unique mechanism, producing the reaction time (RT) effects associated with bottom-up and top-down control. The current study explored this mechanistic hypothesis by analyzing both the temporal (RT) and spatial (initial movement angle, IMA) characteristics of aiming movements after

gaze cues at 7 stimulus onset asynchronies (SOAs) between 100 and 2400ms. In Experiment 1, the eye gaze cue remained fixed on a potential target following the cue. RTs were shorter when participants moved towards a cued target than to an uncued target, but there were no statistical differences in IMA between movements to cued and uncued targets. In Experiment 2, the gaze cue returned to a central position following 150ms. There

was a significant interaction between cue and SOA where RTs were significantly shorter to cued targets at SOAs of 250, 400, 700 and 1000ms. Again, there were no statistical differences between movements to cued and uncued targets in the IMA. Consequently, gaze cueing may not be as tightly coupled with action as are other types of cues.

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Numerical Cognition

Veilingzaal, Friday, 8:20-9:40

Chaired by Oliver Lindemann, Erasmus University Rotterdam

8:20-8:40 (207)

One Model Fits All: Explaining Many Aspects Of Number Comparison Within A Single Coherent Model—A Random Walk Account. DENNIS REIKE and WOLFGANG SCHWARZ, *University of Potsdam* (Presented by Dennis Reike) (Sponsored by Wolfgang Schwarz) — The time required to determine the larger of two digits decreases with their numerical distance, and, for a given distance, increases with their magnitude (Moyer & Landauer, 1967). One detailed quantitative framework to account for these effects is provided by random walk models. These chronometric models describe how number-related noisy partial evidence is accumulated over time; they assume that the drift rate of this stochastic process varies lawfully with the numerical magnitude of the digits presented. In a complete paired number comparison design we obtained saccadic choice responses of 43 participants, and analyzed mean saccadic latency, error rate, and the standard deviation of saccadic latency for each of the 72 digit pairs; we also obtained mean error latency for each numerical distance. Using only a small set of meaningfully interpretable parameters, we describe a variant of random walk models that accounts in considerable quantitative detail for many facets of our data, including previously untested aspects of latency standard deviation and error latencies.

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8:40-9:00 (208)

On The Mental Representation Of The Infinity Symbol. MICHAL PINHAS, *Ariel University* (Presented by Michal Pinhas) — The mental representation of the infinity symbol, as well as the understanding of concepts of infinity, have received little research attention in cognitive science. The present study explored whether the infinity symbol is perceived as larger than the other numbers in the set. In a series of experiments, participants performed numerical and physical size comparisons of the infinity symbol with single- and multi-digit numbers. Numerical comparisons to infinity produced distance-like effects and were slower than comparisons between two numbers. Physical size comparisons revealed a normal size congruity effect for comparisons of infinity and single-digit numbers, and a reversed size congruity effect for comparisons of infinity and multi-digit numbers. The findings suggest that the infinity symbol is not processed as an upper-end value. In addition, perceiving numbers as “large” seems to be highly affected by the decimal syntactic structure.

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9:00-9:20 (209)

Modeling Numeracy Decisions On A Continuous Scale. ROGER RATCLIFF and GAIL MCKOON, *The Ohio State University* (Presented by Roger Ratcliff) — We present a model for decision making for stimuli and responses in continuous space. The model is applied to two numeracy tasks: in one, a two-digit number is presented and the participant has to move their finger to a matching location on a number line, in the other an array of dots is presented and the participant is to move their finger to a matching location on an arc. The model is composed of diffusion processes on lines and planes in which evidence from a stimulus (distributed across space) drives the noisy decision process which accumulates evidence over time to a criterion at which point a response is initiated. Noise is represented as a continuous Gaussian process. The model produces fits for the full distributions of response times and choice probabilities across the stimulus space and provides distributed stimulus acuity measures.

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9:20-9:40 (210)

Modeling The Independence Of Numerical Associations With Visual Size And Space. OLIVER LINDEMAN, *Erasmus University Rotterdam*, MICHAEL WIEMERS, *Radboud University Nijmegen* (Presented by Oliver Lindemann) — Many studies demonstrated interactions between number processing and either spatial codes (spatial-numerical associations) or visual size-related codes (size-congruity). However, the interrelatedness of these two number couplings is still unclear. The present study examines the simultaneous occurrence of space- and size-numerical congruency effects and their interactions both within and across trials using linear-mixed models. In a magnitude judgment task physically small or large digits were presented left or right from screen center. The reaction times analysis revealed that space- and size-congruency effects coexisted in parallel and combined additively. Moreover, a selective sequential modulation of the two congruency effects was found. The size-congruency effect was reduced after size incongruent trials. The space-congruency effect, however, was only affected by the previous space congruency. The observed independence of spatial-numerical and within-magnitude associations is interpreted as evidence that the two couplings reflect different attributes of numerical meaning possibly related to ordinality and cardinality.

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Language Production

Effectenbeurszaal, Friday, 8:20-9:40

Chaired by Laurie Beth Feldman, University at Albany, The State University of New York

8:20-8:40 (211)

Morphological Structure Governs The Access Of Grammatical Gender During Production In Hebrew. AVITAL DEUTSCH, *The Hebrew University of Jerusalem*, MAYA DANK, *Levinsky College of Education* (Presented by Avital Deutsch) — We investigated the gender congruency effect in Hebrew, for animate versus inanimate nouns. The Picture-Word-Interference paradigm was used to manipulate gender congruency between target pictures and spoken distractors. Naming latency was measured. The comparison between animate and inanimate nouns was motivated by the linguistic structure of Hebrew which ascribes grammatical gender specifications to derivational structure for inanimates, versus inflectional structures for animate nouns. Gender congruency effect was predicted for animate nouns only. Indeed, naming latency was longer in the presence of a gender-congruent distractors than with gender-incongruent distractors. No congruency effect was observed for inanimate nouns. These findings reveal the central role of morphological structure on lexical processes in Hebrew. Given the difference in the notional meaning of gender specification for animate and inanimate nouns, Hebrew exemplifies how language-specific characteristics, such as rich morphological structures, can be used by the linguistic system to express conceptual distinctions at the form-word level.

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8:40-9:00 (212)

Predicting Each Other's Words: The Role Of Shared Knowledge. JAROSŁAW R. LELONKIEWICZ, *Scuola Internazionale Superiore di Studi Avanzati*, CHIARA GAMBI, *University of Edinburgh* (Presented by Jarosław R. Lelonkiewicz) — People often complete one another's utterances in conversation, particularly when talking about a topic that is shared between both speakers (Howes et al., 2012). We hypothesized shared knowledge facilitates linguistic prediction (Pickering & Garrod, 2013), which in turn supports fast and accurate completions. Eighteen pairs jointly produced definitions for ambiguous and non-ambiguous words. Pairs could not assume shared knowledge of the intended meaning of ambiguous words. Accordingly, they took longer to produce definitions for these ($M = 2921\text{ms/word}$, $SE = 106$) than for non-ambiguous words ($M = 2672$, $SE = 89$), even though both sets of words were equally easy to define for controls ($N = 26$) who produced definitions alone ($M = 1746$, $SE = 46$ vs $M = 1714$, $SE = 37$; ambiguity*condition: chi-square (1) = 4.36, $p = .037$). A post-test ($N = 54$) confirmed it was easier to guess the final word of definitions relating to non-ambiguous than ambiguous words, but only for definitions produced by pairs ($z = -2.27$, $p = .023$), and not by controls ($z = -.84$, $p = .398$). Thus predictability might explain the effect of shared knowledge on cross-person completions.

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9:00-9:20 (213)

Repeat After Us: Syntactic Alignment Is Not Partner-Specific. RACHEL OSTRAND, *IBM Research*, VICTOR S. FERREIRA, *University of California, San Diego* (Presented by Victor Ferreira) — Conversational partners match each other's production features at many linguistic levels in a process known as *alignment*. But what do speakers align to? Here, we investigate whether alignment is partner-specific – meaning the speaker aligns to their current partner's prior production – or partner-independent – meaning the speaker aligns to their recently-heard linguistic context. In five experiments, participants interacted with two partners who each had unique and systematic syntactic preferences; for example, one only produced double object datives (DO: “The boy threw the man the ball”) whereas the other only produced prepositional datives (PD: “The boy threw the ball to the man.”). Across multiple linguistic contexts and exposure conditions, there was no partner-specific alignment: Subjects produced (e.g.) PDs at the same rate to both partners, regardless of the listener's syntactic preference. However, participants demonstrated other forms of partner-independent syntactic learning and alignment. Thus, at least in the syntactic domain, speakers modulate their speech to match the overall statistics of the linguistic context, but not to match the preferences of their current listener, and alignment is partner-independent.

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9:20-9:40 (214)

Production Of Morphologically Complex Words As Revealed By A Typing Task: Affix Influences On Keystroke Dynamics Of The Stem. LAURIE BETH FELDMAN, *University at Albany, The State University of New York*, RICK DALE, *University of California at Los Angeles*, JACOLIEN VAN RIJ, *University of Gronigen*, DAVE VINSON, *University of California at Merced* (Presented by Laurie Beth Feldman) — In previous work we have reported that temporal sequencing for a constant sequence of letters within a word varies according to the upcoming sequence of letters in a suffix. Thus mean and distribution of keystroke latencies for DEPRESS differed when it appeared alone as compared with when it appeared in DEPRESSION or DEPRESSIVE. Novel here is the comparison of the same stems when they differ with respect to number of affixes like SUPER, SUPER+IOR, SUPER+IOR+ITY. Results provide new insights into the ways in which upcoming morphological structure can influence earlier key stroke sequencing and challenge a purely autonomous account of peripheral motor control in a typing task.

Email: Laurie Beth Feldman, lfeldman@albany.edu

Letter/Word Processing I

Graanbeurszaal, Friday, 8:20-10:20

Chaired by Albert F. Smith, Cleveland State University

8:20-8:40 (215)

Working Memory, Phonological Awareness, And Word Recognition In Arabic Orthography. MOHAMMED ELMIR, *University Sidi Mohamed Ben Abdellah* (Presented by Elmir Mohammed) — This study compared the effects of phonological

awareness and working memory capacity on word recognition in Arabic. Previous results showed reliable relationships between speed word recognition in Arabic language and some skills, such as phonological abilities and working memory capacity. The main goal of this work was to determine how working memory



and phonological awareness influence word recognition in Arabic readers. We aimed at differentiating the contributions of phonological awareness and working memory capacity in word processing. A total of 70 first and third grade native Arabic readers (Age range between 6 and 8 years) have participated in this study. We evaluate performance of participants in word processing, phonological awareness and working memory. Consistent with previous data, our results highlight the growth of the predictive power of working memory comparably with phonological awareness in word processing from first to third grades. These findings assert that the development of working memory capacity leads to the improvement of word recognition achievements. So we concluded that working memory measures could be sufficient for the prediction of word recognition performance in Arabic orthography.

Email: Elmir Mohammed, elmirmohammed21@gmail.com

8:40-9:00 (216)

Eye Movements When Failing To Notice Function Word Repetitions And Omissions. ADRIAN STAUB, *University of Massachusetts Amherst*, SOPHIA DODGE, *University of Wisconsin-Madison*, ANDREW COHEN, *University of Massachusetts Amherst* (Presented by Adrian Staub) — Repetitions and omissions of function words are easily overlooked in text. An eyetracking experiment investigated the causes of this phenomenon. Participants (N = 51) read sentences with repeated *the* (e.g., *John put the garbage on the the curb on Tuesday evening.*) and matched sentences with no error, with a repeated noun, or with an omitted *the*. After each sentence, readers indicated whether there was any error; on filler trials, they were asked comprehension questions. Readers noticed repeated *the* only about 45% of the time, while noticing the repeated noun more than 90% of the time. An omitted *the* was noticed on about 2/3 of trials. On trials on which they did notice a repetition or omission, readers showed clear eye movement disruption immediately upon encountering the error. However, on trials on which they did not notice an omission, readers' eye movements on the critical words (the two instances of the word *the*, or the preceding and following words in the omission trials) were essentially indistinguishable from eye movements on the corresponding words in grammatical sentences. These results indicate that failure to notice function word errors is a psycholinguistic as opposed to perceptual phenomenon.

Email: Adrian Staub, astaub@psych.umass.edu

9:00-9:20 (217)

Readers' Sensitivity To Letter And Bigram Frequency: Evidence From Steady State Visual Evoked Potentials. FABIENNE CHETAIL and ALAIN CONTENT, *Université Libre de Bruxelles* (Presented by Fabienne Chetail) — Individuals rapidly become sensitive to recurrent patterns present in the environment and this occurs in many situations, including reading. However, the nature of the regularities to which readers become sensitive is still unclear. To address this issue, we used an EEG paradigm involving fast periodic visual stimulation with an oddball design. Participants were exposed to a flow of written letter strings at a rate of 6.25 Hz. The stimuli were made of frequent letters (Experiment 1) or frequent bigrams (Experiments 2-3). Every six items, an oddball stimulus including low-frequency letters (Experiment 1), low-frequency bigrams with low-frequency letters (Experiment 2) or low-frequency bigrams with frequent letters (Experiment 3) was presented. In the three experiments, we found a neural response

at the oddball frequency (1.04 Hz), demonstrating that readers are sensitive to both letter and bigram frequency. We will discuss the implications of such results for models of orthographic processing. Email: Fabienne Chetail, fchetail@ulb.ac.be

9:20-9:40 (218)

You That Read Wrong Again! A Transposed-Word Effect In Grammaticality Judgments. JONATHAN MIRAULT, JOSHUA SNELL, and JONATHAN GRAINGER, *Aix-Marseille University* (Presented by Jonathan Grainger) — We report a word-in-sentence equivalent of the well-established transposed-letter effect, where words play the role of letters, and sentences replace words. Participants made speeded grammaticality judgments to sequences of five words presented simultaneously. The critical agrammatical test sequences were formed by transposing two adjacent words from either a grammatical base sequence (The black was dog big) or from an agrammatical base sequence (The black was dog slowly). An equal number of grammatically correct sentences were intermixed with these two kinds of agrammatical sequence, and participants had to decide as quickly and as accurately as possible if the sequence formed a grammatically correct sentence. We found that agrammatical decisions were harder to make when the base sequence was grammatically correct. This provides the first laboratory demonstration that the encoding of word order, like letter order, retains a certain amount of uncertainty. Crucially, in the same way that transposed-letter effects reflect parallel processing of letters, we argue that the novel transposed-word effect reflects parallel processing of words during written sentence comprehension.

Email: Jonathan Grainger, jonathan.grainger@univ-amu.fr

9:40-10:00 (219)

Reading In Multiple Arabics: Effects Of Diglossia And Orthography. AULA KHATTEB ABU-LEIL, RAPHIQ IBRAHIM, and ZOHAR EVIATAR, *University of Haifa* (Presented by Zohar Eviatar) — Background: To test the effects of diglossia and orthography on literacy, we examined Spoken Arabic (SA) and the written form (MSA). MSA has a vowelized (shallow) and an unvowelized (deep) form. Recently Arab youth have developed Arabizi, a form of SA using Latin letters on computers. Method: 77 8th graders performed tasks in which we examined the effects of gloss (SA vs. MSA), form (vowelized MSA, unvowelized MSA, Arabizi) and genre (narrative vs. expository) on reading efficiency and comprehension. Results: Efficiency and comprehension revealed different patterns. Single words and texts were most efficient in unvoweled MSA, least in vowelized MSA, and in-between in Arabizi. Comprehension was highest for vowelized MSA. Genre interacted with gloss: narrative texts were better than expository texts in Arabizi with the opposite pattern in MSA. Conclusions: The results suggest that frequency of type of texts and the way in which phonology is encoded affect skilled reading. Email: Zohar Eviatar, zohare@research.haifa.ac.il

10:00-10:20 (220)

Effects Of Lexicality And Orthographic Regularity On The Classification Of Two-Letter Strings. ALBERT F. SMITH and NICOLE M. RUSSO, *Cleveland State University* (Presented by Albert F. Smith) — To investigate whether two-letter words may be perceived as configurations, experimental participants completed binary-response filtering and biconditional classification tasks with the four two-letter stimuli in sets constructed by crossing two vowels with two positions relative to a consonant (e.g., *ek, ke, uk, ku; it, ti, ot, to*). In each of these tasks, two stimuli are assigned

to each of two responses. From the experimenter's perspective, filtering (e.g., *ek* and *ke* vs. *uk* and *ku*) may be carried out by attending to one attribute; biconditional classification (e.g., *ek* and *ku* vs. *uk* and *ke*) requires attention to both attributes. Over experiments, stimulus sets varied (1) in whether lexicality could be used for biconditional classification (e.g., *it* and *to* vs. *ot* and *ti*) and (2) in the orthographic regularity of the stimuli (e.g., *It*, *Ti*, *Ot*,

To vs. *iT*, *tI*, *oT*, *tO*). Of interest are whether the relative difficulty of filtering and biconditional classification depends on whether biconditional classification can be treated as lexical decision and the effect of orthographic regularity on the relative difficulty of these tasks.

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Metamemory and Metacognition

Berlagezaal, Friday, 8:20-10:20

Chaired by Mariëtte H. van Loon, University of Bern, Switzerland

8:20-8:40 (221)

Do People Really Know That They Know? ASHER KORIAT, *University of Haifa* (Presented by Asher Koriat) — A great deal of research has indicated that people are quite skilled in discriminating between correct and wrong responses, leading researchers to ask “how do people know that they know?” Here, in contrast, I ask “Do people really know that they know?” The results on confidence judgments indicate that people indeed discriminate correct and wrong responses endorsing the former responses with higher confidence than the latter responses. I will show, however, that these results, rather than testifying to a general monitoring ability, actually derive from researcher's tendency to sample items from people's natural ecology. Across items that are not representative of that ecology, confidence is counterdiagnostic of accuracy. The findings on the whole suggest that confidence judgments are based on a heuristic that is specifically tailored to the world we live in.

Email: Asher Koriat, akoriat@research.haifa.ac.il

8:40-9:00 (222)

Students' Memory For Feedback About Past And Future Performance: Effects Of Goal-Setting On Retrieval Biases. SAMANTHA EA. GREGORY and ROBERT A. NASH, *Aston University*, NAOMI E. WINSTONE, *University of Surrey*, NATHAN RIDOUT, *Aston University* (Presented by Samantha Gregory) — Performance feedback received by students generally describes both how well they achieved previously, and how they could improve in future. Researchers and educators often find students more motivated by future-oriented (directive) feedback than by past-oriented (evaluative) feedback. However, despite theory from memory literature leading us to predict that directive feedback should be better remembered than evaluative feedback, this is apparently not the case. In a series of lab experiments, participants read feedback containing critical comments that—through small differences in wording—were either evaluative, describing aspects of the work produced, or directive, describing aspects they should do differently next time. After a short delay, participants were given a surprise free recall test. Across experiments, contrary to expectations, participants recalled evaluative feedback consistently better than directive feedback. We report two studies in which we attempted to shift this bias by encouraging participants to set improvement goals prior to receiving the feedback.

Email: Samantha Gregory, s.gregory1@aston.ac.uk

9:00-9:20 (223)

Is Mind Wandering Related To Depression Symptom Severity? MELANIE TAKARANGI and DIANE NAYDA, *Flinders University* (Presented by Melanie Takarangi) — We know that experiencing negative mood increases the likelihood of mind-wandering, that mind-wandering often focuses on a “current concern” and that

mind-wandering on negative content can exacerbate negative affect. Prior research has also shown a relationship between depression symptoms and mind-wandering without awareness. We aimed to replicate and extend this research. Participants (N=152) completed measures of depression symptoms and mind-wandering either before or after a behavioural mind-wandering task (Sustained Attention to Response Task) with thought sampling probes. Depression symptom severity was related to self-reported mind-wandering, and mind wandering both with and without meta-awareness on the SART. However, these effects were evident only when participants completed the questionnaires *prior* to completing the SART. Our results suggest that when depression symptoms are made salient, people are more likely to mind wander; reflecting on symptoms may increase negative mood and/or increase accessibility to negative thoughts and rumination about the causes and consequences of depression.

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9:20-9:40 (224)

Task Complexity Promotes Contributions Of Processing Fluency To Judgments Of Learning. MONIKA UNDORE, *University of Mannheim* (Presented by Monika Undorf) — There is substantial evidence that the ease of retrieving, encoding, and perceiving materials while studying affects people's predictions of their memory performance (judgments of learning; JOLs). Several studies, however, have found that JOLs exclusively relied on people's explicit beliefs about memory. The current research therefore investigated under what conditions processing fluency affects JOLs. Specifically, four experiments tested whether difficult and complex judgment tasks promote fluency effects on JOLs. To evaluate the impact of fluency on JOLs, participants made pre-study JOLs that cannot possibly rely on fluency or immediate JOLs that can be based on either fluency or beliefs about memory. Task complexity was manipulated through increasing the number of varying cues in Experiments 1 and 2 and through increasing the number of cue levels in Experiments 3 and 4. Results revealed that differences between pre-study JOLs and immediate JOLs in calibration and resolution increased with task complexity. These findings support the idea that task complexity is a moderator for effects of processing fluency on JOLs.

Email: Monika Undorf, undorf@uni-mannheim.de

9:40-10:00 (225)

Does Making Judgments Of Learning After Reading Improve Text Comprehension? ROBERT ARIEL and JEFFREY D. KARPICKE, *Purdue University*, SARAH K. TAUBER and AMBER WITHERBY, *Texas Christian University* (Presented by Robert Ariel) — When students are prompted to make judgments of learning (JOLs) for paired associates, the processes they engage in to monitor their learning can produce direct effects on learning. The current experiments evaluated whether these direct effects

would extend to learning more complex educationally relevant material. Students read several sections of a science text and some students provided JOLs after each section. Across 4 experiments, we manipulated how JOLs were framed to probe students' understanding of the text content. In most cases, instructing students to make JOLs did not improve comprehension above and beyond just reading the text without making JOLs. However, when students were instructed to retrieve information prior to making JOLs (Experiment 4), large learning gains occurred. These results suggest that producing JOLs may not provide direct effects for learning texts in part because students do not automatically engage in retrieval of text-relevant information when making them.

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10:00-10:20 (226)

Effects Of Performance Feedback And Calibration Feedback On Preschoolers' Monitoring Accuracy. MARIËTTE VAN LOON and CLAUDIA ROEBERS, *University of Bern* (Presented

by Mariëtte H. van Loon) — Young children are typically not aware of errors. We aimed to investigate whether two types of feedback, performance feedback and metacognitive feedback, could improve monitoring accuracy and self-rewarding. Children ($n = 105$, mean age 5.8 years) completed six analogical reasoning tasks, made monitoring judgments (indicating for each item whether they thought their response was correct/incorrect), and then gave themselves reward points for each completed task (indicating how many gold coins they deserved). Children were randomly assigned to performance feedback (PF), metacognitive feedback (MF), and no-feedback (NF) groups. Children were overconfident, and did not recognize most of their errors. Feedback improved self-monitoring and self-reward judgments; children who received PF or MF were better able to recognize their errors, and PF was most effective to improve self-rewarding. Findings indicate that feedback, and especially PF can improve monitoring accuracy, error detection, and realism of self-rewarding in the pre-school context.

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SYMPOSIUM III: Learning Words From Experience: The Emergence of Lexical Quality Effectenbeurszaal, Friday, 10:00-12:00

Chaired by Jennifer M Rodd, *University College London*, and Kate Nation, *University of Oxford*

(31)

Where Does Variation in Lexical Quality Come From and how Does it Influence Children's Lexical Processing? KATE NATION, *University of Oxford* (Presented by Kate Nation) — Words vary in lexical quality: we all know some words well, others less so. Where does this variability come from and how does it relate to people's lexical processing? We argue that variations in lexical quality are a product of language experience, especially reading experience. To capture this developmental experience, we analyzed a large corpus of reading material written for children, allowing us to quantify factors that distinguish item-level properties (e.g., frequency, semantic diversity, orthographic age of acquisition). We then related these lexical statistics to children's lexical processing in a range of tasks tapping word reading, semantic judgment and reading comprehension. We found systematic effects of various lexical statistics influencing children's behavior, interacting with the linguistic requirements of each task, and children's level of reading skill. We conclude by framing lexical quality as the dynamic and on-going product of encounters with language, starting in childhood but continuing throughout life.

Email: Kate Nation, kate.nation@psy.ox.ac.uk

(32)

How do Methods of Reading Instruction Influence Lexical Quality? Behavioural and Neural Findings From an Artificial Orthography Experiment. JOANNE SH. TAYLOR, *Aston University*, MATTHEW H. DAVIS, *MRC Cognition and Brain Sciences Unit*, KATHLEEN RASTLE, *Royal Holloway, University of London* (Presented by Joanne Taylor) — Debate continues over whether reading instruction should focus on letters and sounds (phonics) or written words and meanings (whole-language). Framed within the lexical quality hypothesis – which approach facilitates efficient reading by providing high quality associations between print, sound, and meaning? To examine this, adults learned sounds and meanings for novel words written in unfamiliar symbols. We varied the learning focus: one orthography received three times more print-to-sound than print-to-meaning training, whereas the other orthography received the reverse. Reading aloud trained and untrained words and spelling were

more accurate and faster following print-sound training. Print-meaning training benefited reading comprehension speed, but not accuracy. fMRI scans indicated increased neural effort during reading aloud for print-meaning versus print-sound training. During reading comprehension, neural effort was equivalent for the two approaches. We suggest that phonics-like approaches are a more efficient method of reading instruction and do not compromise lexical quality.

Email: Joanne Taylor, j.taylor13@aston.ac.uk

(33)

Quality and Quantity in Language Development: Examining Influences in a Computational Model of Literacy Development. PADRAIC MONAGHAN, *Lancaster University; MPI for Psycholinguistics, Nijmegen*, YA NING CHANG, *University of Lancaster* (Presented by Padraic Monaghan) — Computational models of reading require a specificity about the representations involved in the reading system that may be implicit in descriptive models of behaviour. In this talk, we present a developmental model of language and literacy development, focusing on pre-literacy experience of the model and the effect of this early exposure on learning to read. We show that both quantity and quality of pre-literacy language exposure is critically important for literacy development, and that impoverishment in either is potentially problematic for learning to read. We also show that the quality of these pre-literacy language skills influences the effectiveness of interventions in early reading training. The modelling work enables us to examine the unfolding experience of the learner and its influence on gradual literacy acquisition, with insights on lexical quality in literacy that go beyond static models of the mature language reader.

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(34)

Learning New Meanings for Words That Already Have Meanings. CHARLES A. PERFETTI and XIAOPING FANG, *University of Pittsburgh* (Presented by Charles Perfetti) — Maintaining lexical quality across the lifespan requires that people continuously add new meanings to words they already know, as when one learns

that “skate” is also the name of a fish. 1) How is such learning different from the more studied case of learning meanings assigned to novel word forms? 2) Is there an impact on learning from the competition with the already established learning? 3) What is the fate of both the new meaning and the original meaning? We report a series of behavioral and ERP experiments (including frequency-band analyses) that test hypotheses related to these questions. We draw a general account of new meaning learning that stresses strong interactions between new meanings and prior knowledge. These interactions aid new learning in the early phases of learning but also cause perturbation of prior knowledge and lead to temporary knowledge suppression. Despite these cognitive dynamics, the long term retention of the original meaning usually co-exists harmoniously with the new meaning.

Email: Charles Perfetti, perfetti@pitt.edu

(35)

The Importance of Learning Mechanisms in Word-Meaning Access. JENNIFER M. RODD, *University College London* (Presented by Jennifer Rodd) — Being able to understand exactly what each word in a sentence means is an essential component of language comprehension. This is a relatively challenging task because the vast majority of common words have multiple possible interpretations (e.g., the TRUNK of the elephant/car/tree). I present data from both large scale web-based experiments and lab-based experiments that demonstrate that learning mechanisms continue to shape lexical representations during adulthood in response to their linguistic environment. Listeners’ make use of both very

recent and longer-term experience with specific ambiguous words to facilitate future word-meaning access. We explore how factors such as the modality and the spacing of these encounters influence the magnitude of these effects in order to describe the nature of the underlying learning mechanisms.

Email: Jennifer Rodd, j.rodd@ucl.ac.uk

(36)

Mind the Speaker: The Use of Speaker Characteristics in Lexical-Semantic Processing. ZHENGUANG G. CAI, *University of East Anglia* (Presented by Zhenguang Cai) — Successful language comprehension requires that listeners rapidly and accurately retrieve the meanings that speakers intend to convey in their speech. Thus, retrieving the speaker-intended meaning can be challenging when the listener and the speaker have different semantic or pragmatic interpretations for a word, as in cases where the listener and the speaker come from different demographic backgrounds (e.g., age, gender, dialect). For instance, the word “bonnet” would be typically meant to refer to a type of hat by an American English speaker but a car part by a British English speaker. In this talk, I will present findings that listeners use available characteristics (e.g., accent) of the speaker to make inferences about a word’s intended meaning and that such speaker-based inferences are made in parallel to lexical-semantic processing. Thus, high quality lexical-semantic knowledge not only includes information about what words mean, but also information about how different speakers are likely to use these meanings.

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Bilingualism I

Veilingzaal, Friday, 10:00-12:00

Chaired by Mona Roxana Botezatu, *University of Missouri*

10:00-10:20 (227)

A Bilingual Advantage? Comparing Performance Of Mono-To Bilingual Individuals Via A Mousetracking Paradigm. MARKUS F. DAMIAN and WENTING YE, *University of Bristol* (Presented by Markus F. Damian) — The question whether bilingualism conveys a broad advantage in executive functions has recently been controversially discussed, with the empirical findings presenting a complex pattern of positive and null results. Here we present results from three standard tasks measuring executive functions (Flanker; Simon; Spatial Stroop) in which we compared performance of English monolingual to Chinese-English bilingual young adults. Participants provided responses via movement of a computer mouse rather than the conventional key presses, which provides a rich signal of the unfolding response dynamics. Clear differences between bi- and monolinguals emerged, with the former providing more “efficient” responses than the latter. Results are discussed regarding the extent to which these results can be characterised as a genuine “bilingual advantage”.

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10:20-10:40 (228)

Bilingualism Confers Advantages In Task Switching: Evidence From The Dimensional Change Card Sort Task. HWAJIN YANG, ANDREE HARTANTO, and SUJIN YANG, *Singapore Management University* (Presented by Hwajin Yang) — We examined the influence of bilingualism on task switching by inspecting various markers for task-switching costs. English monolinguals and Korean-English bilinguals completed a modified Dimensional Change Card Sort task based on a nonverbal task-switching paradigm. We found advantages for Korean-English

bilinguals in terms of smaller single-task (pure-block) switch costs and greater reactivation benefits than those of English monolinguals. However, bilingual advantages in mixing costs were relatively weak, and the two groups did not differ on local switch costs. Notably, when we approximated the cue-based priming effect in single-task (pure) blocks, we found no evidence that the locus of bilingual advantages in task-switching performance is attributable to a basic cue-priming effect. Taken together, our results suggest that bilingualism is conducive to task switching via facilitation in control processing, including inhibition of proactive interferences and efficient adaptation to abstract task-set reactivation.

Email: Hwajin Yang, hjyang@smu.edu.sg

10:40-11:00 (229)

Incorporating Rehearsals In Models Of Temporal Context Encoding: Evidence From Word Frequency And Bilingual Proficiency Effects. WENDY S. FRANCIS, MARY K. LIAÑO, and MARCELA M. ARTEAGA, *University of Texas at El Paso* (Presented by Wendy S. Francis) — We tested versions of variable-context and retrieved-context frameworks for encoding and retrieval in recall that were modified to treat rehearsals as encoding episodes equivalent to item presentations. The effects of word frequency, language proficiency, and bilingual status on encoding and retrieval dynamics were examined in two free recall experiments conducted with Spanish-English bilinguals and matched monolingual English speakers. Participants completed multiple study-test cycles with word lists that were pure with respect to word frequency and language. In Experiment 1, serial position effects, position of the first item recalled, preference for forward transitions, and temporal proximity were measured.



Experiment 2 incorporated a rehearse-aloud protocol, which allowed for measurement of rehearsal patterns, functional serial position effects, and functional proximity effects. Data were analyzed using logistic mixed-effects regression models. The results have implications for theories of temporal context encoding and theories of bilingual memory. Supported by NIH Grant R15HD078921.

Email: Wendy S. Francis, wfrancis@utep.edu

11:00-11:20 (230)

Meta-Cognitive Processing In Reading Comprehension In First And Additional Languages: Domain General Or Language Specific? ANAT PRIOR, LILACH TEMELMAN-YOGEV, RAZAN SILAWI, YASMIN SHALHOUB-AWWAD, and TAMI KATZIR, *University of Haifa* (Presented by Anat Prior) — Readers' ability to understand written text relies not only on linguistic processes, but recruits meta-cognitive skills as well. Specifically, readers' accuracy in monitoring and assessing their performance, also termed calibration of comprehension (CoC), contributes to high-order comprehension skills in native language (L1) reading. The current study investigated calibration of comprehension among bilingual (Hebrew-English) and trilingual (Arabic-Hebrew-English) university students across the languages they use. The study characterizes calibration abilities in L1, L2 & L3, and specifically asks whether calibration of comprehension is dependent on proficiency in lower level language skills or independent of them, and whether CoC is best conceptualized as a language-specific or domain general ability that may generalize across multiple languages. Results demonstrate that calibration ability is linked to improved comprehension across all participants and languages. From an individual differences perspective, we found some indications for shared processing across languages, suggesting recruitment of domain general meta-cognitive processes.

Email: Anat Prior, aprior@edu.haifa.ac.il

11:20-11:40 (231)

Mental Representations Of Time By Mandarin Monolinguals And Mandarin-English Bilinguals. WENXING YANG and YING SUN, *Yangzhou University* (Presented by Wenxing Yang) — Two experiments were undertaken to address whether Mandarin monolinguals and Mandarin-English (ME) bilinguals differ in their mental representations of time. In Experiment 1, participants were

asked to arrange in order a series of pictures depicting temporal sequences of natural events. In Experiment 2, a nonlinguistic prime (i.e., a horizontal or a vertical array of pictures depicting a temporal sequence of natural events) presented on the computer screen. Participants were asked to judge if the temporal sequence described in the pictures was in correct order. Converging evidence yielded from the two experiments demonstrate that Mandarin monolinguals and ME bilinguals resemble each other in their temporal thinking patterns. Both Mandarin monolinguals and ME bilinguals rely on a horizontal axis and a vertical axis to represent elapsing time. These results provide counter-evidence regarding the position that second language acquisition is a process in which speakers may undergo cognition reconstruction. Email: Wenxing Yang, stevenjcyang@126.com

11:40-12:00 (232)

Impact Of Second Language Immersion On Native Language Spoken Word Recognition. MORGAN HENLEY, XI REN, and ERYN ADAMS, *University of Missouri*, SHUHUA LI and TAOMEI GUO, *Beijing Normal University*, JUDITH F. KROLL, *University of California, Riverside*, MONA ROXANA BOTEZATU, *University of Missouri* (Presented by Mona Roxana Botezatu) — We evaluated the impact of second language (L2-Chinese) immersion on spoken word recognition in the first language (L1-English). English learners of Chinese studying abroad in Beijing, who varied on measures of Chinese proficiency, and English monolinguals identified spoken English words presented in noise. English words varied in phonological neighborhood density: high-density words (e.g., BAG) and low-density words (e.g., BALL). The phonological neighborhood was separately manipulated at word onset (cohort) and word offset (rhyme). Monolingual and learner groups were matched on cognitive resources; working memory correlated positively with L2-Chinese proficiency. All participants were less accurate in identifying English words from denser phonological neighborhoods. Critically, the magnitude of the density effect for cohorts was larger for learners with lower Chinese proficiency than for monolinguals and more proficient learners. In contrast, the magnitude of the density effect for rhymes was smaller in both learner groups relative to monolingual controls. This pattern of results suggests that the auditory processing of word onsets and offsets may be impacted differentially as a function of L2 proficiency in L2 immersion.

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Learning and Memory II

Graanbeurszaal, Friday, 10:40-12:20

Chaired by Jan De Houwer, Ghent University

10:40-11:00 (233)

Self-Regulation Training In High School Students: Effects On Cognitive, Self-Reported And Behavioral Measures.. BARBARA STUDER-LUETHI, *University of Bern - Division of Neuropsychology* (Presented by Barbara Studer-Luethi) — Self-control depends on a limited resource which becomes depleted by small acts of self-control. Like a muscle, regular practice of small acts of self-control can build up self-control strength. The present study examines the effects of four different training interventions on cognitive, behavioral and self-report measures of self-control as well as life satisfaction. 286 high school students spent two weeks practicing one of four self-regulation exercises: controlling and improving posture, refraining from a self-chosen verbalism (speech), writing down three good things and giving a reason why they were positive, reading two statements of self-regulation a day

sent by a text message (knowledge, active control group). Training exercises were self-administered during ongoing school hours, whereas motivation and compliance measures were reported by a training journal. The training did not show significant differences on behavioral self-control (handgrip task) or cognitive response inhibition (cue-dependent go/no-go task). However, differential effects were observable regarding some variables and writing down three good things a day did have a positive effect on life satisfaction.

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11:00-11:20 (234)

Social Encoding Enhances The Formation Of Both Veridical And False Memories In The DRM Paradigm. ULLRICH WAGNER and GERALD ECHTERHOFF, *University of Münster*

(Presented by Ullrich Wagner) — In the Deese-Roediger-McDermott (DRM) memory paradigm, the rate of false memories for information that has not been presented, but is semantically highly related to the actually learned material, can be elicited to an extent that sometimes even reaches the rate of correct memories. This phenomenon is thought to result from a dynamic encoding process in which pieces of information are not merely stored separately, but also condensed to a gist memory. The present study investigates whether this process is supported when information is encoded socially (i.e., with relevance to another person), using the DRM paradigm in an experimental joint action procedure in which memory enhancement due to social encoding has previously been demonstrated. Results show that in the DRM paradigm, social as opposed to non-social processing of information not only enhanced veridical memories, but also false memories, indicating socially supported extraction of gist memories at Encoding.
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11:20-11:40 (235)

Distributing Person Memory: Groups As Memory Extensions Of Isolated Individuals. MARGARIDA VAZ GARRIDO, *ISCTE-Instituto Universitário de Lisboa*, LEONEL GARCIA-MARQUES, *University of Lisbon* (Presented by Margarida Vaz Garrido) (Sponsored by Gün Semin) — Three experiments investigated collaboration in person-memory assuming that both retrieval and encoding of impression-relevant information are collaborative processes. Nominal groups of 3 isolated individuals forming impressions about a social-target, recalled more target-information than collaborative-groups (i.e., the collaborative-inhibition effect). When impressions were collaboratively formed, collaborative-inhibition was significantly reduced (Exp.1). Exp.2 examined the specific mechanisms underlying shared encoding/retrieval by manipulating the degree of elaboration of the information presented at encoding. Highly elaborated information (compared) was better recalled than less elaborated one (trait-inference). This occurred even when the elaborative processing was undertaken by others: higher recall in baseline conditions (anticipation) for elaborated items. Exp.3 using virtual-groups, replicated the anticipation condition. Overall the collaborative nature of impression-formation determined the emergence of collaborative-inhibition. Shared encoding reduced the collaborative-inhibition effect and participants benefited from the elaboration processes of other group members revealing the truly distributed nature of this process.
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11:40-12:00 (236)

Improving Teenagers' Creativity With Improvisation Theatre. MATHIEU HAINSELIN and BÉATRICE BOURDIN, *Université de Picardie Jules Verne, CRP-CPO EA 7273* (Presented by Mathieu Hainselin) — Previous research indicates that Improvisation Theater (improv) improves adults' creativity, in particular divergent thinking. Here, we evaluated creativity before and after a 12-week improv class in a group of 20 teenagers (10-12 years old) and in a sports control group during the same period. We evaluated divergent thinking using the Alternative Uses Task (AUT). For the participants in the improv group, there was better performance in fluency ($p < .004$), flexibility ($p < .003$) and originality ($p < .006$) after the 12 weeks compared to before, but no difference for elaboration ($p = .44$). No difference was found for any measure for the control group. These first results confirm the impact of improv on creativity, not only for adults but also for teenagers. We need to conduct further research with larger sample and to assess creativity with long term follow-up session to know if this improvement is fleeting or durable. Pedagogical implications will be discussed.
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12:00-12:40 (237)

Kicking The Habit: Why Evidence For Habits In Humans Might Be Overestimated. JAN DE HOUWER, *Ghent University*, AYUMI TANAKA, *Doshisha University*, AGNES MOORS, *University of Leuven*, HELEN TIBOEL, *Erasmus University Rotterdam* (Presented by Jan De Houwer) — Researchers typically classify behavior as habitual if it occurs independently of changes in the value of its outcomes (revaluation test) or the impact it has on those outcomes (contingency degradation test). We argue that these tests are valid only if they (a) are sufficiently sensitive (sensitivity criterion) and (b) target the outcomes that might actually control behavior (information criterion). Past and future evidence for habits should be evaluated in light of these criteria. We illustrate this approach by applying the information criterion to the studies conducted by de Wit et al. (2007, 2013). In three experiments that were modelled after these studies, we used alternative revaluation and contingency degradation tests that targeted other outcomes than those targeted in the original studies. These alternative tests consistently provided evidence for knowledge of outcomes that could have controlled seemingly habitual behavior. Our results suggest that the revaluation test used by de Wit et al. (2007, 2013) did not meet the information criterion, which questions the validity of their conclusions regarding the habitual nature of the observed behavior.
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Decision Making II

Berlagezaal, Friday, 10:40-12:00

Chaired by Lael J. Schooler, *Syracuse University*

10:40-11:00 (238)

A Computational Model For Risky Decisions: Using Eye-Movements To Improve Choice Predictions. MOSHE GLICKMAN, ORIAN SHARONI, DINO LEVY, and MARIUS USHER, *Tel-Aviv University* (Presented by Moshe Glickman) (Sponsored by Marius Usher) — A key question in decision-making is how people integrate information (payoffs and probabilities) to form preferences between risky alternatives. Here, we relied on eye-fixations during decision between lotteries in order to contrast between two types of mechanisms: i) accumulation of preferences based on comparisons between attributes, ii)

accumulation of subjective-utility within each alternative. Experimental results ($N=31$) demonstrated that participants were sensitive to the normative values of the alternatives and showed risk-aversion, which correlates with the pattern of eye-fixations. Mechanism (i) was implemented in a model assuming that preferences are integrated by eye-shifts between alternatives that compute normalized attribute differences. Mechanism (ii) was implemented in a model assuming a within alternative integration, which is multiplicative in nature and proceeds based on two-layers of leaky-accumulators. Model comparison (BIC/AIC and



cross-validation) supported the second model. This model also accounted for the correlation between the risk-aversion and the proportion of fixation to payoffs.

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11:00-11:20 (239)

Integration To Boundary In Decisions Between Sequences Of Numerical Values. MARIUS USHER and MOSHE GLICKMAN, *Tel-Aviv University* (Presented by Marius Usher) — Integration to boundary is an optimal algorithm of choice, which allows to integrate evidence and average out noise, resulting in the fastest choice-time for a given level of accuracy. This choice algorithm was shown to account well for data in perceptual choice tasks with static stimuli or rapidly fluctuating ones. Here we show that integration to boundary extends to a task in which participants are presented with sequences of pairs of numbers (sampled from two overlapping Gaussians) at a rate of 500 ms/pair. The participants are required to decide, which of two sequences originates from a distribution with a higher mean. Most participants are able to choose accurately (>80%) after 6 samples (average) for sequences with a signal/noise of 0.35. The results support the integration to boundary, compared with a random stopping model. We fit the data with a leaky integration model and examine how speed/accuracy manipulations affect the integration-boundary.

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11:20-11:40 (240)

Neural Representations Of Risk Preferences: Experimental Tests Of Prospect Theory And Fuzzy Trace Theory. VALERIE REYNA, *Cornell University*, CHRISTINA CHICK, *Stanford University*, REBECCA WELDON, *Juniata College*, YUVAL EREV, *Tristan Ponzo*, and SHUTING LU, *Cornell University* (Presented by Valerie Reyna) — Framing effects—risk preferences reverse for equivalent options—demonstrate irrationality and are a cornerstone of prospect theory (PT). Neuroimaging results have been interpreted as consistent with PT's nonlinear functions for outcomes and probabilities, which are compensatory. In contrast, fuzzy-trace theory (FTT) suggests that framing effects are driven

by simplified categorical (noncompensatory) gist representations of options. Behavioral tests comparing predictions of these two theories have shown that FTT can explain effects that PT cannot. We tested whether a manipulation of selective attention could distinguish between theories at the level of the brain. As predicted, manipulations increased or decreased framing-consistent choices and activation in supporting brain regions. Dorsal striatum activation mirrored behavioral effects for both gains and losses. Contrasts revealed amygdala, ventromedial prefrontal, and parietal cortex activation, among other areas. Moreover, individuals who made more framing-consistent decisions showed increased inferior parietal activation during these decisions, which correlated with self-reported risk-taking.

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11:40-12:00 (241)

Cognitive Costs Of Decision-Making Strategies: A Resource Demand Decomposition Analysis With A Cognitive Architecture. HANNA B. FECHNER, *University of Zürich*, LAEL J. SCHOOLER, *Syracuse University*, THORSTEN PACHUR, *Max Planck Institute For Human Development* (Presented by Lael J. Schooler) — To measure the effort—or cognitive costs—associated with a decision strategy we developed a method we call Resource Demand Decomposition Analysis (RDDA). RDDA attributes the effort required by a strategy to the demands it places on specific cognitive resources. We instantiate RDDA and simulate strategies in the ACT-R cognitive architecture. Using RDDA, we compared the cognitive costs of two prominent decision strategies, take-the-best (TTB) and tallying. Because TTB may ignore information and forego information integration, it has been said to entail lower cognitive costs than strategies like tallying. However, simulations and a behavioral study demonstrate that under increasing cognitive demands the response times of TTB can exceed those of tallying. RDDA suggests TTB requires more working memory updates and memory retrievals than tallying. The results illustrate the benefits of assessing the cognitive costs of a strategy by understanding how it is embedded in the cognitive system.

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Emotion and Cognition I

Administratiezaal, Friday, 10:40-12:00

Chaired by Magda Dumitru, *University of Liege*

10:40-11:00 (242)

Insult Back Or Empathize With The Insulter? Cognitive Strategies For Dealing With Insults. MARIJN STRUIKSMA, *Utrecht University*, HANNAH DE MULDER, *Leiden University*, ELLA BOSCH, *Donders Institute for Brain, Cognition, and Behaviour*, JOS VAN BERKUM, *Utrecht University* (Presented by Marijn Struiksma) — Being on the receiving end of an insult is an unpleasant experience (Dill et al. 2004). We explored, with EEG and self-reported negative affect, how recipients can best regulate negative feelings in response to a series of insults presented in a WhatsApp-like chat environment. We compared a passive-reading group to a group who insulted the insulter back (e.g. "it takes one to know one!") and a group who empathized with the insulter (e.g. "you must be having a bad day"). Unexpectedly, the empathy group displayed enhanced emotional processing (LPP), whereas the insult-back group did not differ from the passive-reading group. All groups felt increasingly negative about themselves. However, while insults that are met with empathy induce enhanced emotional processing, the empathy strategy does lead people to

feel less negatively about the insulter. Compared to insulting back or doing nothing, reappraising the situation via empathy may thus reduce negative affect overall.

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11:00-11:20 (243)

Direct And Indirect Measures Of Affective Response Caused By Implicit Learning. IVAN IVANCHEI, *Russian Academy of National Economy and Public Administration* (Presented by Ivan Ivanchei) — New objects structurally similar to those seen before are processed as more pleasant than new structurally dissimilar objects. It occurs even if subjects are not consciously aware of any underlying structure (e.g., Newell & Bright, 2001). Using artificial grammar learning paradigm, we wanted to find out: 1) are direct (N-point scale of pleasantness evaluation) and indirect (affective priming, e.g. Fazio, 2001) measures of affect are equally sensitive in detecting tacit structure learning; 2) are incorrect decisions (classification of structured sequence as unstructured or vice versa) are processed as negative events. Results. New objects with familiar underlying structure gave rise to positive affect. Erroneous

decisions regarding underlying structure of these objects are also processed as negative events, suggesting some mechanisms of unconscious conflict monitoring (Jiang et al., 2016). The effect of errors was detected only by indirect measures of affect.

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11:20-11:40 (244)

Effect Of Mood Induction On State Anxiety: An Experimental Study. IRAM BATOOL, SANA FATIMA, and RUQIA SAFDAR BAJWA, *Bahauddin Zakariyya University* (Presented by Dr.Iram Batool) (Sponsored by None None) — This research was aimed to see the effects of mood induction on anxiety. Induced mood plays a major role in manipulation of current (situational) mood and emotions. Theories suggest that level of anxiety will be increased or decreased according to the nature of induced stimuli. A total of 246 students (Experimental group= 126 and Control group= 120) from Bahauddin Zakariyya University participated in this experimental study. A quasi experimental design was used for this research. In class room setting positive and negative stimuli were presented and immediately effects of induced stimuli were measured. To test hypothesis independent t-test, correlation and paired sample T-test analysis was used. The results showed that

level of anxiety was higher among those who had high level of trait anxiety and were negatively induced ($p>0.05$). Findings regarding the relationship between state-trait anxiety and personality traits showed positive correlation between state and trait anxiety (.216^{***}) and agreeableness and conscientiousness also has a significant correlation with state anxiety. Results revealed that mood induction showed effect on person's level of state anxiety (before and after intervention $T=-3.64$, $P=.000^*$, $p<0.001$).

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11:40-12:00 (245)

Covertly-Induced Emotional States Modulate Task Performance. MAGDA L. DUMITRU, *University of Liege* (Presented by Magda Dumitru) — In a series of recent studies, Dumitru and colleagues asked participants to complete several experimental tasks designed to evaluate their perceptual, conceptual, and decision making skills, while covertly manipulating their emotional states. There were significant differences between default and manipulation conditions across tasks, highlighting the rather fluid divides between thinking and emotion as well as the simplicity and effectiveness of the modalities employed to alter task performance. Email: Magda Dumitru, magda.dumitru@gmail.com

SYMPOSIUM IV: Shaping Attention Selection

Effectenbeurszaal, Friday, 13:40-15:40

Chaired by Jan Theeuwes, *Vrije Universiteit Amsterdam*

(46)

Lingering Biases of Attentional Selection. JAN THEEUWES, *Vrije Universiteit Amsterdam* (Presented by Jan Theeuwes) — Lingering biases of attentional selection affect the deployment of attention above and beyond top-down and bottom-up control. We argue that selection history modulates the topographical landscape of spatial 'priority' maps, such that attention is biased towards locations having the highest activation on this map. The present study investigated the extent to which statistical regularities affect both attentional and oculomotor control. Participants performed a visual search task in which they searched for a shape singleton while ignoring a color distractor singleton. The distractor color singleton was presented more often in one location than in all other locations. Even though observers were not aware of the statistical display regularities, the regularities biased selection such that locations that were likely to contain a distractor were suppressed relative to all other locations. Email: Jan Theeuwes, J.Theeuwes@vu.nl

(42)

Self-Biased Attention: The Relationship Between Ownership and Value Attentional Prioritization. REBECCA TODD, *University of British Columbia* (Presented by Rebecca Todd) — It is well established that emotionally and motivationally salient stimuli implicitly guide attention. Moreover, there is ample evidence that we endow the things we own with higher value. In a series of studies we examined whether attentional prioritization was conferred on everyday items through simple assignment of ownership. Participants learned that objects either belonged to themselves or the experimenter and subsequently performed a temporal order judgment task as a measure of attentional prioritization. Self-owned objects were consistently prioritized. Although individual differences in self-biased attention were not associated with loss aversion, participants revealed overall more positive associations with self-owned objects. We next manipulated reward levels to

examine whether higher reward for other-owned objects could reverse the cognitive advantages of ownership. Failure to reverse the effect suggests two competing possibilities: Altering the ownership effect may require a larger reward, or self-relevance and money may differentially affect the reward system. Email: Rebecca Todd, becket.todd@gmail.com

(43)

Effects of Risk and Reward on Attentional and Oculomotor Selection. MIKE E. LE PELLEY, *UNSW Sydney* (Presented by Mike E. Le Pelley) — Classical studies of decision-making have examined how people's explicit evaluations ("Which is better: option A or option B?") are influenced by rewards and risks. Recent work suggests that rewards and risks also influence more 'implicit' decisions made by our perceptual-cognitive system, regarding where to move our eyes next. Specifically, stimuli that have previously signalled the availability of reward become more likely to capture our eye movements, and the likelihood of capture depends critically on the magnitude and (un)certainly of reward signalled by the stimulus. Here we describe a set of studies investigating whether risk/reward exerts a similar effect in the context of explicit evaluations versus implicit eye-movements—which might suggest a common reward-representation underlying both—or whether it is possible to dissociate decisions at these different levels of the cognitive hierarchy. These findings provide insight into how goal-directed and automatic behavior can be shaped by our previous experiences. Email: Mike E. Le Pelley, m.lepelley@unsw.edu.au

(44)

Reward and Prior Selection Can Bias Visual Selective Attention. ANNA SCHUBÖ, *Philipps-University Marburg* (Presented by Anna Schubö) — Selective attention focuses our limited processing resources on relevant information to allow acting coherently in the visual world. Recent research has shown that many instances of attentional selection are



neither resulting from top-down nor bottom-up control, but are a consequence of the observer's "history of selection". Using a visual selection task, we investigated the role of reward and other history-driven effects by analysing lateralized ERP components N2pc, ND and PD. Results showed that target and distractor processing were modified by both reward and prior selection, and that attention was captured by stimuli from a category previously learned to be valuable even when now detrimental to task performance. The results underline the role of selection history in addition to top-down and bottom-up control. Email: Anna Schubö, schuboe@uni-marburg.de

(45)

How Attention and Reward Determine the Learning of Stimulus-Response Associations. MATTHEW SELF, *Netherlands Institute for Neurosciences Amsterdam* (Presented by Matthew Self) — We can learn new tasks by listening to a teacher, but we can also learn by trial-and-error. Here, we investigate factors that determine how participants learn new stimulus-response mappings by trial-and-error. Does learning in human observers comply with reinforcement learning theories, which describe how subjects learn from rewards and punishments? If yes, what is the influence of selective attention in the learning process? We developed a novel redundant-relevant learning paradigm to examine the conjoint influence of attention and reward feedback. Subjects only learned stimulus-response mappings for attended shapes, even when unattended shapes were equally informative. Reward magnitude also influenced learning, an effect that was

stronger for attended than for non-attended shapes and carried over to a subsequent visual search task. Our results provide insights into how attention and reward jointly determine how we learn. They support powerful learning rules that capitalize on the influence of both factors on neuronal plasticity. Email: Matthew Self, m.self@nin.knaw.nl

(41)

Plasticity of the Human Attention System: The Impact of Reward and Statistical Learning on Priority Maps of Space.

LEONARDO CHELAZZI, *University of Verona* (Presented by Leonardo Chelazzi) — We recently demonstrated that reward can alter the "landscape" of spatial priority maps, increasing priority for locations associated with greater reward relative to less rewarded locations. Importantly, the effects persisted for several days after the end of learning and generalized to new tasks and stimuli. We have now begun to assess whether similar effects can be induced via statistical learning. In a series of experiments using variants of visual search, unbeknownst to the participants, we manipulated the probability of occurrence of the sought target and/or of a salient distractor across locations. Results indicate that, analogous to the influence of reward, uneven probabilities of the critical items alter deployment of attention in a persisting fashion. As for reward, we argue that these effects reflect durable changes in priority maps of space, implementing "habitual attention". In summary, reward and statistical learning appear to be strong (and implicit) determinants of attentional deployment. Email: Leonardo Chelazzi, leonardo.chelazzi@univr.it

Autobiographical Memory

Administratiezaal, Friday, 13:40-15:20

Chaired by Marianne Littell, Erasmus University Rotterdam

13:40-14:00 (246)

Personal Past And Personal Future: What Distinguishes Involuntary Memories And Involuntary Thoughts? GIULIANA MAZZONI, *University of Hull* (Presented by Giuliana Mazzoni) — During the past 20 years involuntary memories have been established as a noteworthy phenomenon, which occurs spontaneously in everyday life and with greater frequency than expected. They are about personal rather mundane events and tend to be triggered by external rather than internal cues. Spontaneous thoughts also occur involuntarily and very frequently, both in the normal population and in clinical groups. This talk focuses on spontaneous thoughts in the normal population with the aim of understanding similarities and differences both in content and processes between involuntary memories and involuntary thoughts, considering that both are not intentionally planned, both often pertain to personal matters. Two studies will be presented in which involuntary memories and thoughts are obtained in an experimental setting that mimics a mind-wandering task. Initial results show that the production of both can be disrupted by minimal variations in the procedure, and both engage cognitive resources. Future involuntary thoughts seem to require more cognitive effort than other types of thoughts and memories. Results also reveal the existence of two rather different types of future involuntary memories. Email: Giuliana Mazzoni, giulianamazzoni3@gmail.com

14:00-14:20 (247)

Representing Shared Past: What Makes Public Events More Memorable In Turkey? SAMI GÜLGÖZ, *Koç University*, SEZİN ÖNER, *Kadir Has University* (Presented by Sezin Öner) —

Common processes involved in remembering personal and public events have led researchers to examine public events as a part of the autobiographical memory. In line, we included participants with large age ($N = 1800$) range and examined what makes some events more memorable. In Turkey, Participants reported six most important events that participants experienced in their life and rated the phenomenological properties. In contrast to the literature, we did not find any reminiscence bump for the reported events. Most of the events came from the very recent past and they were mostly extended events. Not recollective features but a metacognitive factor that is the extent event is perceived as part of the collective past was the robust predictor of the frequency of recall. Findings will be discussed considering the role of the collective agenda in the construction of collective memories. Email: Sezin Öner, sezin.oner@khas.edu.tr

14:20-14:40 (248)

Conversational Time Travel In Everyday Life: A Naturalistic Observation Method.

BURCU DEMIRAY, *University of Zurich*, MATTHIAS MEHL, *University of Arizona*, MIKE MARTIN, *University of Zurich* (Presented by Burcu Demiray) — We examined mental time travel in everyday conversations using a novel, naturalistic observation method: Electronically Activated Recorder (portable audio recorder that periodically records snippets of ambient sounds and speech). We developed and validated a coding scheme for "conversational time travel" and examined how much individuals talked about their past versus future. Study 1 included American adults who carried the EAR over one weekend and were recorded every 9 minutes for 50 seconds. Study 2 included young and healthy older adults

from Switzerland who carried the EAR for four days. 30-second recordings occurred randomly throughout the day. Sound files that included speech were coded in terms of temporal focus (past, future, present) and autobiographical nature (self versus others). Results were consistent across samples and showed that only 16% of utterances were time-independent with no reference to time. The remaining were mostly autobiographical, in which individuals mostly talked about their present situation. They talked about their past two to three times as much as their future. This is in contrast to past research showing a prospective bias in thinking, based on self-report and experience-sampling methods.

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14:40-15:00 (249)

A Cross-Cultural Investigation Of The Reminiscence Bumps For Important And Word-Cued Autobiographical Memories.

JUSTIN T. COLEMAN, *Medgar Evers College*, STEVE M.J. JANSSEN, *University of Nottingham-Malaysia Campus*, ROBERT F. BELL, *University of Nebraska-Lincoln* (Presented by Justin Coleman) — The current study examines differences in the temporal distributions of important and word-cued autobiographical memories as well as cross-cultural differences in the reminiscence effect. A national sample of 443 American adults aged 40 and over consisting of 224 African Americans and 219 Caucasian Americans reported 10 important and 10 word-cued autobiographical memories, the age at which they occurred, and rated the emotion of the events being remembered. Results show that the reminiscence bump for word-cued memories occurs earlier than for important memories, as described by Janssen (2015). Significant chi-square results indicate that more cultural life script events are recalled for important memories than for word-cued memories, suggesting that recall for these two cueing methods is structured by separate phenomena. Cross-cultural analyses show that, overall, differences in the temporal distribution of memories between races are minimal, but some differences are observed as a function of a combination of race,

emotional valence, and cue-type. Potential differing phenomena responsible for the structuring of the recall of important and word-cued autobiographical memories are discussed.

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15:00-15:20 (250)

The Effects Of Noradrenergic Activation On The Attenuation Of Emotional, Autobiographical Memories By Dual-Task Interventions: Results From Studies Using An Eye Movement Paradigm.

MARIANNE LITTEL, *Erasmus University Rotterdam*, LEON KENEMANS and JOHANNA BAAS, *Utrecht University*, ALEXANDER LOGEMANN, *Eötvös Loránd University*, MALOU REMIJN and NELLIE RIJKEN, *Utrecht University*, RUTGER HASSINK, *University Medical Center Utrecht*, ANGELICA TINGA, *Tilburg University*, MARCEL VAN DEN HOUT and IRIS ENGELHARD, *Utrecht University* (Presented by Marianne Littel) — Eye movement desensitization and reprocessing (EMDR) is an effective treatment for posttraumatic stress disorder. It uses a dual-task approach: patients retrieve traumatic memories while making lateral eye movements (EM). Laboratory studies have consistently shown that this dual-task component renders the memories less vivid and emotional when they are later recalled again. Recalling highly emotional autobiographical memories enhances noradrenergic (NA) neurotransmission. NA strengthens memory (re)consolidation. However, memories become *less* vivid after recall + EM. Therefore NA might either play no significant role *or* serve to strengthen memories that are attenuated by EM. In other words, arousal-related NA release might contribute to the reconsolidation of memories that have become inferior by a dual-task approach. This talk gives an overview of a series of studies that were designed to test the possible beneficial effects of arousal-related NA activity on memory recall + EM. In these studies it was predicted that increasing NA release (stress task, yohimbine) would enhance the memory degrading effects of EM and blocking NA (propranolol) would reduce these effects. During the talk results are presented and critically discussed.

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Bilingualism II

Veilingzaal, Friday, 13:40-15:20

Chaired by Kalinka Timmer, *Universitat Pompeu Fabra*

13:40-14:00 (251)

Who You Are Talking To Matters! The Role Of Interactional Context On Executive Control.

PRATIK BHANDARI, *Basque Center on Cognition, Brain, and Language*, RAMESH KUMAR MISHRA and SEEMA GORUR PRASAD, *University of Hyderabad* (Presented by Ramesh Kumar Mishra) — Is executive control in a bilingual modulated depending on who she is talking to? Does second language proficiency (L2) play a role? Thirty-six Telugu-English bilinguals were familiarized to monolingual, bilingual and neutral cartoon-like interlocutors. This was followed by Attentional Network Test (ANT) with the image of an interlocutor appearing on every trial before the target. The interlocutor images were presented either in blocks ("Pure context") or mixed together randomly ("Mixed context"). Participants were divided into high and low L2 proficient groups (HP and LP) by a median split on L2 proficiency composite score. The analysis of the executive network showed that HP bilinguals were faster ($p = 0.004$) than LP bilinguals, but only in the mixed context. No differences were observed in the "Pure context" suggesting that HP bilinguals bring

in higher executive control compared to the LP bilinguals only when the interactional context becomes demanding. We interpret our results with respect to adaptive control hypothesis.

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14:00-14:20 (252)

First Language Production Influenced By Brief Exposure To The Second Language Of Bilingual Speakers.

TAMAR DEGANI, *University of Haifa*, HAMUTAL KREINER, *Ruppin Academic Center*, HAYA ATARIA and FARHA KHATEEB, *University of Haifa* (Presented by Tamar Degani) — Bilinguals routinely shift from one language to the other. We examined the consequences of such shifts by testing how production in bilinguals' first language (L1) is affected by recent brief (few minute) exposure to the second language (L2). In Exp. 1, Arabic-Hebrew bilinguals named pictures in Arabic (L1) before and after a short L2 *production* task. In Exp. 2, Hebrew-English bilinguals named pictures in Hebrew (L1) before and after a short L2 *comprehension* task. To test whether the brief-exposure effect reflects item-based competitive mechanisms or more global mechanisms, half of the items in the post-exposure naming task were new and half were repeated from the exposure



task. Overall bilinguals were less accurate and produced more L2 intrusions following brief L2 exposure, and these effects were similar for repeated and new items. Thus, extending previous literature showing L1 on L2 effects (Kreiner & Degani, 2015), the present study demonstrates that even brief L2 exposure can affect subsequent performance in the dominant L1 language. Moreover, the effect operates in a global way beyond item-based mechanisms, highlighting the importance of language context and the dynamic nature of bilingual performance.

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14:20-14:40 (253)

Alphabet Switching And Memory Load: A New Perspective On Bilingual Processing. DUŠICA FILIPOVIĆ ĐURĐEVIĆ, *University of Novi Sad*, LAURIE BETH FELDMAN, *The University at Albany, State University of New York* (Presented by Dušica Filipović Đurđević) — We take advantage of the phonological ambiguity effect (PAE) in Serbian (Feldman & Turvey, 1983) to investigate the involvement of working memory in word recognition. We subject participants to a working memory load while they engage in a visual lexical decision task with phonologically ambiguous and phonologically unambiguous renditions of the same words, presented in Cyrillic or Roman letters (sound-letter ambiguity varies with alphabet). We replicate the PAE in both mixed and single alphabet condition. However, only in the mixed-alphabet condition do we observe its increase with memory load as well as a secondary task by ambiguity interaction. In addition to phonological loop load and visuospatial sketchpad load being more detrimental for phonologically ambiguous than unambiguous words the PAE was larger during central executive load. Results reveal, for the first time, the involvement of executive functions in the process of alphabet switching thus drawing parallels between bialphabetism and bilingualism

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14:40-15:00 (254)

On The Role Of Language Membership Information During Word Recognition In Bilinguals: Evidence From Flanker-Language Congruency Effects. MATHIEU DECLERCK, JOSHUA SNELL, and JONATHAN GRAINGER, *Aix-Marseille*

Université and Centre National de la Recherche Scientifique (Presented by Mathieu Declerck) — According to some bilingual language comprehension models (BIA), language membership information has a direct influence on word processing. However, this idea is not shared by all models (BIA+). To investigate this matter, we manipulated the language membership of irrelevant flanking words while French-English bilinguals performed a lexical decision task on centrally located target words and nonwords. The target words were either French or English words, flanked by words that were either in the same language as the target (language congruent) or in the other language (language incongruent). We found that lexical decisions to target words were harder in the language-incongruent condition, indicating that language membership information was extracted from flanking words and that this affected identification of central target words, as predicted by the architecture of the BIA model.

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15:00-15:20 (255)

On The Flexibility Of Bilingual Language Control: The Effect Of Language Context. KALINKA TIMMER, *Universitat Pompeu Fabra*, INGRID K. CHRISTOFFELS, *Centre of Expertise for Vocational Education*, ALBERT COSTA, *Universitat Pompeu Fabra* (Presented by Kalinka Timmer) — How flexible is bilingual language control and how does it adapt to the linguistic context of a conversation? We address this by looking at the pattern of switch costs in contexts involving mostly the use of a dominant or non-dominant language. This linguistic context affected switching patterns: Switching was equally costly for both languages in a dominant (L1) context, while switching was harder for the weaker language in the non-dominant (L2) context. Also, naming latencies for each language were affected by the linguistic contexts: Only the dominant L1 context led to slower latencies for the dominant language. This latter finding was also present when looking at the amplitude of the LPC component, which may reveal differences in the way inhibitory control is applied depending on the linguistic context. These results reveal that the bilingual language control system is flexible and that it adapts to the linguistic context in which the speaker is placed.

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Letter/Word Processing II

Graanbeurszaal, Friday, 13:40-15:00

Chaired by Betty Mousikou, Max Planck Institute for Human Development

13:40-14:00 (256)

Re-Evaluating The Development Of Letter Position Coding With Longitudinal Data. JANA HASENÄCKER and SASCHA SCHROEDER, *Max Planck Institute for Human Development* (Presented by Jana Hasenäcker) — Reading development involves several changes in orthographic processing. A key question is, how the coding of letter position develops. As a marker of this development, transposed-letter primes have been compared to different control primes – substituted letter primes, all-letter-different primes, and identity primes – with somewhat contradicting results that have led to opposing developmental theories. We present new evidence from a masked lexical decision task including all four prime conditions in a large longitudinal study with 100 children from grade 2 to 4 and an adult control group. The results suggests that the observed effects are driven by faster development of the processing of identity primes rather than changes in the processing of transposed-letter primes. We

re-evaluate previous findings of letter position coding in light of this new evidence and discuss the implications for developmental models of orthographic processing.

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14:00-14:20 (257)

Neural Mechanisms For Rapid Online Word-Form Learning In Visual Modality In The Absence Of Semantics: ERP Evidence. BEATRIZ BERMÚDEZ-MARGARETTO, *Higher School of Economics National Research University*, YURY SHTYROV, *Aarhus University*, ALBERTO DOMÍNGUEZ, *Universidad de La Laguna*, FERNANDO CUETOS, *Universidad de Oviedo* (Presented by Beatriz Bermúdez-Margaretto) — Novel word acquisition has been reported as a fast process, enabling learners to construct memory traces for new spoken words after only a handful of exposures. However, this rapid learning has not been systematically reported in visual modality, and different studies argue that longer training periods and/or access to new word meaning are needed to acquire

representations for visually presented language. We used EEG to explore brain activity dynamics during a brief exposure (six trials) to novel meaningless word-forms. ERP analysis showed rapid changes in the P200 component, whose amplitude increased with this short exposure and reached that produced by familiar words, likely reflecting build-up and activation of lexical memory traces. Neural sources underpinning this dynamics were found in the left lingual gyrus. We conclude that even a short training with meaningless orthographically and phonotactically legal word-forms leads to developing novel neurolexical memory traces, similar to those for pre-existing words.

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14:20-14:40 (258)

How (Not) To Measure Individual Differences In Lexical Processing Ability. XENIA SCHMALZ, *Ludwig-Maximilians-Universität München*, ELEONORA BORELLI, *Università degli Studi di Modena e Reggio Emilia*, PIERLUIGI ZOCCOLOTTI, *Sapienza Università di Roma*, ALESSANDRO LAUDANNA, *Università degli Studi di Salerno*, CLAUDIO MULATTI, *Università degli Studi di Padova* (Presented by Xenia Schmalz) — Lexical processing is a cognitive process where a reader automatically accesses knowledge about a familiar written word upon presentation (Castles & Nation, 2007). This process is necessary for fluent reading: if lexical information is unavailable, readers are forced to rely on the slow and effortful letter-by-letter decoding (Coltheart et al., 2001). Numerous psycholinguistic marker effects have been used to study lexical processing on a group level, however, it is unclear whether they are suitable for studying or assessing individual differences. A further open question is whether different tasks reflect the same lexical processing construct. To address these questions, we tested 100 adults on 9 different marker effects of lexical processing in

lexical decision, reading aloud, and letter detection tasks. Using Linear Mixed Effect Models, we explore the presence or absence of individual differences, and whether performance on the different tasks is correlated.

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14:40-15:00 (259)

A Cross-Linguistic Study On The Role Of Morphology In Developmental And Skilled Reading. BETTY MOUSIKOU, *Max Planck Institute for Human Development*, ELISABETH BEYERSMANN, *Macquarie University*, JOHANNES C. ZIEGLER and JONATHAN GRAINGER, *Aix-Marseille Université and Centre National de la Recherche Scientifique*, SASCHA SCHROEDER, *Max Planck Institute for Human Development* (Presented by Betty Mousikou) — Developmental reading research has traditionally focused on how children learn to read simple words via mapping letters/graphemes onto sounds. Little is known about the processes at play when children learn to read morphologically-complex words, which form the vast majority of words in most of the world's languages. Our study investigates the role of morphology in developmental and skilled reading in French and German, which differ in terms of their morphological productivity. The results from various tasks in different modalities (e.g., aural and visual lexical decision, reading aloud) show that morphology influences word recognition processes similarly in French and German adults. In contrast, German children in Grade 2 seem to be more sensitive to the morphological characteristics of their language than French children, thus suggesting that the morphological richness of a language may shape reading acquisition and development. We discuss the implications of our findings for extant theories of reading.

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Statistics and Methodology

Berlagezaal, Friday, 13:40-15:20

Chaired by Rink Hoekstra, University of Groningen

13:40-14:00 (260)

The Darc Toolbox: Automated, Flexible, And Efficient Delayed And Risky Choice Experiments Using Bayesian Adaptive Design. BENJAMIN T. VINCENT, *University of Dundee*, TOM RAINFORTH, *University of Oxford* (Presented by Benjamin T. Vincent) — Delayed and risky choice (DARC) experiments are a cornerstone of research in psychology, behavioural economics and neuroeconomics. By collecting an agent's preferences between pairs of prospects we can characterise their preferences and probe the underlying decision making mechanisms. We present a state-of-the-art approach and software toolbox allowing DARC experiments that maximise information gain per trial. This is particularly useful when testing special participant populations or when using EEG or fMRI, for example. We make advances over current Bayesian adaptive design methodology to achieve this real time and automatic performance, and demonstrate superior performance over alternative approaches. We provide a number of pre-prepared DARC tools for researchers to use, but a key contribution is an adaptive experiment toolbox that can be extended to virtually any 2-alternative-choice tasks. Users only need only specify a behavioural model and allowable stimuli - the software toolbox automates all other tasks.

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14:00-14:20 (261)

(Withdrawn) Statistical Trajectory Curves: An Analysis Technique To Address p Hacking And Other Biases Related To The Optional Stopping Of Data Collection. RICHARD B. ANDERSON, *Bowling Green State University* (Presented by Richard B. Anderson) — While in the midst of data collection, a researcher may choose to examine the data collected so far, as a means to decide whether to collect more data, or to stop. Such optional stopping permits a researcher to capitalize on chance—stopping data collection at a point where random sampling variability happens to have produced an especially impressive result. The present paper proposes an analysis method wherein the trajectory of the statistical criterion (such as a p value) is plotted to assess when to stabilize. Thus, the impressiveness of the result depends on the obtained degree of stabilization, rather than on any value that would be yielded by any particular stopping point. In principle, the technique can help minimize a variety of decision errors, such as Type I errors, Type II errors, and can reduce the overestimation (or underestimation) of the strength of the evidence favoring one statistical hypothesis over another.

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14:20-14:40 (262)

(Withdrawn) A(nother) Bayesian Approach To State Trace Analysis. MICHAEL KALISH and GREG COX, *Syracuse University* (Presented by Michael Kalish) — Until recently, the application of state-trace analysis had been limited by the lack of an appropriate statistical treatment to evaluate hypotheses in the face of measurement error. This talk provides an informal guide to the basic nature of STA, and to the problems inherent in developing statistical models. The essential insight of STA is that of a common order; for a state-trace of a collection of experimental conditions to be meaningfully one-dimensional on a set of dependent variables, the conditions must all be ordered in the same way across all of the variables. Assessing deviation from the best-fitting common order is the statistical problem for STA. We present a solution using Gaussian process regression that provides an interpretable metric of the strength of evidence for and against a single common order.

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14:40-15:00 (263)

Bayesian Modelling Of Speed-Accuracy Trade-Off Data: Evidence From The Response Deadline Procedure. ASLI KILIC, *Middle East Technical University* (Presented by Asli Kilic) — The speed-accuracy trade-off (SAT), defined as a tendency to trade response time for accuracy and vice versa, is a common problem in two-choice decision tasks. Employing a response deadline procedure provides a full time-course function which describes how cognitive processing unfolds over time. The response deadline procedure allows unbiased estimates of accuracy and speed independent from each other by signalling participants to respond in a controlled condition. In this investigation, a Bayesian model is proposed to estimate the accuracy and speed parameters

of SAT functions obtained from the response deadline procedure. The proposed model is derived from a Bayesian signal detection framework and defines accuracy as an exponential growth function of total processing time. The proposed model was applied to both hypothetical and perceptual data sets, and the obtained parameter estimates were evaluated for validity. The findings suggest that the proposed Bayesian framework can provide an effective approach to model SAT curves.

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15:00-15:20 (264)

An Empirical Analysis Of Alleged Myths Surrounding Coefficient Alpha. RINK HOEKSTRA, JORIEN VUGTEVEEN, and MATTHIJS WARRENS, *University of Groningen*, PETER KRUYEN, *Radboud University Nijmegen* (Presented by Rink Hoekstra) — Cronbach's alpha seems the most frequently used measure to investigate the reliability of measurement instruments in the social sciences. Nevertheless, many warn for its misinterpretation. These misinterpretations include interpreting alpha as indicating the one-dimensionality of a test score, and assuming independence between alpha and the test length. Moreover, supposedly many users use a fixed cut-off point to separate good from bad tests, despite there is no proper justification for that. These claims about regular misinterpretations, however, have not yet been supported by empirical data. To understand how common such beliefs are, we conducted a survey study to test researchers' who had used alpha knowledge of and beliefs about alpha. The results support claims that researchers have difficulty interpreting alpha properly, but simultaneously expounded the claims, by showing that whereas some misinterpretations are fairly typical, others are seldom seen.

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SYMPOSIUM V: Evidence and Scientific Knowledge in a "Post-Truth" World Graanbeursaal, Friday, 15:20-17:20

Chaired by Stephan Lewandowsky, *University of Bristol*

(51)

How to Respond to Persuasive Messages of Vaccine Deniers - Experimental Verification of a Two-Dimensional Debunking Strategy. PHILIPP SCHMID and CORNELIA BETSCH, *Universität Erfurt* (Presented by Philipp Schmid) — Facing vaccine deniers in public is a challenge for health authorities and approaches on how to respond to persuasive messages of vaccine deniers are rare. Recent best practice guidance by the WHO Regional Office for Europe suggests to use two dimensional debunking when facing a denier in public. In terms of the Persuasion Knowledge Model two dimensional debunking increases the audiences knowledge about the content and at the same time reduces the perceived adequacy of the persuasive technique that the vaccine denier is using. In comparison to conventional one-dimensional approaches this combination is expected to minimize the influence of persuasive messages of vaccine deniers on individuals intention to get vaccinated. The effectiveness of this new approach was analyzed in two online experiments. Results reveal that two-dimensional debunking is a promising approach to minimize the impact of vaccine deniers. A transfer of the strategy to other science domains is intended.

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(52)

Incentivized Accuracy in the Encoding and Retrieval of Partisan Information. VITTORIO MEROLA, BENJAMIN LYONS, and JASON REIFLER, *University of Exeter* (Presented by Benjamin Lyons) — We vary the timing at which we provide respondents with monetary incentives to heighten *accuracy motivation*. By providing the incentives before respondents receive information about a policy, we are evaluating whether a greater accuracy motivation at the time of the processing and encoding of new information can help reduce motivated bias. Conversely, by providing these incentives after the information about the policy, we are able to see whether a greater accuracy motivation during the memory retrieval and metacognitive phase is able to reduce motivated bias. Most importantly, we are able to compare these two effects to each other. The design thus allows us to answer questions about whether motivated bias when responding to political information might be caused by biased processing, recall or simply through automatic responses that fail to incorporate any new information.

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(53)

Empowering School Children to Make Informed Judgements on the Trustworthiness of Online Information Resources. GEOFF WALTON, *Manchester Metropolitan University* (Presented by Geoff Walton) — Research with young people demonstrates that

their ability to function in digital environments on a psychomotor level may well be impressive but cognitive responses need to be supported by mechanisms that increase their understanding of the information environment (Pickard et al, 2010). Lewandowsky (2012) reports that people, in general, adopt a cognitive default position of trusting information and it is unsurprising that young people demonstrate a similar trait. The work described here aims to build a new toolkit for digital literacy and informed digital citizenship drawing on previous research on trust (Pickard et al, 2010) and information discernment (Walton, 2017; Walton & Hepworth, 2011: 2013). The aim is to empower school children to make informed judgments on the trustworthiness of online information resources. This paper presents the findings of a project involving one case study of 16-17 year-old students in a UK school.

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(54)

The Fake News Game: Actively Inoculating Against the Spread of Misinformation. SANDER VAN DER LINDEN and JON ROOZENBEEK, *Cambridge University* (Presented by Sander van der Linden) — The theory of inoculation offers a promising framework to help immunize the public against the rise of “fake news”. We theorized that “active” inoculation in particular would offer cognitive resistance by reducing the perceived reliability and persuasiveness of previously unseen fake news articles. In order to test this, we developed a novel “fake news game” in which participants were specifically tasked with creating a news article about a strongly politicized issue (the European refugee crisis) using misleading tactics, from the perspective of different fake news producers. To pilot test the efficacy of the game, we conducted a randomized field study (N=95) in a public high school setting. Our results provide some preliminary evidence that playing the fake news game reduced the perceived reliability and persuasiveness of fake news articles.

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(55)

How Tackling Misconceptions About Psychology Can Inform Us About Tackling Misconceptions in General. ANNETTE TAYLOR and PATRICIA KOWALSKI, *University of San Diego* (Presented by Annette Taylor) — Misinformation, misconceptions

and myths about psychology are pervasive. Even when students are taught the correct information, studies repeatedly show that unless instructors pay attention to, and are aware of specific misconceptions, the students do not change these prior false beliefs. The danger is that students use the misinformation as a foundation to build future knowledge, and may use ways of knowing about misinformation in order to evaluate new information. An additional challenge is that in psychological science there are few large, overarching conceptual frameworks. We need to address most of the many psychological misconceptions individually. So what can we do? What can we learn about re-educating the uniformed and misinformed, in general, by studying psychological misconceptions? We have applied methods adapted from the Denial 101x framework to the psychological sciences and present the result of that adaptation.

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(56)

Are We “Post-Truth” or “Post-Caring”? When Political Affect Becomes Decoupled From Truth. STEPHAN LEWANDOWSKY, *University of Bristol*, BRIONY SWIRE, *Northeastern University and Harvard University*, ULLRICH K.H. ECKER, *University of Western Australia* (Presented by Stephan Lewandowsky) — President Donald Trump made 500 false or misleading statements in his first 100 days in office, and during the election campaign more than 70% of his statements were adjudicated by independent fact checkers to be less than truthful. We analyze and review the socio-psychological and political factors that gave rise to what is widely perceived as a “post-truth” world and we report two experiments that disentangle people’s concern with the truth from their endorsement of political candidates. In the first study, we find that even if participants reduce their belief in Trump’s misinformation when presented with corrective information, their support for the political figure does not simultaneously reduce. Study two investigated whether this null effect is explained by misinformation and factual information being presented in equal proportions. We find that if the ratio of misinformation to factual information is offset, such that there are far more false than true statements, this leads to a modest reduction of support towards both Republican (Donald Trump) and Democratic (Bernie Sanders) candidates.

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Event and Spatial Cognition Berlagezaal, Friday, 15:40-17:20

Chaired by Gabriel Radvansky, *University of Notre Dame*

15:40-16:00 (265)

Primates In Virtual Space: Using Virtual Reality To Compare The Spatial Intelligence Of Bonobos And Humans. FRANCINE L. DOLINS, *University of Michigan-Dearborn* (Presented by Francine Dolins) — What kinds of spatial information do human and nonhumans learn from their environment? How does this knowledge form the basis of intelligent spatial behaviors? In a study of 1 young and 4 adult bonobos compared with 10 humans (children and adults), we presented virtual navigation-foraging tasks to compare the two species’ spatial strategies and their ability to project knowledge gained in the virtual environments to solve problems in the real world (RW), in a one-to-one correspondence. One adult bonobo, Kanzi, outperformed other bonobos and human children, and was comparable to adult humans. These results will be discussed with attention to the performance of

the young bonobo and the human children in particular, and to previous results using virtual reality to test chimpanzee navigation and spatial strategies. This cross-species approach lends insight into the emergence of primates’ complex cognitive abilities.

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16:00-16:20 (266)

Semantic Knowledge Counteracts Age-Related Declines In The Encoding And Memory Of Everyday Activities. KIMBERLY NEWBERRY, MAVERICK SMITH, and HEATHER BAILEY, *Kansas State University* (Presented by Heather Bailey) — Everyday we encounter a continuous stream of activity, and one way that our perceptual systems deal with such activity is by segmenting the activity into discrete, meaningful events. Segmentation helps people organize dynamic activity at encoding, which results in



better memory for the activity. Previous work has demonstrated that segmentation ability declines with age, likely due to changes in working memory; however, older adults' semantic knowledge remains intact and may even improve. Our recent work has evaluated whether older adults are able to use their intact semantic knowledge to more effectively segment and remember everyday activities. Results indicate that activating prior knowledge improves segmentation ability for both young and older adults; however, this manipulation does not benefit memory to the same extent. Age-related changes in segmentation and memory will be discussed as well as implications for future memory interventions
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16:20-16:40 (267)

Which Route You Walk To A First Destination Depends On Where You Intend To Go Later: Wayfinding In Virtual Environments. EN FU, *ShenZhen University*, BEVERLY ROSKOS-EWOLDSSEN, *The University of Alabama* (Presented by En Fu) — Imagine you are sitting in your office and you want to stop by a grocery store before heading home, which route would you navigate to reach the grocery store? Existing study shows that, when walking to two or three targets in a conference room, the route that participants walked to reach the first target depended on the location of the second and third targets. This effect was further investigated in the current study using desktop virtual environments. Size of the environment and visibility of later destinations were manipulated between participants. Location of later destinations were manipulated within participants. Proportion of walking the right route to reach the first destination was the dependent variable. Results show that the second and third destination locations and environment size influenced route. Destination visibility influenced route in some conditions. Region boundaries, specifically the floor patterns, was found influencing route independently from the later-destination location.
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16:40-17:00 (268)

That's Not The Movie I Saw! Measuring Differences In Movie Interpretations. BEVERLY ROSKOS and JESSICA MENDOZA, *University of Alabama-Tuscaloosa*, DAVID R. EWOLDSSEN,

Michigan State University (Presented by Beverly Roskos) — Movie viewers can develop different mental models of the same movie. Across two studies we investigated participants' perceptions of character relationships during a movie. Separate groups of participants were stopped 1/4, 1/2, or 3/4 through the movie, or at the end of the movie, to rate perceived similarities among the characters. At the end of the movie all participants rated the extent to which they agreed with different interpretations of the movie. Based on their endorsement of one of the interpretations, participants at each time point were separated further into two groups. Using multi-dimensional scaling we tracked the changes in judgments of similarities across time, depending on the interpretation. The differences in the MDS solutions across time for the two groups was dramatic. In one group the relationships were constant across time; in the other, the relationships varied depending on the point in time during the movie.
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17:00-17:20 (269)

Forgetting Curve Deviations. GABRIEL A. RADVANSKY and JERRY S. FISHER, *University of Notre Dame* (Presented by Gabriel Radvansky) — The traditional Ebbinghaus forgetting curve is well known in psychology. Typically, this is thought of as a continuous power function that starts operating at the time of learning. However, we find important deviations from this that have not been thoroughly considered before. First, for isolated bits of information (e.g., word lists) we find a sudden drop-off in performance around the one-week mark. This may be due to a shift from more transient memory storage to more permanent memory storage. Second, for well-learned and complex information (e.g., event models), forgetting shows a linear forgetting function, rather than a power function. This may be due to a loss of memory for memory features, along with partial matching and reconstruction processes. Thus, there are important aspects of change in memories over time that have not been seriously studied that are relevant to real world memory retention.
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Working Memory I

Veilingzaal, Friday, 15:40-17:20

Chaired by Candice C. Morey, *Cardiff University*

15:40-16:00 (270)

Order Recall In Verbal Short-Term Memory: A Walk Around The Neighbourhood. MARIE POIRIER, *City, University of London*, JEAN SAINT-AUBIN, *Université de Moncton* (Presented by Jean Saint-Aubin) — In short-term ordered recall tasks, it is well established that lexical factors have a large effect on the number of correctly recalled items and little or no impact on order recall. Contrary to this widespread view, the Activated Network (A-Net) model (Poirier, Saint-Aubin, Mair, Tehan, and Tolan, 2015), proposes that the level of activation within the relevant long-term lexico-semantic networks impacts order recall. The model was supported by manipulations based on semantic category or long-term inter-item associations. However, those results could have been confounded by demand characteristics and grouping strategies. In addition to eliminating these concerns, the present three experiments offer a critical test of the model by using orthographic neighbours, a factor related to speech production processes and operating at the sublexical level. Using both forward

and backward recall, results of all three experiments revealed the predicted item migrations, with order errors increasing when manipulated factors heightened activation levels.
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16:00-16:20 (271)

The Relationship Between Baseline Cognitive Ability And Working Memory Training Improvement. THOMAS S. REDICK, *Purdue University* (Presented by Thomas S. Redick) — Working memory training research has produced mixed results in terms of transfer – most studies observe significant improvement in tasks that are similar to the training materials, but not to other outcomes. One potential limitation is that the research thus far has failed to isolate the specific combination of factors that make working memory training work best. Specifically, other research areas have shown that individual differences in cognitive ability affect the effectiveness of interventions (aptitude-by-treatment interactions), and might be important for working memory

training efficacy, too. I re-analyzed the results of multiple previous working memory training studies of healthy, young adults to assess the relationship between baseline cognitive ability (working memory, fluid intelligence) and working memory training improvement. In contrast to the idea that individuals with working memory impairments would benefit most from working memory training, the results indicate that those already high in cognitive ability improve more during training.

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16:20-16:40 (272)

Retrieval Practice And Interference In Visual Short-Term Memory. PETER SHEPHERDSON, *University of Zurich* (Presented by Peter Shepherdson) — Substantial evidence attests to the benefits of retrieval practice for the retention of information in long-term memory (i.e., testing effects). Does testing also affect more transitory memory? I conducted a colour memory experiment incorporating both single-probe change detection and continuous reproduction tasks. Participants recalled colours more accurately following change detection probes of the same item, compared to conditions where different items were probed. This effect persisted when matching probes (i.e., repetitions) were excluded from analysis. Additionally, when novel items were used as probes, recall performance deteriorated relative to conditions with non-novel probes. These findings suggest that testing effects are not limited to long-term memory, and corroborate results from retro-cue studies showing that directing attention to information in visual short-term memory prior to a test boosts performance. They also suggest a role for novelty in the extent to which subsequent visual information interferes with the contents of memory.

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16:40-17:00 (273)

Nonverbal STM For Order In Developmental Language Disorder. ELISABET SERVICE, *McMaster University*, PEKKA LAHTI-NUUTILA, SINI SMOLANDER, and EVA ARKKILA, *Helsinki University Hospital*, IIDA POROKUOKKA, *University of Jyväskylä*, MARJA LAASONEN, *Helsinki University Hospital* (Presented by Elisabet Service) — Memory for serial order has been suggested to play a role in language development. In particular, explicit short-term memory (STM) for order, tested in immediate memory tasks, and a possibly domain-general form

of implicit memory for order, reflected in the Hebb repetition effect, could both affect vocabulary accumulation. As part of the Helsinki Longitudinal SLI study, we compared 46 4-6-year-old children with suspected developmental language disorder with 50 children with typical language, in explicit nonverbal STM tasks. In the visual condition, participants had to compare pairs of animated sequences consisting of two different-looking fantasy animals moving from one barn to another. In the auditory condition, sequences of backward calls of exotic animals had to be compared. Children with typical language had accurate order memory for longer sequences. The correlational pattern between order memory and vocabulary changed differently with age in the two groups.

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17:00-17:20 (274)

The Impact Of Remembering Verbal And Spatial Information On Processing Speed In School-Age Children. CANDICE C. MOREY, *Cardiff University*, LAUREN HADLEY, *University of Edinburgh*, FRANCES BUTTELMANN, *Friedrich Schiller University Jena*, TANJA KOENEN, *University of Frankfurt*, JULIE-ANNE MEANEY and BONNIE AUYEUNG, *University of Edinburgh*, JULIA KARBACH, *University of Koblenz-Landau*, NICOLAS CHEVALIER, *University of Edinburgh* (Presented by Candice C. Morey) — Models of working memory differ in whether storage and processing require one shared resource or two distinct resources. Complex span tasks, where simple judgments are interleaved between memoranda, are used to measure conflict between storage and processing. We tested 4-5 and 8-9 year-old children using adaptive complex span tasks, which ensured that participants correctly recalled the memoranda most of the time, and analyzed processing response times. Memory load affected processing performance regardless of age or memoranda domain, but we observed differing dynamics within lists. For the younger children, processing speed consistently decreased with each list item. This is inconsistent with the idea that the youngest participants cumulatively rehearsed the memoranda. Older children evinced a more complex pattern. Regardless of domain, processing speeds were always slowest for the first decision. Afterward, speeds tended to increase more while maintaining verbal information than when maintaining spatial information. We consider what these findings imply about maintenance in working memory systems.

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Memory II

Administratiezaal, Friday, 15:40-17:40

Chaired by Jonathan C. Corbin, *University of Richmond*

15:40-16:00 (275)

Can Very Small Font Size Enhance Memory? VERED HALAMISH, *Bar-Ilan University* (Presented by Vered Halamish) — Presenting information in a perceptually degraded format sometimes enhances learning outcomes. However, earlier studies in which words were presented in large or small font in a paradigm that also involved item-by-item memory predictions consistently yielded no effect of font size on memory. Can small font size enhance memory under hitherto unexamined conditions? A series of ten experiments was conducted to systematically examine the effect of font size on memory for words and whether it depends on the strength of the font size manipulation, whether memory predictions are solicited, the format of the test and study time. Very small font size enhanced recognition memory, but only

when the study time was relatively short and memory predictions were not solicited. These results identify the conditions under which very small font size has mnemonic benefits and shed light on the inconsistent effects of perceptual degradation on learning outcomes observed in earlier studies.

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16:00-16:20 (276)

The Effects Of Knowledge Accessibility On The Perception And Use Of A Verbal Analogy Strategy. MITCHELL RABINOWITZ, KENNETH E. WOOLLEY and TIEDAN HUANG, *Fordham University* (Presented by Mitchell Rabinowitz) — A set of experiments was conducted to assess how accessibility to relevant knowledge would affect performance of verbal analogy

problems as well as the efficacy, perception, and maintenance of a componential strategy for solving these problems. The first two studies investigated the effects of item and relationship accessibility on verbal analogy performance. In the third study, participants were taught to use a componential strategy for solving verbal analogy problems while still manipulating accessibility of relevant knowledge and performance and perception of the strategy was assessed. We also investigated whether variations in accessibility to relevant knowledge affected maintenance of strategy use. Results showed that knowledge accessibility affected both performance and the way in which the strategy was perceived. Participants rated the strategy as more useful, easier to use, and less effortful when their initial strategy experience involved solving analogy problems based on familiar vocabulary and relationships. Also, participants who had experience with both the easy vocabulary and easy relationships were significantly more likely to maintain use of the strategy on the maintenance task.

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16:20-16:40 (277)

Meta-Cognitive Evaluation In Confabulation. IRENE P. KAN, *Villanova University*, ASAF GILBOA, *Rotman Research Institute, Baycrest Health Sciences and University of Toronto*, MIEKE VERFAELLIE and GINETTE LAFLECHE, *VA Boston Healthcare and Boston University School of Medicine* (Presented by Irene P. Kan, PhD) — “Confabulation,” commonly observed in patients with ruptured anterior communicating artery aneurysm, is characterized by patients’ tendency to report distorted memories. We examined this tendency within a framework of multi meta-cognitive processes as applied to confabulation (Hebscher et al., 2016). According to this framework, the likelihood of a retrieved memory being correct is initially assessed by a first-order monitoring mechanism. This information is then used by a second-order control mechanism, where a decision about reporting, withholding the response, or initiating a new memory search is made. We examined the second-order control mechanism and hypothesized that when confronted with uncertainty, confabulators would be less likely to withhold their responses than non-confabulators and healthy controls. In this study, subjects evaluated the veracity of trivia statements for which they are unlikely to have prior knowledge. Consistent with our hypothesis, we found that the opportunity to withhold responses had less impact on confabulators than on non-confabulators and controls, suggesting that confabulators experience a deficit in the control mechanism.

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16:40-17:00 (278)

(Withdrawn) Translating (Lack Of) Memories Into Reports: The Role Of Context. MACIEJ HANCZAKOWSKI and ALEKSANDRA KROGULSKA, *Jagiellonian University*, KATARZYNA ZAWADZKA, *University of Sheffield* (Presented by Maciej Hanczakowski) — When queried about events in the past, a person may face questions that concern details that have been witnessed – answerable questions – and details that have not been witnessed – unanswerable questions. With regard to answerable questions, the person’s willingness to answer these questions increases as a function of not only the information available about the queried detail itself, but also as a function of contextual information. The present research assessed whether the willingness to confabulate when facing unanswerable questions also increases with the amount of available contextual information. In two experiments, context information at the time

of memory questioning was manipulated for both answerable and unanswerable questions by either reinstating encoding context or by posing questions in a familiar retrieval context. Both context reinstatement and context familiarity affected the willingness to provide answers to both answerable and unanswerable questions, in the latter case leading to increased confabulation.

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17:00-17:20 (279)

Contextual Information Modulates Memory For Context-Congruent and -Incongruent Objects. JAVIER ORTIZ-TUDELA, *Universidad de Granada*, LUIS JIMÉNEZ, *Universidad de Santiago de Compostela*, MILLIKEN BRUCE, *McMaster University*, JUAN LUPIÁÑEZ, *Universidad de Granada* (Presented by Javier Ortiz-Tudela) — Objects that are semantically incongruent with their surrounding context are quickly detected but poorly identified, a result easily accommodated by recent models of conflict detection. However, several of these models predict that these objects should also be well remembered since they assume that conflict detection (or, prediction error, in a related literature) would trigger a learning signal that, in turn, would lead to enhance encoding of the available information. Nevertheless, in our experiments with memory being assessed through a recognition memory test, this is not the case. Rather, the opposite is true: context-congruent objects are better remembered than context-incongruent ones. In a series of experiments we investigate the nature of this congruity-mediated recognition advantage by exploring underlying candidate mechanisms such as priming, object competition, schema generation or item-specific encoding. The results are discussed into the broader framework of congruity-mediated learning as well as contrasted with previous research with seemingly incompatible results.

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17:20-17:40 (280)

Optimal Bayesians? Memory Is Overly-Biased Towards The Central Category In Line Estimation Tasks. JONATHAN C. CORBIN and L. ELIZABETH CRAWFORD, *University of Richmond*, DAVID LANDY, *University of Indiana* (Presented by Jonathan C. Corbin) — Bayesian models of stimulus estimation have argued that estimates combine an inexact memory trace with prior knowledge about the stimulus distribution, leading to optimal yet biased estimates. In a series of experiments, we estimated trace-level and distributional-level parameters to determine whether adjustment towards the category was optimal given memory uncertainty. Participants viewed lines that varied in length and reproduced them from memory by adjusting a response line. In both experiments, some participants received feedback on their distance and direction from the actual length whereas others received no feedback. On average, participants over-adjusted towards the central category given trace precision, though to a lesser degree when provided with performance feedback. Results suggest that a Bayesian model that emphasizes optimality may not sufficiently capture all processes underlying central tendency effects.

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Visual Perception
Effectenbeurszaal, Friday, 16:00-17:20
Chaired by Stefan Van der Stigchel, Utrecht University

16:00-16:20 (281)

Evolving The Displays To Investigate Crowding In Densely Cluttered Scenes. ERIK VAN DER BURG, *Vrije Universiteit Amsterdam, University of Sydney*, JOHN CASS, *University Western Sydney*, CHRISTIAN OLIVERS, *Vrije Universiteit Amsterdam* (Presented by Erik Van der Burg) — Peripheral vision can be severely impaired by nearby clutter. Decades of research using sparse displays have established that this phenomenon, known as visual crowding, follows Bouma's law: Interference occurs for target-distractor separations up to half the target's eccentricity. Although considered a fundamental constraint on human vision, Bouma's law has never been tested in more dense visual environments. Using a genetic algorithm we investigated crowding in densely cluttered displays. Participants were instructed to identify the orientation of a target line (6° eccentricity) among 284 distractor lines. Displays supporting highest accuracy were selected ("survival of the fittest") and combined to create new displays. Performance improved over generations, predominantly driven by the emergence of horizontal flankers within 1° of the near-vertical target, but with no evidence of interference beyond this radius. We conclude that Bouma's law does not necessarily hold in dense displays. Instead, a nearest-neighbour segmentation rule provides a better account.

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16:20-16:40 (282)

Do We See It Or Not? Sensory Attenuation For Learned Action Effects In The Visual Domain. KATHARINA A. SCHWARZ, ROLAND PFISTER, MICHEL KLUGE, LISA WELLER, and WILFRIED KUNDE, *University of Würzburg* (Presented by Katharina Schwarz) — Sensory attenuation describes the phenomenon that sensory consequences of an agent's actions are perceived less intensely than sensory stimuli that are not caused by the observer. This effect has been discussed as one of the key principles of perception, potentially mediating and facilitating various higher-level phenomena such as agency and the discrimination of self-caused sensory stimulation from stimuli caused by external factors. However, despite these strong claims, evidence for sensory attenuation in the visual domain is surprisingly sparse and ambiguous. Therefore, we present a comprehensive replication effort including three high-powered experiments on sensory attenuation for learned visual action effects with one direct and two preregistered, conceptual replication attempts of an influential study on this topic. Signal detection analyses were targeted to distinguish between true sensitivity and response bias. The results of all three studies give a clear indication that, contrary to previous assumptions, sensory attenuation is absent for learned visual action effects, further supported by Bayesian analyses. This indicates that sensory attenuation should not be seen as a universal principle governing subjective perception.

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16:40-17:00 (283)

Gestalts At Threshold. THIAGO LEIROS COSTA, PIETER MOORS, and JOHAN WAGEMANS, *Katholieke Universiteit Leuven* (Presented by Thiago Leiros Costa) — Recent studies suggested that stimuli leading to configural superiority effects (CSE) and other behavioral modulations attributed to emerging Gestalts have higher information processing costs (i.e., less efficient processing) than their constituent parts presented alone. We conceived a replication study and a critical assessment of this issue, but more broadly, tried to assess how Gestalts behave at threshold. We measured contrast sensitivity with a method of constant stimuli in an odd quadrant task for three types of displays: Good Gestalts (inducing CSE), Bad Gestalts (not inducing CSE) and their constituent parts. In Experiment 1, stimuli were embedded in a field of noise. Noise was absent in Experiment 2. In both experiments, thresholds were lower for CSE-generating stimuli. CSE was preserved around threshold levels. Good Gestalt stimuli led to steeper slopes of the psychometric functions, hinting at the nonlinearity of emergent features. Implications for information processing and Gestalt theories will be discussed.

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17:00-17:20 (284)

Transsaccadic Integration Is Unaffected By Saccade Landing Point. STEFAN VAN DER STIGCHEL, NATHAN VAN DER STOEP, and MARTIJN SCHUT, *Utrecht University* (Presented by Stefan Van der Stigchel) — The experience of our visual surroundings appears continuous, contradicting the erratic nature of visual processing due to saccades. The visual system constructs a continuous experience by integrating pre-saccadic and post-saccadic visual input. Because saccades rarely land exactly at the intended location, transsaccadic integration would need to be robust against variations in actual saccade execution. In the current study participants reported a feature (here color) of the saccade target, which occasionally changed slightly during the saccade. In transsaccadic change-trials, participants reported a mixture of the pre- and post-saccadic color, indicating transsaccadic integration. Importantly, saccade landing distance was not a significant predictor for the color reported. In a second experiment, we used a global effect paradigm in which a distractor appeared together with the saccade target, causing most saccades to land in between the saccade target and distractor. Again, there was no effect of saccade landing point on the outcome of transsaccadic integration. Therefore, transsaccadic perception is robust against deviations in saccade landing point even when saccades land outside of the range of everyday oculomotor variance.

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A Life Span Perspective of Timing Berlagezaal, Saturday, 8:20-10:20

Chaired by Anne-Claire Rattat, Université Fédérale de Toulouse Midi-Pyrénées-INU

8:20-8:40 (301)

Aging And Timing. ALEXIA BAUDOUIN, *Université Paris Descartes*, SANDRINE VANNESTE, *UMR CNRS 7295 CeRCA, Université François Rabelais de Tours* (Presented by Alexia Baudouin) — Psychological time is sensitive to various factors, such as the time-related behaviors (method/measure of the temporal estimation), and of the individual (e.g. age) (Block, 1990). Despite aging is associated with modifications of time perception (Block, Zakay, & Hancock, 1998), in everyday life autonomous elderly people seem to remain relatively temporally adapted to their environment. First, we will examine age-related differences in time estimation on different temporal tasks, in different conditions and for different age groups (old and very old ones). Then, we will look at how temporal processing can influence more complex cognitive behaviors such as temporal prospective memory performances. We will discuss these findings in light of classic hypotheses developed in normal cognitive aging research. Email: Alexia Baudouin, Alexia.Baudouin@parisdescartes.fr

8:40-9:00 (302)

Age-Related Differences In Duration Production Performance: Slowing Of The Internal Clock Or Decrease In Attentional Resources? ALEXIA BAUDOUIN, *Université Paris Descartes*, SANDRINE VANNESTE, *Université François Rabelais de Tours, UMR CNRS 7295 CeRCA* (Presented by Sandrine Vanneste) — The meta-analytic review on time estimation and aging by Block, Zakay, & Hancock (1998) reported age-related differences in duration production performance. To explain these results, they proposed different hypotheses either in terms of age-related slowing in the time base rate or of lower attentional capacities. In our study comparing the productions of young and older adults, we examined the relationships between the time accuracy index, the Stroop index and the spontaneous motor tempo measure. The results indicate that older participants produce shorter durations than younger adults when they perform a simple task, and longer durations when there is a concurrent task. Production performance is related to the rate of the internal clock under the simple condition, and to attentional resources under the concurrent condition. As suggested by Block et al. (1998), these findings are discussed in terms of compensation for the age-related slowing of the internal clock and attentional decrease. Email: Sandrine Vanneste, vanneste@univ-tours.fr

9:00-9:20 (303)

Time Processing In Children With ADHD: A Naturalistic Approach. GIOVANNA MIONI, *University of Padova*, ANNE-CLAIRE RATTAT, *University Fédérale de Toulouse Midi-Pyrénées-INU Champollion*, AGNESE CAPODIECI and CESARE CORNOLDI, *University of Padova* (Presented by Giovanna Mioni) — Previous studies of time perception in children with attention-deficit-hyperactivity-disorder (ADHD) showed that these children perceive time differently than children without ADHD. The purpose of this study is to compare time perception in children with and without ADHD with a naturalistic time reproduction task. Moreover, we included questionnaires to investigate the subjective experience of time. Hundred and eighty children were tested; half of them had a diagnosis of ADHD and half were matched controls. The time reproduction task included 6 videos displaying 6 different actions. Children were asked to watch

the video and reproduce duration of each action presented by either mime it or tapping on a table. Results confirmed temporal impairment in children with ADHD compared to controls; moreover, children without ADHD showed better performance when they were asked to mime the action. Results from the questionnaires also showed differences between children with and without ADHD in particular in younger participants. Email: Giovanna Mioni, mioni.giovanna@gmail.com

9:20-9:40 (304)

Links Between Rhythmic Proficiency And Handwriting Skills In 3Th Grade Children. JOËLLE PROVASI and ISABELLE CARCHON, *Ecole Pratique des Hautes Etudes*, DENIS ALAMARGOT, *ESPE Créteil*, MARIE-FRANCE MORIN, *Université de Sherbrooke*, ALINE FREY, *ESPE Créteil* (Presented by Joëlle Provasi) (Sponsored by EPHE ESPE) — Rhythmic perception and production support numerous abilities, exceeding the only rhythmic or musical fields, specifically cognitive and linguistic skills. It was thus shown a link between rhythmic and reading abilities, in skilled readers as well as dyslexic children. The aim of our study was to examine possible correlations between rhythmic and handwriting abilities. To our knowledge, only one study (Ben-Pazi, Kukke & Sanger, 2007) has observed that children with temporal impairment (i.e. abnormal tapping) had poorer penmanship. Perceptive as well as motor rhythmic performances were recorded in fifty-one 3th grade children. Handwriting tasks were also set up on digitalized tablets to measure letter legibility and handwriting kinematics. Psychometric tests were administered to ensure that children did not present cognitive or motor disorders. Results will be presented. A correlation between rhythmic and handwriting skill would have significant impacts for handwriting teaching and improvement. Email: Joëlle Provasi, joelle.provasi@ephe.sorbonne.fr

9:40-10:00 (305)

Age-Related Differences In Time Perception: A Question Of Attention? MATHILDE LAMOTTE, *University of Luxembourg* (Presented by Mathilde Lamotte) — Some research showed age-related differences in time perception. Older people are less accurate and more variable in time judgments than younger people, particularly in high-demanding tasks. Our study sought to test whether this effect of ageing on time performance would emerge in a bisection task while task difficulty increases and requires more attentional resources. 42 participants (21 to 81 years old) took part in four sessions, one for each range of anchor durations (0.5/1, 1.25/2.5, 4/8 and 15/30-s). In each session, participants processed a bisection task and performed neuropsychological assessments to evaluate their cognitive abilities in terms of working memory, information processing speed and attention. The results showed a general effect of age indicating that older participants have less sensitivity to time than younger participants. Additionally, these individual differences were mainly due by the decline of attention capacities with ageing. Email: Mathilde Lamotte, mathilde.lamotte@uni.lu

10:00-10:20 (306)

Time Knowledge Acquisition In Children, Numerical Skills, And The Role Of The Cerebellum. HUGO CÂMARA-COSTA and FLORENCE LABRELL, *Université Paris-Saclay, Université Paris-SUD, UVSQ, CESP, INSERM*, YANN MIKAELOFF and HERVÉ PERDRY, *Université Paris-Saclay, Université Paris-SUD, UVSQ, CESP, INSERM*, VIRGINIE KIEFFER, *Hôpital Gustave Roussy*, GEORGES DELLATOLAS, *Université Paris-Saclay, Université Paris-SUD, UVSQ, CESP, INSERM* (Presented by Hugo Câmara-Costa) — Acquisition of time knowledge (TK; the correct representation and use of time units) is associated with the development of numerical abilities. In a first study, 105 typically-developing children (mean age 8.7 years) were interviewed with the Time Knowledge Questionnaire (TKQ) and the Zareki-R,

a battery for the evaluation of numerical abilities. The results indicated that four numerical components were implicated in TK: academic knowledge of numbers and number facts, number line estimation, contextual estimation and numerical tasks involving verbal working memory. A second study with 38 children (mean age 11.6 years) treated for malignant cerebellar tumors showed that all TK subtests were significantly lower in the tumor group, when compared with typically-developing children. These results are discussed in the light of the role of the cerebellum in time processing and in the context of two different models of temporal processing: the internal clock model and the neural network state model.

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Pre-lexical Deficits in Acquired Dyslexia

Effectenbeurszaal, Saturday, 8:20-9:40

Chaired by Randi Starrfelt, University of Copenhagen

8:20-8:40 (307)

Hemispheric Differences And Spatial Dyslexia. ERIC SIÉROFF, *Paris Descartes University* (Presented by Eric Sieroff) (Sponsored by Jonathan Grainger) — Patients suffering from posterior cerebral lesions frequently present spatial dyslexia, a deficit affecting spatial processes involved in reading. The first type of spatial dyslexia, neglect dyslexia, is more frequent after right than left posterior lesions. It is characterized by the omission or substitution of contralesional letters or words when reading words or texts, respectively. Another “group” of spatial dyslexia is represented by multiform deficits, in which errors are not necessarily contralesional. These multiform deficits are mainly described after left posterior lesions. In this presentation, the different types of spatial dyslexia will be explained by a reading model separating two aspects of attention affecting differently the reading efficiency: the modulation of attentional resources organized in a left-right gradient, and the selection control, determining the position of an attentional window of processing. When reading a word, the attentional window is focused on the initial letter, then redistributed over the entire word.

Email: Eric Sieroff, eric.sieroff@orange.fr

8:40-9:00 (308)

Neural Correlates Of Spatial Dyslexia. RADEK PTAK, *University of Geneva* (Presented by Radek Ptak) — Spatial dyslexia is a peripheral reading disorder characterized by omissions, substitutions and occasional additions of letters on the side opposite a focal (mostly right-hemispheric) brain lesion. The disorder is often seen as a direct consequence of spatial neglect, and hence is believed to result from damage to the same neural circuits. However, while there is a strong association of spatial dyslexia with object-centred measures of neglect, the disorder may be present in the absence of space-based deficits. I here discuss evidence from voxel-based lesion mapping, multivariate lesion mapping and diffusion tensor imaging studies showing that spatial dyslexia is closely associated with damage to the posterior parietal cortex and its connections with the superior temporal cortex. These findings suggest that the coordination between dorsal and ventral stream representations is crucial for the elaboration of an object-centred reference frame for reading.

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9:00-9:20 (309)

Neglect Dyslexia Or Crowding Dyslexia? ROBERTA DAINI, *Università degli Studi di Milano-Bicocca* (Presented by Roberta Daini) — Martelli et al. (2011) suggested that error type analysis of the reading impairment after right brain damage is diagnostic for the mechanisms involved. Letter substitution errors may be related to a difficulty in segregating letters and increasing letter spacing restores recognition. Similarly, in normal crowding a peripheral above acuity letter is hard to recognize when closely surrounded by other letters. Conversely, letter omission errors increase with spacing and patients characterized by this phenomenon show a pattern of co-occurrence of unilateral spatial neglect (USN) and altered eye-movements (Primativo et al., 2013). We tested the hypothesis that a specific type of acquired dyslexia, mainly characterized by substitutions, involves the same mechanisms underlying crowding. Unlike neglect dyslexia we found that this deficit is dissociated from USN. We call it crowding dyslexia and speculate that might depend on the focal attention resolution needed to define the optimal field of integration for letter identification.

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9:20-9:40 (310)

Letter And Word Recognition In Pure Alexia And Peripheral Vision. RANDI STARRFELT, *University of Copenhagen* (Presented by Randi Starrfelt) — *Pure alexia*, or alexia without agraphia, is a curious neuropsychological syndrome where patients lose the ability to read following focal brain injury, while their written and spoken language is largely intact. Typically, both word and letter recognition is impaired, and some attribute the reading deficit to a problem with single letter recognition, perhaps due to a more general deficit in visual recognition.

We have investigated the relationship between letter and word recognition in pure alexia using a word superiority experiment, comparing performance with short words and single letters. I will present data showing that the word recognition deficit in pure alexia is disproportionate to the patients' problems with single letter recognition, and relate this to findings in central and peripheral vision in normal participants.

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Cognitive Control II

Administratiezaal, Saturday, 8:20-10:20

Chaired by Niels Taatgen, University of Groningen

8:20-8:40 (311)

Increasing Inter-Trial Interval Dissociated List-Level And Item-Level Proportion Congruence Effects. SEVGÜL TÜRKOĞLU and BURAK ERDENİZ, *Izmir University of Economics*, NART BEDİN ATALAY, *TOBB University of Economics and Technology* (Presented by Nart Bedin Atalay) — The list-level proportion congruent (LLPC) and the item-level proportion congruent (ISPC) effects have been regarded as closely related. They are demonstrated by a larger Flanker effect in the high proportion-congruent list (in the LLPC effect) or high proportion-congruent items (in the ISPC effect), compared to the low proportion-congruent list or items. In the present study, we observed the time course of LLPC and ISPC effects. We conducted a Flanker task where stimulus onset asynchrony was manipulated by presenting the flanker letters before, at time same time with, or after the target letter. Critically, we increased the inter-trial interval to 3 seconds, far longer than a typical LLPC or ISPC experiment. We hypothesized that longer inter-trial intervals would increase the strength of S-R associations. Results showed that while the LLPC effect disappeared when the flanker was presented after the target, the ISPC effect did not. These results were the first to demonstrate a dissociation between LLPC and ISPC effects.

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8:40-9:00 (312)

To Solve Several Conflicts Concurrently, Do We Need More Control Or More Slowing? ALODIE REY-MERMET and MIRIAM GADE, *Catholic University of Eichstätt-Ingolstadt* (Presented by Alodie Rey-Mermet) — Responding to two conflicts concurrently, such as answering a phone call while writing an email, has been found to result in better or similar performance than responding to one conflict. To determine whether this interaction between conflicts stems from the interplay of additional control processes (e.g., attentional adjustment or inhibition), we conducted a study in which we combined a Stroop task (which required identifying the color of color words) with a Flanker task (which required identifying a central character among flankers). Participants were asked to respond to the color of a central color word among flanking color words. To increase control requirements, we occasionally asked half of participants to respond to the word meaning. The results revealed that the interaction between conflicts did not stem from additional processes, but rather from a larger slowing in performance. These findings should encourage us to be more cautious when stipulating additional control processes.

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9:00-9:20 (313)

Does The Item Specific Proportion Congruency Effect Change As A Function Of SOA In A Picture-Word Verification Task? MINE MISIRLISOY, *Middle East Technical University*, NART BEDİN ATALAY, *TOBB University of Economics and Technology* (Presented by Mine Misirlisoy) — The item-specific proportion congruency (ISPC) effect is demonstrated by a smaller Stroop effect for mostly incongruent (MI) items compared to mostly congruent (MC) items. Currently, there is an ongoing debate regarding the contribution of automatic control processes and stimulus-response contingency learning processes to the ISPC effect. The aim of the present study was to further explore the

cognitive processes underlying the ISPC effect. Specifically, the ISPC effect was investigated by using a picture-word verification task. In this task, which is not a selective attention task, subjects indicate whether or not the presented picture and the color match. Results revealed a significant ISPC effect, which cannot be explained by item-specific control processes, since the task is not a selective attention task. However, contrary to our predictions, the observed ISPC effect did not change as a function of SOA. Current findings can neither be explained by a pure item-specific control, nor a pure stimulus-response contingency learning account.

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9:20-9:40 (314)

Striking A Balance Between The Sexes: An Experimental Approach To Biases In The Representation Of Women And Men. MIKE NICHOLLS, ELLIE ANIULIS, NICOLE THOMAS, OWEN CHURCHES, BLAKE LAWRENCE, and DANIELLE CLODE, *Flinders University* (Presented by Mike Nicholls) — There is an unfortunate bias for females to be systematically underrepresented in everyday life, from extra scenes in movies to Lego figures. We sought to understand the origins of this social bias using the techniques of experimental psychology. Participants viewed a rectangular 30-item array containing various proportions of males and females and indicated whether the number of males and females was the same or not. If there is no bias in the representation of the sexes, the peak of 'same' responses should be centred around the point of objective equality. Instead of this, the peak was shifted towards more females. That is, there needs to be more females in the array for an observer to think they are the same. Over four experiments, we observed this shift for (a) faces, (b) faces with the hair removed, (c) full figures and (d) toilet sign icons. The bias occurred irrespective of whether the observer was male or female. The bias disappeared when participants determined the sex of hens and roosters. It therefore seems that the number of human females are systematically underestimated. We explore the origins of the bias and discuss it represents an attentional predisposition or weighting effect.

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9:40-10:00 (315)

Towards A Unitary Model Of Human Decision Making And Action Control. BERNHARD HOMMEL, *Leiden University*, REINOUT WIERS, *University of Amsterdam* (Presented by Bernhard Hommel) — From its academic beginnings, the theory of human action control has distinguished between endogenously-driven, intentional action and exogenously-driven, habitual or automatic action. We challenge this dual-route model of action control and argue that attempts to provide clear-cut, straightforward criteria to distinguish between intentional and automatic action have systematically failed. In particular, we show that there is still no evidence for intention-independent action, and that attempts to use the criterion of reward sensitivity and rationality to differentiate intentional and automatic action are conceptually unsound. As a more parsimonious, and more feasible alternative, we suggest a unitary approach to action control, according to which actions are (a) represented by codes of their perceptual effects; (b) selected by matching intention-sensitive selection criteria; and (c) moderated by metacognitive states.

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10:00-10:20 (316)

We Can't Stop Thinking. NIELS A. TAATGEN, *University of Groningen* (Presented by Niels Taatgen) — In experimental psychology we tend to focus on studying how people carry out tasks in a controlled environment. We pretend that the only thoughts people have in the experiments are related to the task, and that any other thoughts they might have can be considered as noise. Several of our experiments have demonstrated that even in intense tasks subjects still have other thoughts than are strictly necessary for the task. To understand this competition between

tasks and distractions, we constructed a model in which mental operations are in a continuous competition for cognitive resources. Priority among these operations is controlled by activation of the task goals, but also of potential distractions both external through perception and internal through associative memory processes. In my talk, I will demonstrate how this model was able to predict a number of counterintuitive experimental results in both visual attention and working memory performance.
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Associative Learning**Veilingzaal, Saturday, 8:20-9:40**

Chaired by Sander Los, Vrije Universiteit, Amsterdam

8:20-8:40 (317)

Negative Evidence And Inductive Reasoning In Generalization Of Associative Learning. JESSICA C. LEE, PETER F. LOVIBOND, BRETT K. HAYES, and DANIEL J. NAVARRO, *University of New South Wales* (Presented by Jessica Lee) — Research on stimulus generalization in the associative learning literature and property generalization in the inductive reasoning literature share the common goal of understanding how we extrapolate from known instances to unknown instances. We present a series of associative learning experiments that test diverging predictions from these two literatures concerning the effect of distant 'negative evidence' (stimuli which do not cause an outcome) on generalization from 'positive evidence' (stimuli which cause an outcome). Across both causal judgement and fear conditioning paradigms, we found that the addition of distant negative evidence increased generalization to stimuli varying on the positive stimulus dimension, consistent with the inductive reasoning literature. The empirical results were successfully simulated with a novel Bayesian model incorporating a Markov random field associative map and a 'helpful' sampling assumption. The results suggest that a common set of psychological processes underlie generalization in associative learning and inductive reasoning.

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8:40-9:00 (318)

Cognitive Procedures As Algorithms? JAMIE CAMPBELL, YALIN CHEN, and ALICIA ORR, *University of Saskatchewan* (Presented by Jamie Campbell) — We examined learning in alphabet arithmetic (e.g., $C + 3 = C D E F$). Sixteen adults practiced 12 alphabet arithmetic problems for 40 blocks. If learning reflected speed up of a counting algorithm, speed up should be proportional to the number of counting steps (+1, +2 or +3). Response time decreased across blocks, but there was no evidence of proportional speed up, at least early in practice. Near the end of practice, response times to +2 problems were similar to +3 problems, which suggests that speed up reflected a gradual shift to associative fact retrieval. The results raise questions for theories of cognitive procedure learning as algorithmic speed up.

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9:00-9:20 (319)

Task-Irrelevant Motion-Training Improves Word Decoding In Reading Disabled Participants. STEVEN R. HOLLOWAY and JOSÉ E. NÁÑEZ, SR., *Arizona State University* (Presented by Steve Holloway) — The present study employed a task-irrelevant motion-training paradigm with the goal of eliciting increases in perceptual sensitivity to motion. Research has implicated the central dorsal stream as being at least partially responsible for one aspect of reading, namely, word decoding. We hypothesized that improvements in motion detection would result in improved flicker and word decoding ability in a reading disabled population of college-aged students. The study included pre-test, training, and post-test phases. Perceptual sensitivity changes were evaluated by comparing pre-test to post-test performance. Here, we show that reading disabled participants who were exposed to near-threshold motion-training expressed increased sensitivity in all tests including a nonlinguistic word decoding measure. Control participants who were exposed to near-threshold tone changes in lieu of motion showed perceptual sensitivity improvements in tone discrimination but not motion detection, flicker perception, or word decoding. These findings demonstrate that a psychophysical visual learning paradigm may be employed to mediate some effects of reading difficulties.

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9:20-9:40 (320)

The Warning Stimulus As Retrieval Cue In Temporal Preparation. SANDER A. LOS, *Vrije Universiteit*, WOUTER KRUIJNE, and MARTIJN MEETER, *Vrije Universiteit Amsterdam* (Presented by Sander Los) — In a warned reaction time task, the warning stimulus (S1) initiates a process of temporal preparation, which promotes a speeded response to the impending target stimulus (S2). According to a recent theory, temporal preparation is driven by the joint activation of multiple memory traces formed on preceding trials. Here we present empirical evidence for this theory by showing that S1 serves as a selective retrieval cue of these memory traces. In a typical experiment, a trial started with one of two possible S1s (e.g., a tone or a flash), followed by a foreperiod (i.e., the S1-S2 interval) of variable duration. After one S1, foreperiods were mostly short (an exponential distribution), while after the other S1, foreperiods were mostly long (anti-exponential distribution). The typical result was that the function relating reaction time to foreperiod was strongly modified by the S1 that initiated the trial. This result supports the view that temporal preparation is driven by long term memory where S1 serves as a selective retrieval cue of associated memory traces.

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Learning and Instruction
Graanbeurszaal, Saturday, 8:20-10:00
Chaired by Mary A. Pyc, Dart NeuroScience

8:20-8:40 (321)

Learning Through Guessing: The Role Of Semantic Activation. KATARZYNA ZAWADZKA, *University of Sheffield*, MACIEJ HANCZAKOWSKI, *Tenczynek* (Presented by Katarzyna Zawadzka) — When people learn related pairs of words, initial attempts to guess targets improve memory performance as compared to reading both words outright. Various mechanisms for this pattern have been proposed, including semantic activation of targets during guessing and increased attention to surprising feedback following incorrect guesses. In the present study, we tested these mechanisms by using homographs as cues. We analysed memory performance as a function of the relationship between the meaning of participants' guesses and the target words, under the assumption that initial guesses indicate the semantic representations of the homographs that were activated during guessing, and that targets with meaning incongruent with the guesses are more surprising and more likely to attract attention. Memory performance was improved when both the guesses and the target words tapped the same meanings of the homographic cues. This pattern remains consistent with the semantic activation account but not the increased attention account.
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8:40-9:00 (322)

Got Metacognition? A Desirable Difficulties Scale. VERONICA X. YAN, *University of Texas at Austin*, KHANH-PHUONG THAI, *Age of Learning, Inc.*, MAXWELL MANSOLF, *University of California, Los Angeles* (Presented by Veronica X Yan) — Learners often organize their study in ways that aim to 'make learning easy.' This fundamental assumption, however, reflects a faulty model of how we learn. Rather than making learning easy, effective strategies introduce challenge and engage the learner more actively and effortfully in the process of learning (i.e., 'desirable difficulties', Bjork, 1994; Yan, Clark, & Bjork, 2016). However, in contrast to the proliferation of surveys to measure learners' motivation and mindsets (e.g., grit, growth), there have been few attempts to create measures of learners' knowledge of effective strategies for long-term learning; those that have are now outdated and do not reflect our current understanding of effective learning. We develop a new scale to assess what learners understand about effective strategies, present its psychometric properties, and use it to map the relationships between different strategies and relationships to motivation and implicit beliefs.
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9:00-9:20 (323)

Do Encoding Processes Contribute To The Forward Effect Of Testing? OLIVER KLIEGL and KARL-HEINZ T. BÄUML, *Regensburg University* (Presented by Oliver Kliegl) — The forward effect of testing refers to the finding that recall testing of previously learned (nontarget) material can promote learning of subsequently presented (target) material. The present study reports the results of experiments which examined influences of target material's serial learning position on the forward effect. Participants studied a target list of unrelated items preceded by two nontarget lists. The nontarget lists were either re-exposed immediately after study (restudy condition) or participants were asked to recall each nontarget list immediately after study (testing condition). Results show enhanced target list recall in the testing

condition, relative to the restudy condition, which replicates the forward effect of testing. More important, the enhancement effect was more pronounced for early than middle and late target list items, suggesting an influence of items' serial learning position on the effect. The findings point to a critical role of encoding processes for this testing effect.
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9:20-9:40 (324)

An Examination Of Long-Term Recency And Contiguity Effects Using Smartphone Applications. CATHLEEN CORTIS MACK and CATERINA CINEL, *University of Essex*, NIGEL DAVIES and MICHAEL HARDING, *University of Lancaster*, GEOFF WARD, *University of Essex* (Presented by Cathleen Cortis Mack) (Sponsored by Geoff Ward) — In three experiments, participants were presented with experimentally-controlled lists of words at the very slow rate of one word every hour using an iPhone application, RECAPP, which was also used to recall the words in either any order (free recall: Experiments 1 to 3) or the same order as presented (serial recall: Experiment 3). We found strong temporal contiguity effects, weak serial position effects with very limited recency, and clear list length effects in free recall; clear primacy effects and classic error gradients in serial recall; and recency effects in a final two-alternative forced choice recognition task (Experiments 2 and 3). Experiment 4 used an Android application, My Good Old Kodak, for participants to take photos over 12 successive days. We found recency and contiguity effects when utilising incidental learning instructions. Our findings extend the timescales over which temporal contiguity effects have been observed, but failed to find consistent evidence for strong long-term recency effects.
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9:40-10:00 (325)

(Withdrawn) Successive Relearning: An Evaluation Of Individual Differences In Learning And Consolidation. MARY A. PYC and J. STEVEN DE BELLE, *Dart NeuroScience* (Presented by Mary A. Pyc) — The memorial benefits of spaced retrieval practice are well documented. We capitalized on this powerful learning schedule across successive relearning sessions to evaluate individual differences in learning and consolidation. After an initial study trial with 60 face-name pairs, participants received one cued-recall test (with feedback) with each item. On subsequent sessions, participants had one cued-recall test (with feedback). Items were tested across five to ten sessions, with a 24 hour spaced interval between sessions. A final retention test occurred after one week or month. Performance consistently improved across sessions and greater forgetting occurred after a retention interval of one month versus one week. However, substantial individual variability was observed for learning and consolidation across sessions. Results highlight the importance of evaluating both learning and consolidation patterns at the individual level to understand how to best tailor schedules of spaced retrieval practice to support student learning and scholarship.
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SYMPOSIUM VI: What Limits the Capacity of Working Memory? An 'Adversarial' Working Memory Symposium
Effectenbeursaal, Saturday, 10:00-12:00

Chaired by Robert Logie, University of Edinburgh

(61)

Emerging Working Memory Capacity from Multiple Interacting Systems: E Pluribus Unum. ROBERT LOGIE, JASON DOHERTY, and AGNIESZKA JAROSLAWSKA, *University of Edinburgh* (Presented by Robert Logie) — The concept of an executive controller or attentional control in working memory begs the question of what is controlling the controller and so on, leading to an infinite hierarchy of executives or “homunculi”. We will briefly review a range of studies of healthy younger and older adults and brain damaged individuals, along with some new data on concurrent dual-task performance suggesting that executive control might arise from the interaction among multiple different functions in cognition that use different, but overlapping, brain networks, and that the concept of an executive controller for attention might now be offered a dignified retirement.
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(62)

How Can Attention Be Distinguished From Multiple Modules? NELSON COWAN, STEPHEN RHODES, and MOSHE NAVEH-BENJAMIN, *University of Missouri - Columbia* (Presented by Nelson Cowan) — Researchers favoring attention-based analyses of working memory suggest that memoranda stored with different kinds of codes can interfere with one another in working memory. Those favoring a more modular view sometimes suggest that verbal memoranda can be recoded for spatial storage, and vice versa, to retain an overflow when the primary module reaches capacity. Can these views be distinguished? We suggest that they can, supporting the attention-based view when there is interference between memory and non-memory tasks with minimal potential for coding overlap, and when brain mechanisms show effects of mnemonic effort and suggest a close relationship between perception and memory prioritization. We offer examples from the recent literature.
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(63)

Number and Precision: Distinct Aspects of Online Memory Function. ED AWH, *University of Chicago* (Presented by Ed Awh) — Working memory (WM) capacity can be characterized both in terms of the number of items stored as well as the precision of those representations. Work examining individual differences shows that number and precision are uncorrelated, suggesting that they reflect distinct aspects of memory ability. Moreover, number exhibits robust correlations with fluid intelligence while precision shows no such link. Despite the apparent utility of this number/precision dichotomy, however, prominent WM models argue against the validity of the number construct by positing that WM can store an unlimited number of items. I'll review recent work that demonstrates sharp limits in the number of items that can be stored, confirming the number construct. Finally, I'll discuss how this dichotomy offers a natural explanation of neural signals that track the number of individuated representations in working memory while remaining insensitive to the “information load” associated with those items.
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(64)

Temporal Constraints Limit Working Memory Capacity. PIERRE BARROUILLET, *University of Geneva*, BELLETIER CLEMENT and VALERIE CAMOS, *University of Fribourg* (Presented by Pierre Barrouillet) — In the time-based resource sharing (TBRS) model, the amount of information that can be maintained in working memory results from the balance between loss and reconstruction mechanisms. When attention is distracted and focused on a concurrent activity, memory traces degrade over time. However, through attentional focusing, traces can be reactivated to counteract their forgetting. As a consequence, the speed at which a concurrent task is performed and the time during which attention is available for maintenance determine working memory capacity. Studies in young adults and children would illustrate the impact of these different temporal constraints.
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(65)

A Computational-Modeling Approach to Working Memory Capacity. KLAUS OBERAUER, *University of Zurich* (Presented by Klaus Oberauer) — Multiple mechanisms and processes are assumed to contribute to working memory (WM). Understanding their interplay is a challenge for the unaided mind, often resulting in vagueness and over-simplification of informal theories. Computational modeling helps to overcome these difficulties, making assumptions more explicit and testable. I will present examples of how computational models of WM help to explain key findings reflecting its capacity limit: The effects of set size, and of concurrent processing of distractors from the same or from a different content domain than the memoranda. In these models, interference is the main cause of the capacity limit of WM. The notions of time-based decay, and of limited resources, which play a prominent role in informal theories of WM, so far appear to be unnecessary, or unhelpful, in the context of computational models.
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(66)

Different Perspectives on Working Memory. RANDY ENGLE, *Georgia Institute of Technology* (Presented by Randy Engle) — I don't see the different approaches presented in this symposium as conflicting any more than I see the 6 blind villagers observing an elephant as conflicting. I have learned a great deal about working memory from the work of all of the participants in this symposium. My own perspective starts with my interest in the role of temporary memory in real-world tasks and that led me to the study of individual differences in working memory, how to measure that, and what are the elements of the working memory system responsible for those differences. I have used both experimental and differential approaches and have concluded that differences in ability to control attention in the service of temporary memories is a key factor in maintaining those memories but also in disengaging from those memories.
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Attention and Performance

Veilingzaal, Saturday, 10:00-12:00

Chaired by Viona Wijnen, Geriatric Psychiatry Observation Unit, Institution for Mental Health Care 'Dijk and Duin', Parnassia Group

10:00-10:20 (326)

Rapid, Nonconscious Effects Of Landmark Cues On Visual Orienting. SAM ASKELUND, NATHAN RYCKMAN, and ANTHONY LAMBERT, *University of Auckland* (Presented by Anthony Lambert) — In two experiments we investigated effects on attention of peripheral landmark cues, that predicted a target at the same location, and counter-landmark cues, that predicted a target at a different location. In both experiments, the delay between cue and target onset was very brief (66ms), and participants were not informed of the cue-target relation. On trials where cue and target appeared at the same location, simple response times (Experiment 1) and eye movements (Experiment 2) were faster on valid (landmark) compared to invalid (counter-landmark) trials. This effect was apparent early in practice. On trials where cue and target appeared at different locations, valid (counter-landmark) and invalid (landmark) trials did not differ. We propose that rapid movements of attention in response to landmark information can be viewed as a form of visually guided action, controlled by rapid, non-conscious encoding of visual cues by the dorsal visual stream.

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10:20-10:40 (327)

Automatic Attentional Bias For Future Rewards. HELEN TIBBOEL, *Erasmus University Rotterdam* (Presented by Helen Tibboel) — When stimuli are consistently paired with reward, attention toward these stimuli becomes biased. An important premise is that participants need to experience stimulus-reward pairings repeatedly to obtain these automatic effects. This idea is based on associative learning theories which suggest that extensive exposure to stimulus-reward pairings leads to the formation of stimulus-reward associations, and a transfer of salience of the reward to the neutral stimulus. However, novel learning theories suggest that such effects are not necessarily due to associative learning; they can be caused by complex propositional knowledge and expectations regarding future events as well. In our experiments, we examined how anticipated (i.e., instructed) stimulus-reward pairings affect automatic attention. We found that attention was drawn automatically toward high-reward stimuli (relative to low-reward stimuli), even when stimulus-reward pairings were not yet experienced, but only expected. This implies that automatic attentional bias toward reward-related stimuli can be caused by complex propositional knowledge and expectations (as opposed to trained associations).

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10:40-11:00 (328)

Influences Of Transcutaneous Vagus Nerve Stimulation On The Alerting System: Evidence From The Attentional Network Task. LORENZA S. COLZATO, *Leiden University and Ruhr University Bochum*, ALESSANDRA FINISGUERRA, *University of Udine*, BRYANT JONGKEES, *Leiden University* (Presented by Lorenza S. Colzato) — In recent years, three attentional networks have been defined in anatomical and functional terms. These functions involve alerting, orienting, and executive attention and have been linked to different neuromodulators: noradrenaline (NE), acetylcholine and dopamine, respectively. Here, we assessed the causal role of the noradrenergic system in modulating the alerting network by applying transcutaneous vagus nerve stimulation

(tVNS), a new noninvasive and safe method to stimulate the vagus nerve and to increase NE concentrations in the brain. A single-blind, sham-controlled, between-group design was used to assess the effect of tVNS in healthy young volunteers during the Attention Network Test (ANT), designed to evaluate alerting, orienting, and executive attention. Taking into account the baseline vagal tone (as indexed by heart rate variability) of our participants, results showed increased alerting effect during active tVNS, as compared with sham stimulation. These findings provide evidence for an important causal role of the noradrenergic system in the alerting network.

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11:00-11:20 (329)

Value Driven Unconscious Processing: Influence Of Reward On Masked Priming. SEEMA PRASAD and RAMESH MISHRA, *University of Hyderabad* (Presented by Seema Gorur Prasad) (Sponsored by Ramesh Mishra) — Reward has been shown to play a crucial role in attentional control. But its role in modulating subliminal processing remains unexplored. Can the unconscious influence of a stimulus be controlled by the value attached to it? We examined this in two experiments using a backward masking paradigm with free and forced choice trials. Masked primes were presented on each trial before the target phase. High or low reward points were attached to the target stimuli. Numbers (1, 2 and 0) were used as primes/targets in Experiment 1 and arrows (left, right, double headed) in Experiment 2. A control block without reward was administered to all the participants. In both the experiments, results showed positive priming effects for low reward trials and negative priming effects for high reward trials indicating that high reward lead to self-inhibition of the primes resulting in negative compatibility effects. These findings shed new light on the extent of top-down control on unconscious priming.

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11:20-11:40 (330)

Preparing For Distraction: Attention Is Enhanced Prior To The Presentation Of Distractors. TAL MAKOVSKI, *The Open University of Israel* (Presented by Tal Makovski) — How do people prepare for the presentation of distractors? Previous studies have shown that attention is sometimes enhanced when distractors are expected. However, this was mainly shown in selective attention tasks in which observers were also expecting to-be-attended targets. Here, subjects performed a change-detection task while only distractors were presented at a fixed moment during the retention interval. To probe attention, subjects were also asked to detect a dot-probe that appeared unexpectedly on some trials. Probe detection was faster when it appeared in distractor blocks than in no-distractor blocks. Further experiments revealed that the effect was not temporally or spatially specific. In addition, a similar effect was found when the expected stimuli were informative rather than distracting. Together, these findings strongly suggest that not only distractors are not inhibited prior to their presentation, but also observers allocate more attentional resources to all expected stimuli, even when they are distracting.

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11:40-12:00 (331)

Task-Free EEG Dynamics Track And Predict Patient Recovery From Severe Acquired Brain Injury. VIONA WIJNEN, *Institution for Mental Health Care 'Dijk and Duin', Parnassia Group*, RUDY VAN DEN BRINK, *Leiden University*, GEERT VAN BOXTEL, *Tilburg University*, GILLES VAN LUIJTELAAR, *Radboud University*, HENK EILANDER, *Radboud University Nijmegen Medical Centre*, SANDER NIEUWENHUIS, *Leiden University* (Presented by Viona Wijnen) — Detecting awareness in patients with disorders of consciousness (DOC) may be hindered by impairments in motoric, sensory, or cognitive abilities, resulting in a substantial proportion of misdiagnosed DOCs. Task-free paradigms that are independent of the patient's sensorimotor and neurocognitive abilities may offer a solution

to this challenge. We present a study in which we acquired task-free EEG measurement, and examined changes in amplitude and connectivity metrics of oscillatory brain activity across recovery. We applied multi-class linear discriminant analysis to assess diagnostic and prognostic utility at the individual-patient level. We found that patients exhibited nonlinear frequency band-specific changes in spectral amplitude and connectivity metrics that aligned with the metrics' frequency band-specific diagnostic value during recovery. Connectivity during a single task-free EEG measurement predicted the level of patient recovery approximately 3 months later with 75% accuracy. Our findings show robust pathophysiological markers that can be used for diagnosis and prognosis of DOC.

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Orthographic Processing and Reading Graanbeurszaal, Saturday, 10:20-12:00

Chaired by Sascha Schroeder, Max Planck Institute for Human Development - MPRG REaD

10:20-10:40 (332)

OB1-Reader, A Model For Word Recognition And Eye Movements In Reading. MARTIJN MEETER, *Vrije Universiteit Amsterdam*, JOSHUA SNELL, *Aix-Marseille University, Vrije Universiteit Amsterdam*, JONATHAN GRAINGER, *Aix-Marseille University* (Presented by Martijn Meeter) — In the last decades, sophisticated accounts have been developed both of the mechanisms underlying single word recognition, and of eye-movement control in text reading. However, these accounts have had relatively little cross-fertilization. To bridge the gap, we developed OB1-Reader, a computational model of reading that covers both levels and integrates insights from both literatures. Key features of OB1 are: (i) words activate open bigram units, which code for letter identity and relative position; (ii) bigram units activate representations of words they are part of; (iii) multiple words are processed in parallel, but this is modulated by an attentional window of adaptable size; (iv) saccade onset is influenced by word recognition, while saccade goal is determined by visual input to the model. A comparison of simulation results with experimental data shows that the model provides a fruitful and parsimonious theoretical framework for understanding reading behavior.

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10:40-11:00 (333)

Modeling Orthographic And Semantic Effects In Visual Word Recognition. WALTER JB. VAN HEUVEN, *University of Nottingham*, TON DIJKSTRA, *Radboud University Nijmegen* (Presented by Walter van Heuven) — Computational models of visual word recognition (e.g., Davis, 2010) have been successful in simulating orthographic effects in visual word recognition. However, most of these models are limited to orthography and cannot account for semantic effects in visual word recognition. We developed a new computational model that includes orthographic and semantic codes. The model uses a letter position coding scheme based on the open-bigram model (Grainger & van Heuven, 2003). Semantics in the model are implemented using a semantic network based on word associations or distributional semantics. The model explains a large amount of the variance of the form priming effects reported in Adelman et al. (2014). Furthermore, the model accounts for a large percentage of the variance in the

English Lexicon Project (Balota et al., 2004). These results as well as simulation results of semantic/associative priming effects reported in the literature will be presented

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11:00-11:20 (334)

Parallel Syntactic Processing In Reading: The Sentence Superiority Effect. JOSHUA SNELL and JONATHAN GRAINGER, *Aix-Marseille University* (Presented by Joshua Snell) (Sponsored by Jonathan Grainger) — We theorize that during reading, parallel word processing generates a sentence-level representation that in turn constrains the recognition process for individual words. The novel Rapid Parallel Visual Presentation (RPVP) paradigm was used to test this theory. Four-word sequences (e.g. "the man can run") were briefly presented (200 ms), followed by a post-mask and a cue at one of the four word positions for partial report. Word identification (e.g. "man" at position 2) was more accurate in grammatically correct sequences compared with agrammatical re-combinations of the same words (e.g. "run man the can"), and this sentence superiority effect did not vary as a function of the target's position. The results indicate that syntactic information was picked up from multiple words at once, in line with the predictions of our parallel interactive model of sentence reading.

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11:20-11:40 (335)

The Influence Of Closeness Centrality On Visual Word Recognition. CYNTHIA S.Q. SIEW, *University of Warwick* (Presented by Cynthia S. Q. Siew) — The influence of *closeness centrality*, a network science metric that measures a node's "importance" in the network (Borgatti, 2005), on visual word recognition was investigated. Closeness centrality represents the inverse of the average number of links that must be traversed from one word to all other words in the orthographic language network—a web-like representation of orthographic word-forms in the mental lexicon where links are placed between orthographic neighbors. Words with high closeness centralities are "close" to other words in the lexicon. Regression analyses of behavioral data from the English Lexicon Project (Balota et al., 2007) revealed that closeness centrality was a significant predictor of speeded naming and lexical decision performance. High closeness centrality words were processed more slowly and less accurately than low closeness centrality words in the naming task, whereas high

closeness centrality words were processed more quickly than low closeness centrality words in lexical decision. The present findings demonstrate that the network structure of the orthographic mental lexicon influences visual word recognition performance and have important implications for models of visual word recognition.
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11:40-12:00 (336)

Parafoveal Processing Of Orthographic Information: A Developmental Study. SASCHA SCHROEDER, *Max Planck Institute for Human Development*, SARAH EILERS, *Max Planck Institute for Human Development - MPRG REaD*, SIMON P. TIFFIN-RICHARDS, *Max Planck Institute for Human Development-MPRG REaD* (Presented by Sascha Schroeder)

— Parafoveal processing of orthographic knowledge plays an important role in adult reading. It is still unclear, however, when exactly children start to extract this kind of information in the parafovea during sentence reading. In a longitudinal study following up children from grade 2-4, we investigated how orthographic and phonological preview information is processed using the boundary paradigm. Target words (e.g. “band”) were presented either in a transposed-letter (“bnad”), a pseudo-homophone (“bend”) or corresponding control conditions. Results show that children start to extract phonological information earlier than orthographic information and that the size of the orthographic preview benefit slowly expands from the beginning to the end of the word. This developmental trend is consistent with the dual-route model of reading development.
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False Memory

Administratiezaal, Saturday, 10:40-11:40

Chaired by Greg J Neil, Southampton Solent University

10:40-11:00 (337)

False Memories For Actions: Hard To Die? DONNA GIFT CABALO, *Sehir University-Istanbul*, FRANCESCO IANI, *University of Torino*, REYYAN BILGE, *Sehir University-Istanbul*, GIULIANA MAZZONI, *University of Hull* (Presented by Giuliana Mazzoni) — Previous work has shown that it is easy to create false memories for actions using visual false evidence such as doctored videos (Nash et al, 2009). In the current study, in addition to subjective belief and memory ratings, we used a recognition task. In session 1, participants imitated a number of actions that the experimenter performed. In session 2, they saw doctored video-recordings containing clips that falsely suggested they had performed additional (fake) actions. Fake actions received higher ratings for belief and memory compared to new actions. Our results also show that the critical actions were recognized as performed significantly more than novel actions. Further, correctly rejecting critical actions generated slower responses. These results suggest that doctored videos are highly effective mean to create false memories, and that the suggestions cannot be easily ignored. Participants were subsequently debriefed, nevertheless a sizeable number of false memories persisted for two weeks.
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was substantially larger on White faces. Our results suggest that repetition per se is not sufficient to change the encoding strategies employed while viewing other-race faces
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11:20-11:40 (339)

The Perceptual Misinformation Effect: Biasing The Interpretation Of Distorted Speech With Misleading Subtitles. GREG J. NEIL, *Southampton Solent University*, PHIL A. HIGHAM, *University of Southampton*, SIMON FOX, *Southampton Solent University* (Presented by Greg J Neil) — In standard misinformation experiments, eyewitnesses’ memory reports of an initial event are impaired by inaccurate post-event information. However, with the increasing prevalence of recording devices, auditory evidence is becoming more common. Across 3 experiments, we explored audio misinformation presented through inaccurate subtitles presented alongside the initial event. We show that this “perceptual misinformation” impacted earwitness memory for the content of a police interview. Furthermore, perceptual misinformation biased value judgments of how incriminating the audio was, and also their guilt judgments about the suspect. Attempts to protect participants from perceptual misinformation through pre- and post-warnings were ineffective. However, measures to help participants detect discrepancies between the subtitles and the audio provided limited protection from the misinformation. The results will be discussed in relation to theories of misinformation and hindsight bias, as well as the implications of the results for the use of transcripts and audio evidence in court.
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11:00-11:20 (338)

Does List Repetition Influences The Own-Race Bias In Face Recognition? TOMÁS A. PALMA, *Universidade de Lisboa*, LEONEL GARCIA-MARQUES, *CICPSI, Universidade de Lisboa* (Presented by Tomás A. Palma) — We explored whether seeing a face multiple times during encoding influences the own-race bias (ORB). Specifically, research on false memories suggests that study-list repetition might lead to two different results: it makes the critical item more familiar, which might lead to an increase in false recognition; and it increases the knowledge of the studied items, which can lead to a decrease in false recognition. Based on the idea that White faces are processed in an individuated manner and Black faces in a categorically manner, we tested whether repetition also has a dual effect on face recognition. Our hypothesis was that repetition would decrease false recognition for White faces but increase false recognition for Black faces. In three studies, we manipulated the number of times White and Black faces were shown during encoding. Later, participants received a recognition test. Results were similar across studies: repetition improved memory discrimination for both type of faces, however, its effect

Reward, Motivation and Decision Making**Berlagezaal, Saturday, 10:40-12:00***Chaired by Anna Szekely, Eötvös Loránd University, Budapest***10:40-11:00 (340)**

Interactions Between Response Conflict And Instrumental Learning. NURA SIDARUS, STEFANO PALMINTERI, and VALERIAN CHAMBON, *Ecole Normale Supérieure* (Presented by Nura Sidarus) — Adaptive behaviour requires the online monitoring of actions and outcomes, to detect conflicts and correct behaviour. Conflict is considered aversive, and choices may be biased by external suggestions to avoid conflict. Additionally, conflict can reduce the perceived control, and valence, of action outcomes. Yet, it remains unclear whether external stimuli could influence goal-directed decision-making, and whether conflict may influence instrumental learning. These questions were addressed by embedding irrelevant flankers within a reinforcement learning task, with intermixed free and instructed trials. Results showed that participants could adapt their choices to maximize rewards. Nevertheless, participants were still biased by flanker stimuli, and avoided conflict. The perceived cost of conflict with an irrelevant suggestion can sometimes trump internal value representations. This bias in decision-making was captured by adapting computational models of reinforcement learning. Model-based analyses further suggested that conflict may not affect learning for free choices, but may influence learning when following instructions.

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11:00-11:20 (341)

When Do People Cheat, And What Can We Do About It? SEBASTIAAN MATHÔT, MARCELLA FRATESCU, and ANDREA PITTARELLO, *University of Groningen* (Presented by Sebastiaan Mathôt) — What determines when people cheat? And can we reduce cheating? We asked participant to report a target digit that was indicated by a jittery cue; participants were paid more for reporting higher digits, which provided an incentive to cheat. We found distinct patterns of cheating: “brazen liars” always reported the highest digit, regardless of the target; other participants mainly made self-serving mistakes by reporting valuable digits next to the target. Importantly, participants’ very first eye movements indicated whether they would cheat or not,

suggesting that (in some cases) cheating reflects an automatic bias. In line with this, we could reduce cheating by increasing the visual saliency of the target. In summary, our results suggest that: in some cases cheating reflects an automatic self-serving bias, rather than a deliberate choice; and cheating can be counteracted by introducing other biases, for example by making ‘honest’ options more salient.

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11:20-11:40 (342)

A Common Genetic Factor In Longevity, Reactivity, And Cognitive Performance Endophenotypes. ANNA SZEKELY, ESZTER KOTYUK, and JULIANNA BIRCHER, *Eötvös Loránd University*, ANDREA VERECZKEI, *Semmelweis University*, DAVID A. BALOTA, *Washington University in St. Louis*, MARIA SASVARI-SZEKELY and ZSOLT RONAI, *Semmelweis University* (Presented by Anna Szekely) — The dopamine D4 receptor (DRD4) is a crucial component in modulating behavior through the reward circuitry, involving motivation and attentional mechanisms. Animal models highlight role of the DRD4 in shaping behavioral responses to environmental cues. Elevated 7-repeat allele frequency was found in migratory populations as compared to sedentary populations and among 90-109 years old Californian centenarians, as compared to an ancestry-matched young population. We investigated the role of the DRD4 7-repeat allele in human traits related to motivation, cognition and longevity in a large (N>1800) non-related Caucasian sample. 7-repeat carriers scored lower on impulsive traits, but higher on flow-proneness. They performed slower in long and tedious cognitive tasks, but not in a stimulating one involving reward. Moreover, a continuous pattern of increase of this allele from ages 18-75 was confirmed, also pointing to the possible role of gene-environment interaction effects, probably driven by historical events in our oldest old groups. We conclude that the 7-repeat form of the dopamine D4 receptor gene could be a longevity enabling genetic variant through shaping behavior towards successful adaptation to the changing environment.

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SYMPOSIUM VII: Proactive Control: Mechanisms and Deficits**Effectenbeurszaal, Saturday, 15:00-16:40***Chaired by Eyal Kalanithoff, The Hebrew University of Jerusalem, Israel, and Marius Usher, Tel-Aviv University***(71)**

Flexible Neural Mechanisms of Cognitive Control: The Dual Mechanisms Framework. TODD BRAVER, *Washington University in St. Louis* (Presented by Todd Braver) — The neural mechanisms of cognitive control, which involve a network of brain regions centered on the lateral prefrontal cortex, appear to be highly flexible. We have argued that this flexibility arises because cognitive control can be deployed in both a proactive and reactive mode. The proactive mode of control is future-oriented, preparatory and sustained in nature, while the reactive mode is transient, stimulus-driven, and frequently engaged by the presence of interference. I will present some recent work highlighting this theoretical approach, its utility for understanding individual differences and cognitive impairment in different populations, as well as some new directions it has taken us in understanding how motivation interacts with cognitive control. In addition, I

will describe on-going large-scale behavioral and brain imaging projects utilizing a newly developed task battery designed to more thoroughly test this framework.

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(72)

Task-Conflict and Proactive-Control: A Computational Theory of Stroop. MARIUS USHER, *Tel-Aviv University*, EDDY DAVELAAR, *Birkbeck College* (Presented by Marius Usher) — The Stroop task is a central experimental paradigm used to probe cognitive control by measuring the ability of participants to selectively attend to task-relevant information and inhibit automatic responses. Here, we focus on a particular source of Stroop variability, the reverse-facilitation (RF; faster responses to nonword neutral stimuli than to congruent stimuli), which has been suggested as a signature of task-conflict. We propose

that task-conflict variability results from the degree of proactive-control that subjects recruit in advance of the Stroop stimulus and we present a computational model of Stroop, which includes the resolution of task-conflict and its modulation by proactive-control. Results show that the model (a) accounts for the variability in Stroop-RF reported in the literature, and (b) solves a challenge to previous Stroop models—their ability to account for reaction time distributional properties. Finally, we show that the model accounts control deficits observed in patients with Schizophrenia.

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(73)

Cortical Oscillations for Proactive and Reactive Cognitive Control. TOM VERGUTS, *Ghent University* (Presented by Tom Verguts) — Recent single-cell/EEG/MEG work has suggested an important role of neurophysiological oscillations in cognitive control. For example, right before or during difficult tasks, electrophysiological activity in medial frontal cortex exhibits theta frequency ($\approx 6\text{--}8\text{Hz}$); which is coupled to faster (gamma, $\approx 40\text{--}50\text{Hz}$) frequencies; and the coupling strength correlates with behavioral performance in such tasks. However, the mechanistic role of these frequencies and their coupling has remained unclear. This talk will present recent computational modeling work attempting to address this issue. It is demonstrated that theta-frequency waves originating from medial frontal cortex can synchronize gamma-frequency waves in posterior processing areas (e.g., areas for processing color or word information). This principle can be usefully applied to several tasks (e.g., probabilistic reversal learning, Stroop task), both in a proactive and a reactive manner, accounting for the electrophysiological signatures. Finally, preliminary EEG data that confirm this model will be examined.

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(74)

The Effect of Emotion and Anxiety on Proactive Task Control. EYAL KALANTHROFF, *The Hebrew University of Jerusalem, Israel* (Presented by Eyal Kalantrhoff) — The talk will report investigations of the effect of negative emotional distractors and of anxiety on proactive task control. In the first experiment we

found that when Stroop stimuli are preceded by brief aversive (but not neutral) picture primes (distractors), patients who suffer from anxiety show a deficit in pro-active control associated with task-conflict. In the second experiment we used a “threatened morality manipulation” to induce guilt and anxiety in normal (student) participants before they carried out a Stroop and an object interference task. Again, we found evidence for a deficit of pro-active control, especially in highly anxious participants. In the third experiment using the Stroop and object interference tasks, we found a similar deficit in pro-active control in patients with obsessive-compulsive disorder (OCD), which strongly correlates with symptom severity. We suggest that anxiety, which is triggered by stimuli or task-instructions, or is inherent to the individual (OCD) leads to a shift in the type of cognitive control from proactive to reactive.

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(75)

Proactive Control in Children: Mechanisms of Change. NICOLAS CHEVALIER, *University of Edinburgh* (Presented by Nicolas Chevalier) — As children grow older, they engage cognitive control less reactively and instead more proactively anticipate and prepare for task demands. In this talk, I will present findings showing that this developmental shift from reactive to proactive control is observed across multiple tasks, tapping response inhibition, working memory, and set-shifting. Critically, although younger children are already capable of proactive control engagement, behavioural, eye-tracking, and event-related potentials evidence shows that they often spontaneously engage reactive control, even when their performance would already benefit from proactive control. Further, proactive control engagement relates to how children value cognitive effort. Together, these findings suggest that proactive control engagement is not necessarily constrained by fundamental cognitive limitations, but also by metacognitive skills. More broadly, cognitive control development does not merely reflect a quantitative increase in cognitive resources, but also and foremost better and more flexible engagement of extant resources to match changing task demands.

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Complex Cognition II

Berlagezaal, Saturday, 15:00-16:20

Chaired by Kelly M Goedert, Seton Hall University

15:00-15:20 (343)

Perceived Advancement Of Knowledge Via Scientific Studies With Conflicting Results. DEREK J. KOEHLER, *University of Waterloo*, GORDON PENNYCOOK, *Yale University* (Presented by Derek J. Koehler) — Conflicting results from scientific studies may trigger a sense of uncertainty that in turn leads to a feeling that nothing new has been learned from those studies. Participants read about pairs of highly similar scientific studies with results that either agreed or disagreed, and were asked, “When we take the results of these two studies together, do we now know more, less, or the same as we did before about [the study topic]?” We find that the majority of participants do not feel that “we know more” as the result of the two new studies when the second study fails to replicate the first. When the two study results strongly conflict (i.e., one finds a positive and the other a negative association between two variables), a non-trivial proportion of participants actually say that “we know less” than we did before. Such a sentiment violates normative principles of statistical and scientific inference positing that new study findings can never reduce our level of knowledge

(and that only completely uninformative studies can leave our level of knowledge unchanged). Drawing attention to possible moderating variables, or to sample size considerations, did not change people’s perceptions of knowledge advancement.

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15:20-15:40 (344)

What Do Relative Quantity Judgments Tell Us About The Nature Of Cognitive Processing? SARA CORDES, *Boston College*, ANDREA L. PATALANO, *Wesleyan University* (Presented by Hilary Barth) — A prominent theme in cognitive science is the idea that cognitive systems combine information sources in a Bayesian manner (or an approximation), tracking source variability and weighting the sources’ contributions accordingly. Bayesian cue combination theories are favored in literature on the role of categories in cognition; they are thought to explain estimation biases in diverse tasks (the “Category Adjustment Model” (CAM, e.g. Huttenlocher et al., 2000; for recent related work in theoretical neuroscience, see Jazayeri & Shadlen, 2010; Sciutti et al., 2015).

Some findings taken as evidence of these processes, however, may be better explained in terms of simpler models of relative quantity judgment. We will discuss this theoretical possibility and present data from multiple tasks in children and adults suggesting that estimation biases in many tasks do not provide evidence of Bayesian combination of information sources. We further show how an alternative family of explanations links at least two distinct research literatures.

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15:40-16:00 (345)

"I Can't Think Without My Hands": Spontaneous Gestures Promote Spatial And Abstract Thought. BARBARA TVERSKY, *Columbia University and Stanford University*, MELISSA ZRADA-BRADLEY and YANG LIU, *Columbia Teachers College* (Presented by Barbara Tversky) — We show that most people spontaneously gesture when studying descriptions of events in time, mechanical systems, math, preferences, and political arrangements. Their gestures model the situations that they need to understand and remember. When they gesture they perform better. Many participants directed to sit on their hands have difficulty doing so. Arranging things in space helps to arrange them in the mind. Arranging things in space helps to arrange them in the mind.

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16:00-16:20 (346)

Motor Fluency Effects On Causal Judgment. KELLY M. GOEDERT, *Seton Hall University* (Presented by Kelly M Goedert) — Human understanding of causation may be grounded in our experience of physical forces in the world. We investigated whether right-handers, who exert greater force with their right than left hands, judge candidate causes on the right side as more causal. In two experiments, subjects simultaneously learned about a moderately effective and an ineffective cause on a trial-by-trial basis. Subjects rated the moderately effective cause as more causal when it appeared on the right side of space. This effect also emerged in subjects' trial-by-trial predictions, but the effect reversed with a left-right reversal in the spatial-numeric mapping of the causal judgment scale. The results are not consistent with the notion that our understanding of causation is grounded in our ability to exert force. However, the results suggest that motor fluency influences causal judgment. Our results may reflect greater use of conceptual information corresponding to more fluently processed spatial locations.

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Letter/Word Processing III

Administratiezaal, Saturday, 15:00-16:40

Chaired by Anurag Rimzhim, *Central Connecticut State University & Haskins Laboratories*

15:00-15:20 (347)

Neural Correlates Of Incidental L2 Auditory Word Learning. KRISTIN LEMHÖFER, JULIA EGGER, and JAMES M. MCQUEEN, *Radboud University Nijmegen* (Presented by Kristin Lemhöfer) — We investigated the electrophysiological correlates of naturalistic, incidental word learning in a second language (L2). Native Dutch speakers made price comparisons of objects in their L2 English, or listened to those by a virtual partner and judged them for price consistency. Critically, some of the object names (e.g., 'whisk') were previously unknown to them, as verified in a pretest. Later trials where participants had to name the same critical objects showed whether they had learned the words. On average, 36 % of the previously unknown words were learned after the first, and another 20 % after the second exposure. Instead of an enlarged N400 usually observed for pseudowords vs. words, there was a late-positive ERP for previously unknown compared to previously known words, suggesting that new-to-be learned words are encoded differently than pseudowords. Preliminary analyses of a small subset of participants for which this comparison was numerically possible showed a late positivity for subsequently learned vs. forgotten words. Furthermore, learned new words became less distinguishable from previously known words in the second exposure. This study reveals neural correlates of learning and memory for new L2 words.

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15:20-15:40 (348)

The Cerebral Effects Of Learning To Read Written Language And Musical Notation: A Longitudinal Approach. FALK HUETTIG, ALEXIS HERVAIS-ADELMAN, and MIGUEL TAVARES BORGES, *Max Planck Institute for Psycholinguistics* (Presented by Falk Huettig) — Learning to read written language or music is a profound cultural experience, requiring systematic instruction, practice over months or years, and concurrent

cortical re-organization. How do these cultural inventions yield this re-organization of the neural systems for vision and language (Dehaene et al [2010, Science], Castro-Caldas et al [1998, Brain], Petersson et al [1998, NeuroImage], Carreiras et al [2009, Nature])? In two longitudinal intervention studies with young, completely illiterate adult participants in India, we used functional and structural imaging before and after a literacy training program in which participants learned to read and write Devanagari (an alphasyllabary) script. We will report literacy-related functional and structural brain changes that crucially complement current neurobiological concepts of normal and impaired literacy acquisition. We will also report on ongoing work with two groups of adult alphabetic literates in Dutch as they increase proficiency in reading Mandarin Chinese and musical notation, i.e. new symbolic systems acquired in addition to their native writing system.

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15:40-16:00 (349)

ERP Masked Repetition Priming In Deaf And Hearing Readers. PHILLIP J. HOLCOMB, KATHERINE J. MIDGLEY, and GABRIELA MEADE, *San Diego State University*, JONATHAN GRAINGER, *Center National Research Scientifc*, KAREN EMMOREY, *San Diego State University* (Presented by Phillip Holcomb) — Masked priming is the gold standard paradigm for exploring the perceptual mechanisms involved in visual word recognition and paired with ERP recordings has proven useful in elucidating the neuro-cognitive nature of these mechanisms. Here we used masked repetition-priming to compare word processing in groups of hearing (N=32) and congenitally deaf (N=32) adults. Deaf readers acquire reading skills somewhat differently than hearing readers because they do not have access to the rich phonological representations that hearing readers rely on when learning to map letter strings onto meaning. Deaf readers showed

a pattern of early ERP priming effects that differed in polarity and distribution from the pattern seen in a matched group of hearing readers. The results will be discussed within the context of the bi-modal interactive activation model that has previously been used to explain masked priming in hearing readers.
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16:00-16:20 (350)

Phonology-Coding Neurons In The Visual Word Form Area: Evidence From TMS Adaptation Paradigm. CHOTIGA PATTAMADILOK, *Aix-Marseille Université*, SAMUEL PLANTON, *Aix Marseille University, CNRS, LPL*, MIREILLE BONNARD, *Aix Marseille University, INSERM, INS* (Presented by Chotiga Pattamadilok) — The left ventral occipito-temporal cortex (vOT) or the Visual Word Form Area plays a central role in reading. Yet, the area also responds to spoken input. This cross-modal activation has been explained either by top-down activation of orthography-coding neurons by speech input or by the assumption that the area acts as an ‘integration zone’ that codes multimodal rather than purely visual information. Here, we combined transcranial magnetic stimulation (TMS) with an adaptation protocol to examine the properties of the vOT neurons. Visual and auditory adaptations were used to manipulate the initial state of the area, tuned to either written or spoken input. After adaptation, subjects performed a lexical decision task on written and spoken stimuli, while paired-pulse TMS was applied on vOT. TMS facilitatory effects were found only when the stimuli presented during the adaptation and the task were both visual or both auditory. No cross-modal facilitation was found. Thus, learning to read seems to generate functionally segregated

populations of neurons within vOT, that separately encode orthographic and phonological attributes of language. Such cortical reorganization may also explain multimodal integration phenomena in other domains.

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16:20-16:40 (351)

Hindi Is Read Alphabetically Regardless Of L2-English Literacy Levels. ANURAG RIMZHIM, *Central Connecticut State University and Haskins Laboratories*, CAROL FOWLER, *University of Connecticut and Haskins Laboratories* (Presented by Anurag Rimzhim) — Akshar-based orthographies of South Asia (e.g., of Hindi) are generally identified typologically as alphasyllabaries. However, Rimzhim, Katz and Fowler (2014) proposed that these orthographies are *typologically* aksharic (syllabic) but *functionally* alphabetic. In a lexical-decision study of transpositions of different-sized orthographic units (C-Cə, V-V, V-Cə, C-V, C-CV, Cə-CV, and CV-CV), Rimzhim et al. (2016) reported the relevance of the letter in reading Hindi. However, this finding can be attributed to participants’ L2-English literacy. We reran Experiment 1 from Rimzhim et al. (2016) in a village in India on students of grades 11 and 12 who had minimal English literacy. The results show similar transposition effects across the two samples. The accuracy analysis shows more undetected transpositions of letters than akshars, even when the letters were consonant-bound vowel diacritics. These findings underscore the relevance of the letter in reading Hindi and highlight the functionally alphabetic nature of aksharic orthographies.

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Speech Perception

Veilingzaal, Saturday, 15:00-16:20

Chaired by Heather Bortfeld, *University of California, Merced*

15:00-15:20 (352)

Limited Spatial Selectivity Of Perceptual Retuning In Speech (And Why It Matters). HOLGER MITTERER, *University of Malta* (Presented by Holger Mitterer) — Listeners can retune their phonological categories when hearing ambiguous sounds in unambiguous environments (e.g., seeing an /b/-like lip-closure when hearing a sound between /b/ and /d/). One account argues that such retuning effects may reveal perceptual units in speech processing while others argue that the effect resides in episodic memory outside the linguistic system. In line with the episodic account and questioning the phonological-category account, previous studies failed to find generalization of retuning across spatial positions. However, these studies used a “psychophysical” design with just one stimulus and no exposure-test delays while retuning can also be obtained with varied stimuli and despite a delay. We show that no spatial selectivity is observed with such a high-variability design and an exposure-test delay. This shows that retuning may reveal perceptual units after all, and the evidence for allophones based on retuning studies cannot be pushed aside.
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15:20-15:40 (353)

Neural Entrainment Influences The Sounds You Hear. HANS RUTGER BOSKER, *Max Planck Institute for Psycholinguistics* (Presented by Hans Rutger Bosker) — When listening to speech, the brain is known to ‘track’ the spoken signal by phase-locking neural oscillations to the syllabic rate of speech. It remains debated, however, whether this neural entrainment actively shapes

speech perception or whether it is merely an epiphenomenon of speech processing. This study, presenting neuroimaging (MEG) and psychoacoustic evidence, reveals that entrained oscillations persist for several cycles after the driving rhythm has ceased. This sustained entrainment, in turn, influences the temporal sampling of subsequent speech segments, biasing ambiguous vowels towards long/short percepts. Thus, these experiments demonstrate the influential role of neural entrainment in speech perception.

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15:40-16:00 (354)

Cognitive Load Impairs Pure-Tone Detection. SVEN MATTYS, *University of York*, MELANIE FERGUSON, *National Institute for Health Research, Nottingham*, ANTJE HEINRICH, *University of Manchester* (Presented by Sven Mattys) — Cognitive load (CL), e.g., a concurrent memory task, reduces speech perception accuracy. Here, we asked whether CL has a similar effect on pure-tone audiometry (PTA), a behavioral measure of basic auditory processes that is often seen as encapsulated from cognition. Young and older adults performed a PTA test on .5, 1, 2, and 4 kHz pure tones under CL and no CL. CL consisted of a visual 2-back task running throughout the PTA test. The stimuli in the 2-back task involved either sub-vocal encoding or purely visual encoding. Young adults showed a significant 2-dB elevation of detection thresholds, but only when CL involved sub-vocal encoding. CL had no effect when it involved purely visual encoding. In contrast, older adults showed elevated detection thresholds under both types of CL. The cost was also approximately 2 dB. The results indicate that CL disrupts

even basic auditory processes. While a 2-dB hearing loss is small in absolute terms, it can have significant consequences in a noisy background. The age difference in the CL condition involving purely visual encoding suggests important lifespan changes in the attentional regulatory system and sensory representations.

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16:00-16:20 (355)

Dissociating Cortical Activity During Processing Of Native And Non-Native Audiovisual Speech From Early To Late Infancy. HEATHER BORTFELD, *University of California, Merced* (Presented by Heather Bortfeld) — Infants learn language from speech that is directed toward them by people talking to them, meaning they learn from a complex audiovisual signal. How do

they respond to that signal at different developmental time points as their experience with it accrues? Here, we use near-infrared spectroscopy to measure blood concentration changes in the bilateral temporal cortices of infants across three different age groups (3-to-6 months, 7-to-10 months, and 11-to-14-months) as they are exposed to engaging audiovisual speech. Critically, all three groups of infants were tested with audiovisual speech produced by the same speaker, both in the infants' native language (English) and in another, unfamiliar language (Spanish). We found that infants at each age range showed different patterns of cortical activity in response to both the native and the non-native audiovisual speech, highlighting their changing sensitivity to different components of these two signals over developmental time.

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Memory and Technology

Graanbeurszaal, Saturday, 15:00-16:40

Chaired by Phil Higham, *University of Southampton*

15:00-15:20 (356)

Retrieval In The Information Age: How Efficient Interface Design Thwarts Long-Term Memory. AARON S. BENJAMIN and GEOFFREY L. MCKINLEY, *University of Illinois at Urbana-Champaign* (Presented by Aaron S. Benjamin) — Access to information is more immediate than at any other point in history. The ready availability of personal Internet-connected devices has consequences for our engagement with our own memories—why make the effort to rely on our own, faulty, memory when we can more quickly and easily access sought-after information on our phone or computer? We report the results of experiments using a lookup task that allows learners to access information from a computer or to retrieve it directly from their own memory. Design characteristics that promote easy lookup yield negative effects on long-term memory because they discourage users from relying on their own memory. Those users consequently fail to enjoy the cognitive benefits of retrieval, and remember less about the outcomes of queries than users who use a less efficient lookup device

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15:20-15:40 (357)

Optimal Use Of Reminders: Metamemory, Ageing, And The Avoidance Of Cognitive Effort. SAM GILBERT, *University College London* (Presented by Sam Gilbert) — In everyday life, we often use external reminders (e.g. to-do lists, smartphone alerts) to prompt memory for delayed intentions. I will present two studies that address the following question: given that setting a reminder incurs both a cost (e.g. the time/effort to set it up) and a benefit (increased likelihood of remembering), do participants weigh these costs/benefits optimally or show systematic biases? Participants performed a memory task in which they could choose between a) scoring a higher number of points per correct response using their own memory, or b) scoring fewer points when permitted to use reminders. Participants were systematically biased towards using external reminders, even when they earned less money as a result. Individual differences in this bias were stable over time, and larger in older than younger adults. Practical and theoretical implications of these results will be discussed.

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15:40-16:00 (358)

Optimizing Adaptive Task Distribution In Human-Machine Teams. MARY E. FRAME, *Wright State Research Institute*, JENNIFER S.G. LOPEZ, *Air Force Research Laboratory, Wright*

Patterson AFB, ALAN S. BOYDSTUN, *Wright State Research Institute* (Presented by Mary Frame) — A great deal of theoretical groundwork has been established advocating for effective human-machine teaming via supervisory control. Under increasingly complex task environments, multitasking agents are constrained by cognitive workload, distraction, and fatigue. As a result, they frequently must offload tasks to automation, to varying effectiveness. Under given circumstances, either the human or the automation may have a performance advantage for certain tasks, but these advantages are nonstationary. We have developed a program that dynamically distributes tasks between human analysts and automated agents using intelligent decision logic in order to optimize team performance and reduce cognitive workload. This is accomplished by allowing the program to simultaneously interpret ongoing human and automation performance (and workload), then control the tasking distribution in real-time. Our technique provides a 6%-24% ($\mu = 13\%$) performance improvement, and contributes to the supervisory control literature by demonstrating a method of dynamic multi-task allocation for future human-machine teaming technologies.

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16:00-16:20 (359)

Which Note-Taking Method Supports The Best Encoding And Storage? Longhand, Laptops, Or Ewriters? JOHN DUNLOSKY, KAYLA MOREHEAD, and KATHERINE A. RAWSON, *Kent State University* (Presented by John Dunlosky) — A recent paper by Mueller and Oppenheimer (2014) offered a high-profile conclusion that the pen is mightier than the keyboard for supporting effective note-taking, which has led many teachers to admonish students for using laptops to take notes. In two laboratory experiments, we attempted to replicate their outcomes and extend them to explore the efficacy of using eWriters for taking notes. In Study 1, the impact of these note-taking methods was assessed on the encoding function of note-taking, and in Study 2, their impact on both encoding and storage functions were estimated. Although our pattern of outcomes coincides relatively well with those reported by Mueller and Oppenheimer (2014), our outcomes and those from prior work also suggest that longhand is not always mightier than the keyboard, which may be superior in some classroom contexts.

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16:20-16:40 (360)

The Power Of The Pen: The Multiple Learning Benefits Of Longhand Notetaking During Lectures. PHIL HIGHAM and KATIE CORIA, *University of Southampton* (Presented by Phil Higham) — Technological advances have meant that university students engage in very different activities during lectures compared to a few decades ago. For example, longhand notetaking on blank paper has largely been replaced by reading/annotating copies of PowerPoint lecture slides. Our research assessed the effect on learning that these changes have had by manipulating the activities that students engage in while encoding lectures

on science and medicine. We found that generative longhand notetaking (but not verbatim copying) led to better short- and long-term learning compared to passive observation and slide annotation. These benefits occurred regardless of the type of material (concepts versus facts) or lecture pace (fast versus slow). Moreover, notetaking reduced the time that students needed to revise for an examination on the lecture material eight weeks later. In none of our experiments did slide annotation, the most common type of lecture activity, produce any learning benefits compared to passive observation.

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Emotion and Cognition II

Berlagezaal, Saturday, 16:40-18:00

Chaired by Andreas Eder, University of Würzburg

16:40-17:00 (361)

How Is Emotional Intelligence Related To Mood Dynamics? DMITRY LYUSIN and ABDUL-RAHEEM MOHAMMED, *Higher School of Economics* (Presented by Dmitry Lyusin) — It has been shown that emotional intelligence (EI) predicts positive mood but EI relations with dynamics characteristics of mood are understudied. The study aimed at exploring relations between EI and variability, instability, and inertia of mood. Mood self-reports of 28 participants were collected through a two-week experience sampling procedure; mood was assessed with the scales of Positive Affect, Negative Affect, and Tension. EI was measured with a questionnaire EmIn comprising the scales of Interpersonal EI, Intrapersonal EI, Emotion Understanding, and Emotion Management. EI was more related to dynamic than static mood characteristics. Interpersonal EI and emotion understanding were positively related to inertia of positive and negative moods (r s from .30 to .46) and negatively to instability of tension (from .30 to .32). Results suggest that EI plays an important role in mood endurance and stability. Associations between dynamic characteristics of mood and Big Five personality traits will also be presented.

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17:00-17:20 (362)

That's Frowned Upon: Embodied Simulation and Expression of Emotion During Language Processing. BJÖRN 'T HART and MARIJN STRUIKSMA, *Utrecht University*, ANTON VAN BOXTEL, *Tilburg University*, JOS VAN BERKUM, *Utrecht University* (Presented by Björn 't Hart) (Sponsored by Marijn Struiksma) — Research on embodied language processing often takes activity of the corrugator supercilii ('frowning muscle') to reflect the conceptual simulation of valenced (i.e. positive or negative) linguistic meaning, e.g. the valence of the word "furious", or the simulation of a furious character when "Marc is furious". However, the frowning muscle also functions to express our own emotions. We report on multiple EMG studies where we examined what happens when emotions simulated by the reader as they make sense of a story are at odds with emotions felt by the reader over particular story events. The reader's emotional response to such events was manipulated by describing story characters as moral or immoral. We found evidence that corrugator activity during subsequent descriptions of valenced events reflected both emotional simulation and expression. Our findings suggest that theories of embodied language processing must take into account evoked emotions, especially in richer linguistic materials.

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17:20-17:40 (363)

Affective Responses Towards Evaluatively Conditioned Stimuli. FERDINAND PITTINO, KATRIN M. KLIEGL, and ANKE HUCKAUF, *Ulm University* (Presented by Ferdinand Pittino) — Evaluative Conditioning (EC) is defined as the change in liking of a conditioned stimulus (CS) due to its pairings with an affective unconditioned stimulus (US). However, affective US do not only differ from neutral ones regarding subjective ratings, but also regarding physiological and behavioral measures. In two experiments affective responses towards evaluatively conditioned stimuli were investigated, i.e. subjective ratings, pupil size, and duration estimation. In Experiment 1, the CSs were either paired with negative or neutral pictures. After conditioning, the CS^{negative} was rated to be more negative and more arousing, elicited larger pupils, and was temporally overestimated compared to the CS^{neutral}. Thus, a consistent pattern of affective responses emerged. In Experiment 2, participants were merely informed about the contingency between the CS and the US. After conditioning, the subjective ratings also changed, but there was neither evidence for differential pupillary responses nor for differential temporal processing. The results demonstrate that EC can indeed affect all layers of the affective response simultaneously. However, Experiment 2 suggests that there might be moderating factors based on the type of EC procedure.

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17:40-18:00 (364)

Is Thinking Really Aversive? ANDREAS B. EDER, THORSTEN ERLE, and ANAND KRISHNA, *University of Würzburg* (Presented by Andreas Eder) — Previous research showed that people prefer to administer electric shocks to themselves instead of being left alone with their thoughts. In our research we examined the motivations driving this behavior. Several experiments replicated the result that participants choose to shock themselves during a waiting period (15 minutes). The primary motivation for this behavior was however not hedonic (escape from engaging in one's own thoughts) but, rather, sensation seeking and participants' curiosity about the effects of shocks. The results suggest that people show a motivation to explore regularities in the environment even when they are clearly unpleasant to them.

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Working Memory II
Veilingzaal, Saturday, 16:40-18:20
Chaired by Elkan Akyurek, University of Groningen

16:40-17:00 (365)

Working Memory Updating, Gating, And Removal: The Reference-Back Paradigm. YOAV KESSLER and RACHEL RAC-LUBASHEVSKY, *Ben-Gurion University of the Negev* (Presented by Yoav Kessler) — Working memory (WM) enables both maintenance, the ability to robustly hold information, and updating, the ability to modify the information when needed. According to gating models, these two functions are coordinated by a gate. Information is robustly maintained when the gate to WM is closed, while opening the gate enables updating WM with new input. Building on this notion, we suggest that memory updating can take place in two forms: controlled, gating-dependent WM updating, and automatic, gating-independent updating that takes place outside WM. The reference-back paradigm, a novel version of the n-back, was designed to tease apart these two types of updating. In each trial, participants were presented with a stimulus that appeared inside a red or a blue frame. The task was to indicate whether or not this stimulus is identical to the one that appeared inside the most recent red frame. Trials involving a blue frame (“comparison trials”) only required a same/different decision, but not WM updating. Trials involving a red frame (“reference trials”) also required WM updating. Switching among these two conditions corresponded to gate opening and closing. The utility of this paradigm for understanding WM updating will be demonstrated.

Email: Yoav Kessler, kessler@bgu.ac.il

17:00-17:20 (366)

Suppression Of Spatial And Non-Spatial Features During Visual Working Memory Maintenance. QI LI, *The University of Tokyo* (Presented by Qi Li) — Visual working memory (VWM) allows the comparison of the perceptual information from objects separated in space and time. In real world, visual information constantly gains or losses relevance as the environment around us is always highly dynamic. This study investigated whether it is possible to retrospectively suppress a task-irrelevant feature during VWM maintenance. Participants’ task was to memorize objects defined by the combination of color, shape and location, and decide whether a feature swap occurred between two objects after a retention interval. During the retention interval, a retro-dimension-cue which informed participants of the irrelevant dimension was presented. Performance was significantly better when participants were retrospectively cued to ignore objects’ shapes compared to the baseline condition where all feature dimensions were relevant. However, cueing participants to ignore the locations of the objects profoundly impaired performance. These results indicate that spatial and non-spatial features have different roles in VWM maintenance.

Email: Qi Li, liqi@l.u-tokyo.ac.jp

17:20-17:40 (367)

Irrelevant Speech And Short-Term Memory: Is The Semantic Mismatch Effect Due To Attentional Capture? JAN PHILIPP RÖER, *Witten/Herdecke University*, RAOUL BELL and AXEL BUCHNER, *Heinrich Heine University Düsseldorf* (Presented by Jan Philipp Röer) — Task-irrelevant, to-be-ignored speech disrupts serial recall. Recently, it was demonstrated that distractor sentences with semantically unexpected endings (e.g., “It is a beautiful day without a single cloud in the church.”) produce a larger amount

of disruption than distractor sentences with semantically expected endings (e.g., “It is a beautiful day without a single cloud in the sky.”). In the present series of experiments, we tested whether this semantic mismatch effect is due to attentional capture. Disruption was reduced when participants were given the opportunity to listen to the upcoming distractor sentence before the trial during a preexposure phase. However, the semantic mismatch effect did not habituate and it did not differ between individuals with high and low working memory capacity. The results do not support the idea that the semantic mismatch effect is the result of attention shifts to the auditory modality.

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17:40-18:00 (368)

Does Dynamic Visual Noise Eliminate The Concreteness Effect In Working Memory? IAN NEATH, CHRISSY M. CHUBALA, and AIMÉE M. SURPRENANT, *Memorial University of Newfoundland*, PHILIP T. QUINLAN, *University of York* (Presented by Ian Neath) — Dynamic visual noise (DVN), an array of squares that are set randomly to black or white every 250 ms, interferes with certain tasks that involve visuo-spatial processing. Given the assumption that the representation of concrete words includes an imagistic code whereas that of abstract words does not, Parker and Dagnall (2009) predicted that DVN should disrupt visual working memory and selectively interfere with memory for concrete words. They observed a reversal of the concreteness effect in both a delayed free recall and a delayed recognition test. In our experiments, DVN abolished, but did not reverse, the concreteness effect with delayed free recall, delayed recognition, and immediate serial recognition tests. Subsequent experiments found no effect of DVN on immediate serial recall: concreteness effects were observed both with and without DVN. The results challenge current explanations and alternatives are discussed.

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18:00-18:20 (369)

How Working Memory Benefits From Dynamic Temporal Packaging. ELKAN G. AKYUREK and MICHAEL J. WOLFF, *University of Groningen* (Presented by Elkan Akyurek) — The limited amount of information that we can retain in working memory, even for relatively short time periods, is one of our most noticeable cognitive bottlenecks. Although working memory capacity varies from person to person, even the most able can barely maintain more than a handful of items. It is thus important to optimize that precious capacity. Strategically chunking information is then very useful. For example, remembering the arbitrary numbers 1, 2, 1, and 5 is easier when chunked as the year 1215 (Magna Carta). I will present evidence from different measures, including subjective visibility ratings, pupil dilation, and event-related potentials, showing that perceptual processes, and temporal integration in particular, help to optimize working memory. Multivariate pattern analysis of trial-wise EEG furthermore suggested that during integration, feature-specific representations are rapidly wrapped in a dynamic temporal code. Featural information is thereby preserved within variable temporal packages, ready for the opportune moment.

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Psycholinguistics

Effectenbeurszaal, Saturday, 17:00-18:40

Chaired by Antje S. Meyer, Max Planck Institute for Psycholinguistics and Radboud University Nijmegen

17:00-17:20 (370)

The Blame Game: An Investigation Of Grammatical Aspect And Blame Judgments. ANITA EERLAND, *Utrecht University*, ANDREW M. SHERRILL, *Emory University*, JOSEPH P. MAGLIANO, *Northern Illinois University*, ROLF A. ZWAAN, *Erasmus University Rotterdam* (Presented by Anita Eerland) — Imperfective aspect (i.e., *was punching*) is interpreted by the language processing system as a dynamic, unfolding sequence of actions, whereas perfective aspect (i.e., *punched*) is interpreted as a complete whole. Hart and Albarracín (2011) showed that grammatical aspect can influence perceptions of intentionality for criminal actions. We examined whether grammatical aspect can also influence perceptions of blame, a concept related to intentionality. There were no effects of grammatical aspect on judgments of blame but the results showed an effect of narrated order (Experiments 1-3). First-mentioned actions made the agent more to blame for the outcomes than last-mentioned actions. This effect was not due to the order of the blame questions (Experiment 2) or influenced by the chronological order of the events (Experiment 3). Experiments 4 and 5 showed strong effects of grammatical aspect on temporal dynamics and revealed that grammatical aspect can even influence the mental representation of non-mentioned actions.

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17:20-17:40 (371)

Plausibility Exerts An Impact On Comprehension Of Chinese Transitive Constructions. DONG-BO HSU, *National Taiwan Normal University* (Presented by Dong-Bo Hsu) — This study investigated the issues of how Mandarin speakers' interpretations of transitive constructions can inform the development of psycholinguistic models of comprehension. While they comprehended the Mandarin SVO, *ba(agent-BA-patient-V)-*, and *bei(patient-BEI-agent-V)-*constructions, which were crossed with plausibility (plausible vs. implausible) when noun phrases on these constructions were both animate, their choices of agent and response times were collected. Their responses indicated that plausibility affected the choice of agent and the response times of these constructions. The results suggested that the sentence comprehension model should incorporate not only heuristics but also language-specific properties that are encoded in the constructions, i.e., adversary properties embedded in the *ba-* and *bei-*constructions.

Email: Dong-Bo Hsu, dhsu2@ntnu.edu.tw

17:40-18:00 (372)

Script-Dependent Word Associations In Mandarin Chinese. SHUWEN CHEN and EMMANUEL KEULEERS, *Tilburg University* (Presented by Emmanuel Keuleers) — Chinese has two systems of writing in widespread use: Simplified characters, which have incomplete and arbitrary links to pronunciation, and Hanyu Pinyin, a phonetic system with strict grapheme-to-phoneme correspondences. In an online word association test with 119 Chinese native speakers in which we manipulated the script of the cue and the response script, we found that cues presented in Chinese characters resulted in more semantically relevant associations while cues presented in Pinyin resulted in more phonetically relevant word associations. In contrast, no significant impact of target script on writing production

was found. We conclude that reading text written in Chinese Simplified characters may lead to different semantic associations than reading Pinyin representations of the same words. However, writing text in Chinese Simplified characters may not lead to different associations than writing the same text in Pinyin script. These findings bear on the long-standing debate about whether the Chinese character-based writing system should be replaced completely by a Pinyin-based system and suggest that doing so would also structurally alter Chinese speaker's semantic spaces.

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18:00-18:20 (373)

Expectation Modulations Based On Verb Bias And Grammatical Structure Probability Shape Sentence Processing. CRISTIANO MICHELI, *Radboud University Nijmegen*, LENA HENKE and KIRSTEN WEBER, *Max Planck Institute for Psycholinguistics* (Presented by Kirsten Weber) — Prior knowledge and the current linguistic environment influence language processing. In this project we looked at how two types of information, 1) the statistics of the input (the proportion of two ditransitive sentence structures across different blocks) and 2) verb preferences biasing towards one of these structures or the other, influence sentence processing. We acquired electroencephalography recordings while 20 participants were reading sentences word by word. We looked at the N400 as well as later ERP components of the post-verbal noun, where our two expectation manipulations should influence the processing of sentence structure. Unexpected information based on the statistics of the input led to larger N400 as well as later more frontal effects, while unexpected structures based on verb bias modulated the N400 component and a later more posterior effect. The results show how two experimental manipulations of expectation can have overlapping as well as distinct influences on sentence processing.

Email: Kirsten Weber, kirsten.weber@mpi.nl

18:20-18:40 (374)

Planning And Coordination Of Utterances In A Joint Naming Task. ANTJE MEYER, *Max Planck Institute for Psycholinguistics and Radboud University Nijmegen*, RENSKE HOEDEMAEKER, *Max Planck Institute for Psycholinguistics Nijmegen* (Presented by Antje S. Meyer) — According to the model of dialogue as joint action, interlocutors represent both their own and the partner's task. We investigated this co-representation account using a naming task where pairs of participants either took turns naming three objects on a shared display (Speaker A naming the first and third and Speaker B the second object), or one speaker named one, two, or all three objects. Inter-turn pause durations indicated that the speakers effectively coordinated their utterances in time. Speaker A's speech onset latencies depended on the number of objects they named but not on speaker B's task. Moreover, Speaker A's eye movements indicated that they attended much more to their own than to B's objects. These results indicate that speakers prioritized planning their own responses over attending to their interlocutor's task, and that effective coordination can arise even when speakers take a rather egocentric rather than a co-representative approach to dialogue.

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Learning and Memory III
Graanbeurszaal, Saturday, 17:00-18:40
Chaired by Karen Lander, University of Manchester, UK

17:00-17:20 (375)

The Role Of Feedback In Implicit And Explicit Artificial Grammar Learning: A Comparison Between Dyslexic And Non-Dyslexic Adults. AYELET SASSON and RACHEL SCHIFF, *Bar Ilan University* (Presented by Rachel Schiff) — The importance of feedback for learning has been firmly established over the past few decades. The question of whether feedback plays a significant role in the statistical learning abilities of adults with dyslexia, however, is currently unresolved. Here, we examined the role of feedback in grammaticality judgment, type of structural knowledge and confidence rating in both typically developed and dyslexic adults. We implemented two artificial grammar learning experiments: implicit and explicit. The second experiment was directly analogous to the first experiment in all respects except training format: the standard memorization instruction was replaced with an explicit rule-search instruction. Each experiment was conducted with and without performance feedback. While both groups showed significantly improved learning in the feedback-based explicit artificial grammar learning task, only the typically developed adults demonstrated higher levels of conscious structural knowledge. The present study demonstrates that the basis for the grammaticality judgement of adults with dyslexia differs from that of typically developed adults, regardless of increase in the level of explicitness.

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17:20-17:40 (376)

Effects Of Male Behavior And Women's Sexual-Affective Socialization In Young Women's Memory And Emotional Responses To Pictures And Texts. SANDRA RACIONERO-PLAZA and XABIER ANSORENA-URCHEGUI, *Universidad Loyola Andalucia*, LÍDIA PUIGVERT-MALLART, *University of Cambridge*, DIEGO GÓMEZ-BAYA, *Universidad de Huelva*, CARMEN MARTÍN-GÓMEZ, *Universidad Loyola Andalucia* (Presented by Sandra Racionero-Plaza) — This study explored whether young women's attraction is influenced by (1) men's sexual-affective behavior and (2) women's sexual-affective socialization (more or less exposure to violence). 24 female participants memorized and rated perceived arousal and valence of (a) images of physically attractive and unattractive men, and (b) combinations of those images with texts about the sexual-affective behavior of males representing dominant, oppressed, or alternative masculinities. Results showed that (1) subjects reported higher valence and arousal for images combined with texts reflecting alternative sexual-affective behavior, and that (2) women exposed to violent socialization showed better recall of images combined with texts reflecting dominant sexual-affective behavior. Results indicate that young women's attraction towards men is influenced by men's sexual-affective behavior, and this, in turn, is influenced by sexual-affective socialization. These findings enhance our understanding of processes involved in female sexual-affective attraction and have important implications for the prevention of gender violence.

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17:40-18:00 (377)

Never Forget: Negative Emotional Valence Enhances Recapitulation. HOLLY J. BOWEN and ELIZABETH A. KENSINGER, *Boston College* (Presented by Holly Bowen) — Episodic memory involves mentally travelling back to the time of encoding. This concept has been supported by studies of recapitulation – the reactivation of encoding processes at the time of retrieval. Recapitulation may explain why negative events are remembered better, with more vivid detail, and greater feelings of re-experience. Our lab has shown that recapitulation in visual processing regions supports successful memory for negative visual stimuli, but not positive stimuli, and functional connectivity within visual processing regions varies by prior emotional context. Based on this work, we have proposed a new model of emotional memory entitled 'NEVER: Negative Emotional Valence Enhances Recapitulation'. This model proposes that, compared to positive emotions, negative emotions trigger increased encoding of sensory detail and elicit a tighter match between the sensory encoding signature and the sensory retrieval signature leading to differences in the subjective and objective qualities of the memory.

Email: Holly Bowen, holly.bowen@bc.edu

18:00-18:20 (378)

Calibration Of 10- And 12-Year-Old Children's Self-Score Judgments And Peer-Score Judgments. MARIËTTE VAN LOON, CLAUDIA ROEBERS, NIKE TSALAS, *University of Bern* (Presented by Mariëtte van Loon) — We investigated how well elementary school children (4th and 6th graders) can score their own and their peers' responses on a concept-definition test using feedback standards. Children's calibration is often not accurate when making self-score judgments (SSJs), but monitoring others seems easier than monitoring oneself. Therefore, calibration may be more accurate and benefit more from feedback when children make peer-score judgments (PSJs) than SSJs. Indeed, findings confirm these hypotheses: Calibration for SSJs was less accurate than calibration for PSJs, and calibration of SSJs was more accurate for 6th than for 4th graders. Further, calibration of SSJs and PSJs was related, indicating consistency in calibration accuracy. In the presentation, I will discuss that children's overconfidence does not only seem to be due to a metacognitive deficit, but also to self-protective reasons. As well, I will discuss potential research applications.

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18:20-18:40 (379)

Are Extraverts Better At Recognising Cars And Buildings As Well As Faces? KAREN LANDER, *University of Manchester* (Presented by Karen Lander) — The ability to recognise faces is an important aspect of everyday life, and most of us can distinguish between and remember hundreds of different faces. Despite this, relatively little work has investigated individual variation in face recognition ability. Interestingly, Li et al. (2010) established that extraverts perform significantly better than introverts on a face-specific recognition memory task. Further, Lander and Poyarekar (2015) found that more extraverted individuals perform significantly better on an upright famous face recognition task and show larger face inversion effects. One possibility is that extraverts are just more interested in their environment and popular culture, and this is what leads them to better recognition of faces. Accordingly,



in two experiments, we explore the effect of extraversion on face recognition, car recognition and building recognition. Our results found that participants higher in extraversion are significantly better at recognising faces (Cambridge Face memory test & famous

face recognition) but not cars (Cambridge Car memory test) or buildings. We discuss the theoretical and practical implications of our findings.

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POSTER SESSION 1

Animal Research

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

ANIMAL RESEARCH

(1002)

Same/Different Performance Is Not Facilitated By A Differential Outcomes Effect In A Touchscreen Task With Rats. LAUREN CLELAND, CHEYENNE ELLIOT, SYDNEY WILSON, and KENNETH LEISING, *Texas Christian University* (Sponsored by Kenneth Leising) — A differential outcomes effect occurs when acquisition of a discrimination is facilitated by the delivery of a unique outcome (e.g., reinforcer) following correct responses to discriminative stimuli. In same/different learning, the correct response isn't contingent on which discriminative stimulus is present, rather on the relationship between stimuli. Rats were trained in an iPad-equipped operant box. Rats were presented one of four visual stimuli as the sample. The sample was followed by a 50-ms, 1000-ms, 2000-ms (Experiment 1a) or a 500-ms, 1500-ms, 3000-ms, 6000-ms (Experiment 1b) delay before the test stimulus was presented. The test stimulus was followed by response boxes. Touches were reinforced to the box associated with "same" if the two stimuli matched. Touches to the "different" box were reinforced if the stimuli didn't match. No differential outcomes effect was found. Contrary to the literature, rats were more accurate on trials with longer delays between sample and test displays. Email: Lauren Cleland, l.cleland@tcu.edu

(1003)

Processing Of "Pleasant" Or "Threatening" Realistic Pictures In Baboons: Inter-Individual Differences In Valence's Allocation. CAROLE PARRON, *CNRS University of Aix-Marseille*, MARIE MONTANT, *University of Aix-Marseille* — Emotional reactions are organized by underlying motivational states that have evolved to promote the survival of individuals and species. How emotion and cognition interact has not been extensively studied in primates. We investigated whether emotional value of a realistic picture would

prevail over its natural class in primates. Twelve pictorially naïve baboons were trained to associate a "pleasant" picture, a banana, and a "threatening" picture, a snake, to two different responses (coloured circles). Once baboons had learned the task, they were tested with new pictures selected according to their potential positive or negative contents. The different items were carefully chosen in order to prevent animals from categorizing the pictures based on their natural class. Results show that the two coloured circles have actually acquired a different valence. However, some striking inter-individual differences suggest that the emotional value allocated to the pictures may considerably vary.

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(1004)

What Embodied Cognition In Baboons Tells Us About Human Language. MARIE MONTANT, *CNRS and Aix-Marseille University*, CAROLE PARRON, *CNRS & Aix-Marseille University* — According to theories of grounded cognition, mirror neurons, and neural re-use, language -like all cognitive functions- relies on simulation networks involving perceptual, motor and affective information. The semantics of an action verb like "running" for instance should be stored in a network that includes parts of the somatosensory and motor cortices involved in the perception and motor command of the legs; and the recognition of that verb should be made possible through the reenactment of that precise neural network. Here we propose to study the behavior of non-human primates to investigate the emergence -through evolution- of multimodal neural networks that code for the semantics of objects. We will present the results of an experiment with baboons in which we questioned the embodied nature of object knowledge: if graspable objects are stored in sensorimotor loops, visual presentation of these objects should interfere with the baboons' hand trajectory a simple pointing task.

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Attention

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

ATTENTION

(1005)

The Role Of Phonological Similarity Of Objects' Names In Visual Search Guidance. MAXIM MOROZOV, *The Russian Presidential Academy of National Economy and Public Administration* (Sponsored by Vladimir Spiridonov) — In our study, we investigate how subordinate category labels and their phonological similarity influence visual search performance. As the stimuli we used pictures of butterflies (10 categories), and learned our participants to use subordinate labels for a half of them (5 categories). Two of five labels were phonologically similar ("krupinnitsa" and "krushinnitsa") and the other were phonologically dissimilar to each other. Then, our participants perform a visual search task with those categories. Our results suggest that phonological similarity of target's and distractors'

labels do not influence search performance. However, we also found that participants perform a search faster when distractors, as a target have or have not subordinate category labels. We can conclude that the presence/absence of subordinate category labels in participants' experience, but not its phonological similarity guides visual search.

Email: Maxim Morozov, morozovmaksimmm@gmail.com

(1006)

Target Color And Contrast Influence Temporal Attention In Rapid Serial Visual Presentation Tasks. AYTAC KARABAY and ELKAN G. AKYUREK, *University of Groningen* (Sponsored by Elkan Akyurek) — Various factors are known to modulate temporal attention and integration in dual-target rapid serial visual presentation tasks. We investigated how target colors (I) and contrasts (II) influence task performance. A hybrid



attentional blink/temporal integration task was used to test how different color/contrast pairs influence identification accuracy on the second target (T2), as a measure of temporal attention, and the frequency of temporal integration. We presented either single color/contrast (T1 and T2 had matched colors/contrast), or mixed color/contrast (T1 and T2 were different). We found (I) T2/T1 accuracy and temporal integration were higher in the mixed color condition. This was surprising, since single targets were always monochrome. We furthermore observed (II) no difference between single and mixed contrast condition on T2 accuracy and temporal integration. Instead, greater T1 and T2 accuracy was observed when targets were presented in high contrast. In conclusion, (I) temporal attention and integration were influenced by target color pairing; while (II) target contrast did not influence temporal attention in the same way, suggesting that these stimulus properties have different loci in visual perception and attention. Email: Aytac Karabay, a.karabay@rug.nl

(1007)

Can An Unexpected But Neutral Stimulus Change An Attentional Breadth? MASAE TAKENO and SHINJI KITAGAMI, *Nagoya University*, ATSUNOBU SUZUKI, *University of Tokyo* (Sponsored by Atsunobu Suzuki) — An emotional stimulus narrows or broadens a breadth of attention. It has been considered that a negative/positive emotion generated the attentional narrowing/broadening. In contrast, it has been proposed that a motivational intensity change the attentional breadth. According to this motivational hypothesis, a high motivated stimulus narrows attention and a low motivated stimulus broadens the attentional breadth. However, most of the previous studies of the motivational intensity did not discriminate the arousable and the motivated stimulus because they used the arousal intensity as the motivational intensity. Thus, the present study investigated the arousable but not motivated stimulus, which was unexpected and neutral, changed the attentional breadth compared with an expected stimulus using a flanker task. As a result, the unexpected stimulus delayed all reaction but it did not change the attentional breadth. It suggested that the motivation changed the attentional breadth but not the arousal. Email: Masae Takeno, takeno.masae@k.mbox.nagoya-u.ac.jp

(1008)

Multi-Sensory Attentional Capture: Facilitation And Distraction Effects Under Load. JESSICA LUNN, AMANDA SJOBLÖM and JAMIE WARD, *University of Sussex*, SALVADOR SOTO-FARACO, *Universitat Pompeu Fabra*, SOPHIE FORSTER, *University of Sussex* (Sponsored by Yana Weinstein) — Multisensory (MS) stimuli are argued to capture attention more effectively than unisensory (US) stimuli (e.g. Santangelo & Spence, 2007), due to their ability to elicit a super-additive neuronal response (Wallace et al., 1992). However, behavioural evidence for MS attentional capture is mixed, and conflicting evidence suggests that MS integration may itself be dependent upon attention (e.g. ten Oever et al., 2016). The present research examines the effect of attentional task demands on two measures of attentional capture by MS stimuli: facilitation and distraction effects. Across a series of 5 studies, perceptual load was manipulated to determine whether MS stimuli are still able to capture attention in perceptually demanding situations, which would reduce attentional capture by most other types of stimuli. We consistently found that MS stimuli are detected faster than US stimuli regardless of perceptual load, although they are nevertheless subject to load modulation. In contrast,

task irrelevant MS stimuli did not cause greater distraction than US stimuli, suggesting that the enhanced attentional status of MS stimuli may be limited to facilitating top down search. Implications for alerts in driving and aviation are discussed.

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(1009)

Examining The Test-Retest Reliability Of Reward-Modulated Attentional Biases. DANIEL PEARSON, *University of New South Wales Sydney*, LUCY ALBERTELLA, *Monash University*, JENNY LE, ALEXIS PORTER, and MIKE LE PELLEY, *University of New South Wales Sydney* (Sponsored by Mike Le Pelley) — Pairing a stimulus with a monetary reward increases the extent to which it involuntarily captures attention. This *value-modulated attentional capture* (VMAC) effect has been demonstrated even when attending to the reward-associated stimulus is directly counterproductive, in that it causes the omission of the reward that would otherwise have been received. Maladaptive attentional biases and dysfunctional reward-learning processes have been indicated in several mental health problems (e.g., addiction, depression, schizophrenia) as well as sub-clinical behaviors that influence physical health (e.g., risk-taking, over-eating). Thus, there has been considerable interest in determining whether the magnitude of VMAC is related to these phenomena. However, it remains to be established whether VMAC is stable across measurement points. We will present new data that suggests that VMAC has low test-retest reliability. This suggests that reward-modulated attentional biases are not stable across time, and may therefore be of limited use in predicting behavior and trait variables.

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(1010)

Comparing The Effects Of Deviant Sounds After Go And NoGo Trials In Young And Older Adults. ALICIA LEIVA, PILAR ANDRÉS, and FABRICE PARMENTIER, *University of the Balearic Islands* — Participants in a visual categorization task where every target follows an irrelevant sound exhibit longer response times (RTs) when this sound deviates from an otherwise repetitive, standard, sound (deviance distraction). If the task involves trials without a target (NoGo trials), deviant sounds elicit - relative to a standard sound - different effects depending on type of preceding trial: longer RTs following a Go trial, shorter RTs following a NoGo trial. The latter is thought to reflect the deviant's contribution to the release from the non-action mode induced by the preceding NoGo trial. Here we compared these effects in 46 young (M age = 20.39) and 46 older adults (M age = 65.15) using a cross-modal oddball task in which half the trials contained no target. We found that, compared to the standard sound, (1) deviant sounds following Go trials elicited longer RTs in young and in older adults (significantly more so in the latter); and that (2) deviant sounds following NoGo trials elicited significantly faster response times in young adults but not in older adults. The results suggest that older adults are more distracted by deviant sounds but benefit less from it to disengage from the non-action mode induced by NoGo trials. Email: Alicia Leiva, a.leivamir@gmail.com

(1011)

The Context That Faces Appear In Influences How Fearful Faces Are Processed. AIMEE MARTIN, STEFANIE I. BECKER, and ALAN J. PEGNA, *The University of Queensland* (Sponsored by Stefanie Becker) — It is well known that potentially threatening stimuli can attract attention, which facilitates their perceptual processing. fMRI studies have shown increased activity in fear-

related areas when threatening stimuli are situated in physical proximity, but could not clarify the underlying mechanism or processes. This study investigated how distance modulates attentional vs. perceptual processing of emotional faces. EEG/ERPs were recorded when participants had to make a gender judgement of emotional faces that appeared either within peripersonal space (50cm) or in extrapersonal space (120cm). Preliminary results revealed a larger face-specific N170 towards fearful faces in peripersonal than extrapersonal space, and a larger N170 for fearful male than fearful female faces. Furthermore, the marker of attention, the N2pc, was only significant for fearful female faces in peripersonal distance. These results demonstrate that distance modulates attentional and face-specific processes differently, indicating the need to modify existing accounts of the processing of emotional stimuli.

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(1012)

Attentional Suppression Elicited By Value. JI YEONG NOH, SANG A CHO, and YANG SEOK CHO, *Korea University* (Sponsored by Yang Seok Cho) — A greater cueing effect was obtained by a neutral cue signaling reward in the cueing paradigm (Failing & Theeuwes, 2014), indicating an involuntary attentional bias towards reward-associated stimuli (Anderson et al., 2011). However, it is not yet clearly examined whether reward contingency depending on cue validity modulates attentional bias towards reward signaling cue. In the present study, participants were to identify a red letter (L or T) in one of three placeholders arranged in a triangular form. Importantly, for one of two color cues (blue and green) reward was given only when the target was presented at a certain uncued location (e.g., clockwise from cued location), and cue-target interval (CTI) was manipulated (100 ms and 250 ms in Experiment 1 and 100 ms, 200 ms, and 400 ms in Experiment 2). In both experiments, the unrewarded cue captured attention in short CTI (100 ms), indicating a stimulus-driven attentional capture. Critically, the cueing effect disappeared for the cue rewarded on invalid trials in short CTI. Consequently, the results imply that attentional orienting can be modulated in the way of suppressing the reward-associated cue by reinforcing the attentional process on invalid trials.

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(1013)

Altering Spatial Priority Maps Via Statistical Learning Of Target Selection And Distractor Suppression. OSCAR FERRANTE, ALESSIA PATACCA, VALERIA DI CARO, CHIARA DELLA LIBERA, ELISA SANTANDREA, and LEONARDO CHELAZZI, *University of Verona* (Sponsored by Leonardo Chelazzi) — The cognitive system has the capacity to learn and make use of environmental regularities – known as statistical learning (SL). For instance, it is known that attentional selection is biased according to the spatial probability of targets; similarly, changes in distractor filtering can be triggered by the unequal spatial distribution of distractors. Open questions remain regarding the cognitive/neuronal mechanisms underlying SL of target selection and distractor filtering. In a series of visual search experiments, participants had to discriminate a target stimulus, while ignoring a task-irrelevant distractor (when present). We systematically manipulated spatial probabilities of either one or the other stimulus, or both. By this approach, we confirmed that SL of both target and distractor location implicitly bias attention. Most importantly, we described substantial indirect effects, with the unequal spatial probability of the target affecting filtering efficiency and, vice versa,

the unequal spatial probability of the distractor affecting selection efficiency across locations. The observed cross-talk demonstrates that SL of target selection and distractor filtering are instantiated via (at least partly) shared neuronal machinery.

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(1014)

The Impact Of Incident Characteristics And Visual Scan Strategies On Performance In CCTV Security Surveillance. CINDY CHAMBERLAND, *Université Laval*, HELEN M. HODGETTS, *Cardiff Metropolitan University*, FRANÇOIS VACHON and SÉBASTIEN TREMBLAY, *Université Laval* (Sponsored by François Vachon) — Security surveillance requires the timely detection of criminal activity to maintain public safety and security. The current study examined whether detection rates were influenced by the cognitive and perceptual characteristics of critical incidents, as well as by the monitoring strategy that operators spontaneously adopt. Using a city centre simulation comprising eight camera feeds and six display screens, results showed that more than two-thirds of incidents remained undetected. The probability of detecting an incident was influenced by its size on the visual display, its duration, and also by expectancy (whether the operator was briefed on the location/nature of a possible incident). While most subjects used a monitoring strategy based on prioritization – opting to display some camera feeds longer than others – performance was similar regardless of the strategy used. Our findings highlight the unique contribution of eye tracking combined with microworld simulation to the understanding and improvement of security surveillance.

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(1015)

Now, Where Was I? Investigating The Utility Of Eye-Tracking Feedback During Interrupted Search Tasks. LAUREN H. WILLIAMS and TRAFTON DREW, *University of Utah* (Sponsored by Trafton Drew) — Radiologists are often interrupted while searching through medical images (Yu, et al. 2014). In prior research, we found that interrupting CT scans led to an increase in search time relative to uninterrupted cases (Williams & Drew, 2017). Using eye-tracking (ET), we discovered this time cost was associated with impaired memory for previously searched locations. Following interruption, search was resumed in a different quadrant of the lung 77% of the time and there was an increase in refixation rate. Based on this evidence, we predicted that showing the observer where they have already searched should enable them to resume the task more quickly. In the current research, we tested the effectiveness of ET feedback during 3 interrupted search tasks (nature scenes, Landolt Cs, and CT scans). In Exp. 1, the feedback highlighted previously visited regions of the image. In Exp. 2, this feedback was shown for 15 s following the interruption. In Exp. 3, feedback indicated the most recent fixation prior to the interruption. Overall, despite evidence that search was resumed more accurately following the interruptions (e.g., same quadrant of lung in Exp. 3), the feedback did not reduce the associated time cost or improve target detection.

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(1016)

Do Lifeguards Prioritize Critical Events During Surveillance? LYNDSY K. LANAGAN-LEITZEL, *Eastern Connecticut State University* — Previous research has found that lifeguards have differing views on what events are critical to monitor during surveillance and often fail to sufficiently monitor expert-identified



events. In this study, three lifeguards were shown 40 minutes of video of normal aquatic activity in a variety of venues (ocean, lake, pool) and with variable numbers of swimmers (3-42) while an eye-tracker recorded their eye position. Additionally, each lifeguard rated their judgment of the severity of a selection of 100 incidents isolated from the same video. These severity ratings were compared to fixations on these same events. Consistent with past research, the lifeguards were variable in their ratings of severity and often did not sufficiently monitor those events that they had judged to be severe when isolated. These results suggest that lifeguards may miss critical events when they are in context, providing one explanation for variable lifeguard performance in the field.

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(1017)

Visual Search Attention Training Minimizes Task Distractibility.

TESSA ABAGIS and JOHN JONIDES, *University of Michigan - Ann Arbor* (Sponsored by John Jonides) — We conducted a visual search training paradigm for five daily sessions. In the task, irrelevant color singleton distractors appeared during self-timed visual search on 50% of trials. Over the week, distractor interference and overall reaction time (RT) for distractor present and absent trials decreased. This minimized distractor interference persisted at a one-month follow-up session. Participants completed transfer tasks before and after training and at follow-up. Preliminary analyses show closely related visual search tasks benefited from visual search training. Participants displayed decreased distractor interference in a similar visual search task with a singleton distractor. Past studies in our lab have suggested that, in a single session, participants with ADHD display a larger decrease in distraction as the task continues as compared to participants without ADHD. We are currently recruiting participants with and without ADHD to determine whether this training could be an effective method to combat distractibility associated with ADHD.

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(1018)

Emotional Distraction And The Attentional Blink.

CATHERINE THOMPSON, *University of Salford* — The Attentional Blink (AB) effect demonstrates that identification of a stimulus is impaired if it is presented in close temporal proximity to an initial stimulus. Theories to account for the effect focus on the importance of attentional control. An experiment was conducted to investigate the influence of emotional information on the AB. Across three blocks of trials participants identified two digits from a rapid serial presentation of letters. In two blocks emotional faces were presented at the start and end of each trial and the task relevance of the faces was manipulated. The AB was reduced by the addition of the faces, regardless of task-relevance. Performance also varied according to the emotion portrayed by the faces. The findings are consistent with research showing that emotion has an influence on attentional control. They also support the argument that the AB occurs due to difficulties in controlling the top-down attentional set.

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(1019)

Maintaining Efficiency: Redundant Target Processing Is Resistant To Changes In Dual-Task Load.

STEPHANIE A. MOREY and NICOLE A. THOMAS, *Flinders University*, JASON S. MCCARLEY, *Oregon State University* (Sponsored by Glen Bodner) — In two experiments we examined redundant target processing efficiency within a dual-task paradigm. Sixty-six participants performed a redundant target detection task by itself and with a concurrent joystick tracking task. In Experiment 1 ($N = 32$), targets were discriminable in the visual periphery. In Experiment 2 ($N = 34$), targets were small and flanked by maskers, demanding serial, foveal processing. We gauged target processing efficiency with a measure of workload resilience. Experiment 1 produced evidence of parallel limited-capacity processing, whereas Experiment 2 produced evidence of super-capacity processing. However, neither experiment found any change to processing resilience due to concurrent task-load. Findings suggest redundant target processing, whether parallel or serial, is robust against changes to dual-task load. However, our findings also illustrate the importance of display type in determining processing efficiency, with displays demanding serial processing engendering greater processing efficiency than displays demanding parallel processing.

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Autobiographical Memory

Thursdays

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

AUTOBIOGRAPHICAL MEMORY

(1020)

Remembering Episodic Memory With Nostalgia Influences Delay Discounting.

JUN KAWAGUCHI, *Nagoya University*, HIROKO NAKAMURA, *Aichi Shukutoku University*, AYAOKA SUZUKI, *Nagoya University* — Nostalgia refers to sentimental longing for one's past. Recent studies suggest that nostalgia influences varieties of psychological aspects, social connectedness, prosocial behaviour, and so on. It is also known that people recollect episodic details when they feel nostalgia. Episodic memory research showed that mental time travel, remembering or imaging of episodic details, is considered as the key of episodic memory and episodic future thinking as well. Therefore, remembering nostalgic memories can be seen as a specific

example of mental time travel in a sense of containing episodic details. In recent research, episodic future thinking has shown to increase delay discounting, reflecting envisioning processes. In this study, we examined whether remembering episodic memory with nostalgia influences delay discounting. Participants were asked remembering nostalgic or ordinary memory listening to nostalgic or recent music, followed by delay discounting task. The results showed the influence of remembering episodic details on the delay discounting task.

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(1021)

What's On Your Wandering Mind? The Content Of Mind Wandering During Text And Film Comprehension.

MYRTHE FABER, *Radboudumc Donders Institute for Cognitive Neuroimaging*,



SIDNEY K. D'MELLO, *University of Colorado Boulder* — What do we think about when we mind wander? We asked 88 students to read an instructional text and watch a film (each 20 minutes) and report whenever they found themselves zoning out. Each time they did, we asked them to report their thoughts and what, if anything, triggered them. We then categorized these thoughts (1208 in total) based on their content, and found that in contrast with previous studies, only 17% involved prospection whereas 33% consisted of autobiographical and semantic memory retrieval. This discrepancy might be driven by the rich content of stimuli: 71% of autobiographical and semantic retrieval was explicitly triggered by the text or film, compared to 28% of prospection. Latent semantic analysis revealed that memories were more similar to their triggers than prospective thoughts, suggesting that a substantial proportion of mind wandering is driven by the content of our environment. Email: Myrthe.Faber, myrthe.faber@gmail.com

(1022)

Family Memory: A Specific Type Of Collective Memory.

VICTORIA BARANOVA, *Lomonosov Moscow State University*, PETKO KUSEV, *The University of Huddersfield* — Collective memory theories argue that group memories are determined by the current situation of the existence of a social group and its values. One type of collective memory is the memory for collective family events. We have explored whether the family memory is different than the 'generic' collective memory. The results of the study showed that there are statistically significant differences between the judged importance of family and collective events, as well as time to retrieve events from these two types of memory. Accordingly, respondents judged family memory events as more important than the generic collective memory events. However, the respondents took more time to judge the importance of the collective memory events than the importance of family memory events. We also found that age and gender predict the judgments of importance for collective and family events. Email: Victoria Baranova, bva06@mail.ru

(1023)

The Influence Of Retrieval Cues On Involuntary Episodic Memory.

ADAM R. CONGLETON and DORTHE BERNTSEN, *Aarhus University* — Involuntary episodic memories are memories of past events that come to mind with no preceding attempts of retrieval, but typically in response to cues in the ongoing situation. Despite their importance, many questions about how these cues may modulate the experience of involuntary memories remain unanswered. Here we focused on the influence of the sensory modality of the retrieval cue on the frequency and content of the involuntary memories. We employed a novel experimental paradigm that allowed for greater control over the encoding of an event, while simultaneously maintaining many features of naturalistic experiences. The paradigm involved having participants watch a film depicting a first-person perspective view of going through a situation, while imagining themselves in the role of the film's protagonist. Afterwards, they were presented with visual and/or auditory cues from the film and their experience of involuntary memories was assessed using a probe-caught method. The results indicated the sensory modality of the cue modified both the frequency and content of the involuntary memories, with the findings suggesting visual cues may outshine auditory cues in terms of the elicitation and content of the memories produced. Email: Adam R. Congleton, congleton@psy.au.dk

(1024)

Dissociating Appraisals Of Accuracy And Occurrence Using Simple Scenes.

KASSANDRA KORCSOG and ALAN SCOBORIA, *University of Windsor* (Sponsored by Alan Scoboria) — Autobiographical memory research has indicated that appraisals of the occurrence of events and appraisals of the accuracy of the details recollected within them arise from distinct underlying mechanisms. Participants ($N=45$) were shown 60 neutral scenes (30 silent videos, and 30 audio recordings). One week later, they completed a source-monitoring test, described what they recalled from the scene, and rated occurrence and accuracy measures for 90 scenes. Participants received positive or negative feedback about the source and quality of their recall for viewed scenes that they had correctly identified as initially viewed. They then re-rated occurrence and accuracy for these scenes. Feedback about source influenced occurrence ratings but not accuracy ratings and negative feedback about the accuracy of recollection influenced accuracy but not occurrence ratings. This study indicates that appraisals of occurrence and accuracy can be dissociated with differing types of feedback. Email: Kassandra Korcsog, korcsog@uwindsor.ca

(1025)

Mental Imagery Of A Secure Attachment Figure Helps To Forget Negative Memories: An Example From A Directed Forgetting Study.

GÖRKEM GÖVEN and TUGBA UZER, *TED University* — Previous research indicated that thinking about an attachment figure after remembering negative experiences was helpful in regulating unpleasant feelings. The role of imagining an attachment figure before remembering negative memories in regulating emotions remains unclear. The present study investigated whether imagining an attachment figure at the outset had an influence on inhibiting negative memories. 144 (72 insecurely attached) participants were first instructed to imagine either an attachment figure, an acquaintance, or a good but not very close friend. Next, they were asked to remember positive, negative and neutral autobiographical memories as two lists. Forget group was informed that List 1 memories should be forgotten so that List 2 memories could be remembered better later. But, remember group was told that they should remember all memories. All participants were required to remember all memories in the final phase. Results demonstrated increased cost effect for negative memories of secure attachment figure imagination condition. Email: Tugba Uzer, tugba.uzer@tedu.edu.tr

(1026)

Age-Related Positivity Effects In Imagining And Recalling Future Positive And Negative Autobiographical Events.

ELVIRA GARCÍA-BAJOS, MALEN MIGUELES, and ALAITZ AIZPURUA, *University of the Basque Country* — The objective of this study was to examine the age-related positivity effect of recall for future positive and negative autobiographical events in young and older adults. The participants were presented with eight positive and eight negative future events as a model and the corresponding cues to generate their own positive and negative future events. The participants correctly recalled more positive than negative events. The young adults recalled more events than the older participants whilst the older participants showed better recall of their own imagined future events than the model's events, and committed more errors when recalling the model's events than their own imagined events. More than half of the errors were valence changes, most of these being from negative to positive



events, and these valence changes were more pronounced in the older than in the younger adults. Our findings suggest that people are well disposed toward recalling positive future events.

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(1027)

How Intention And Expectation That Memory Will Happen Influence Retrieval Of Autobiographical Memories. KRYSTIAN BARZYKOWSKI, *Jagiellonian University*, SØREN R. STAUGAARD, *Aarhus University* — Involuntary autobiographical memories come to mind effortlessly and unintended. We hypothesize that involuntary retrieval depends on memories that are highly accessible, while the elaborate search that characterizes voluntary retrieval also produces memories with low accessibility. Previous research provides some evidence for this 'threshold hypothesis'. This study aimed to investigate the effects of retrieval intentionality (i.e., wanting to retrieve a memory) and selective monitoring (i.e., instructions to report only memories) on the phenomenology of autobiographical memories. Participants were instructed to (1) intentionally retrieve autobiographical memories, (2) intentionally retrieve any type of thought (3) wait for an autobiographical memory to spontaneously appear, or (4) wait for any type of thought to spontaneously appear. The results support the prediction that highly accessible memories mostly enter awareness unintended and without selective monitoring, while memories with low accessibility rely on intention and selective monitoring.

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(1028)

Effects Of Time On Phenomenal Characteristics Of Memories For Terrorist Attacks. ANTONIO L. MANZANERO, *Universidad Complutense de Madrid*, TERESA SCOTT, *Universidad del Desarrollo*, ROCÍO VALLET, *Universidad Complutense de Madrid* — Over the last decade, several European capital cities have suffered attacks that have severely affected their populations. The study of how people remember these events over time can be useful to prevent psychological damage associated to victimization. Several studies looked at the phenomenal characteristics of memories

of negative events concluded that, compared to other types of memory, these memories were less clear and vivid, less well remembered, thought about and talked about more, and had less visual detail. In contrast, another studies found that memories of negative events differed only in the sense that they were reported as having less sensory information. The objective of this study was to explore the effect of time on the phenomenal characteristics of memories about terrorist attacks that took place in Madrid in 2004 and in Barcelona in 2017. To evaluate the memories of the events, *Phenomenological Questionnaire on Autobiographical Memory* was used. Differences were shown between the two groups in terms of memory quality, emotions associated with the event, and accessibility of the information remembered. Results supported the assertion that long-term event memories have different characteristics than recent ones.

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(1029)

A Comparison Of The Reminiscence Bump In Recall For Public Events To The Reminiscence Bump In Rated Importance Of Public Events. DORTHE BERNTSEN, *Aarhus University* — The *reminiscence bump for public events* refers to the finding that, when individuals are asked to cite particularly important public events of recent history, many events are cited most frequently by those who were in adolescence or early adulthood when the event occurred. The bump for public events has generally been attributed to the heightened encoding of events of the bump period, due to their ostensible importance to one's generational identity. In the current study, we used a nationally representative sample of over 1000 Danes to compare the frequency of this reminiscence bump in recall to the frequency of the parallel effect in rated importance of public events, that is, the proportion of events that would be rated as most important on a Likert scale by individuals who were in adolescence or early adulthood at the time of their occurrence. We found little evidence of a parallel bump in rated importance. We argue that, in contradiction of the identity-based account of the bump that currently holds sway, this finding suggests that mnemonic accessibility, rather than encoding processes, underlies the bump in recall for public events.

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Embodied Cognition

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

EMBODIED COGNITION

(1030)

Non-Instrumental Movement Inhibition Of Postural Fidgeting During Formative Online Reading Comprehension Tests Is Associated With Engagement. HARRY J. WITCHEL, CARLOS P. SANTOS, and THOMAS T. RANJI, *Brighton and Sussex Medical School, University of Sussex*, NACHIAPPAN CHOCKALINGAM, *Staffordshire University* — Introduction: Measuring engagement during non-active tasks such as during a reading comprehension test can incorporate embodied markers including posture metrics, although the relationship of posture to engagement is controversial. Methods: Two computerized three-minute reading comprehension tests, one boring and the other interesting, were presented to 27 healthy adult volunteers while alone in a classroom; the stimuli were combined with an

interrupting clicking task that forces screen engagement. Postural movements (speed) were measured using video-tracking, and these were compared to subjective ratings for visual analogue scales in a repeated measures design. Results: The interesting reading elicited less fidgeting shoulder movement (mean $\pm$ s.d. = 0.0637 ± 0.0657 mm/sec 2-dimensional speed at 1 Hz) than the boring reading (0.1152 ± 0.0940 , repeated measures ANOVA), and there was a correlation between the ratings for wanting "the experience to end earlier" and the extent of shoulder movement (Spearman's $\rho = 0.3226$). Conclusions: In this context, the type of boredom elicited is restless rather than lethargic. Engagement in this low arousal (formative) situation leads to Non-Instrumental Movement Inhibition (NIMI) of fidgeting.

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(1031)

Cardiovascular Reactivity To Mental Stress Modulates Temporal Precision. NICOLA CELLINI, *University of Padova*, GIOVANNA MIONI, *University of Padova*, SIMON GRONDIN, *Laval University*, FRANCA STABLUM and MICHELA SARLO, *University of Padova* (Sponsored by Giovanna Mioni) — Recent studies have suggested that peripheral signals (i.e., heart rate) may predict and modulate our precision in temporal tasks. Here we aimed to explore the relationship between temporal abilities and autonomic activity after a stressful situation. Thirty-eight participants were asked to perform a temporal bisection task after either performing a stressing attentional task or the non-stressing version of the task. Physiological measures such as heart rate and skin conductance were recorded at rest and prior to the task and during performance. Our results showed that the stressful situation was able to elicit a marked heart rate acceleration and an increased skin conductance response, as well as a subjective feeling of arousal and unpleasantness, compare to the control situation. Also, participants in the stressful situation showed a more accurate and less variable temporal performance relative to the participants in the non-stressing version of the task. Overall, our results are suggesting idea that bodily signals may shape our perception of time.

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(1032)

Verbs And The Body Parts That Serve Them Most: The Role Of Age Of Acquisition. EMILIANO DÍEZ, *University of Salamanca-INICO*, MARÍA A. ALONSO, *University of La Laguna*, ANTONIO M. DÍEZ-ÁLAMO, *University of Salamanca-INICO*, MARIANA E. CAIRÓS, *University of La Laguna*, ANGEL FERNANDEZ, *University of Salamanca* — With the goal of exploring the relationship between verbs and the parts of the body that are involved in the performance and simulation of those verbs, a study was conducted to characterize a set of 550 verbs in Spanish that covered a wide range of age of acquisition (AoA). Each verb was presented to a group of 50 young adults in a restricted association task in which they provided the first instance of a body part that came to mind when reading the verb. Across participants and verbs, 25 unique parts of the body were produced as responses. The most frequently supplied body parts were hands, mouth, legs, head, eyes, arms and feet. Statistical analyses revealed that AoA was a strong determinant of how body parts tended to form clusters around verbs. The findings are discussed in relation to theoretical approaches to meaning and language processing, including embodiment theory.

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(1033)

The Quality Expressed By Adjectives Modulates The Motor Responses Evoked By Nouns. GIOACCHINO GAROFALO, *Università degli studi di Parma*, STEFANO BELLELLI, *Università di Trento*, BARBARA F.M. MARINO, *Università degli Studi di Milano-Bicocca*, LUCIA RIGGIO, *Università degli studi di Parma* (Sponsored by Lucia Riggio) — We performed two experiments to investigate if the adjectives modulate motor activation elicited by the name of graspable objects. In experiment 1, stimuli were the names of graspable objects. Participants had to categorize each name as natural or man-made, by performing either a precision or a power reach-to-grasp movement. Response grasps could be compatible or incompatible with the grasps used to manipulate the objects. Results revealed faster RTs in compatible trials. In experiment 2, we added to each name an adjective that could give disadvantageous (*hot*) or neutral (*reddish*) information about object

graspability. Results revealed that with disadvantageous adjectives, no difference in RTs between compatible and incompatible conditions was found. In contrast, an action compatibility effect occurred when neutral adjectives were combined with nouns referring to natural objects. Our results suggest that the quality expressed by the adjective seems to be applied to the objects defined by the nouns.

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(1034)

Perceptual Strength Norms For 2,100 Serbian Nouns. MILICA POPOVIĆ STIJAČIĆ, *Laboratory for Experimental Psychology*, DUŠICA FILIPOVIĆ ĐURĐEVIĆ, *University of Novi Sad* (Sponsored by Laurie Feldman) — Numerous studies revealed the importance of word concreteness for representational issues, but also pointed to its questionable status by introducing additional variables. In order to enable further investigation of various aspects of word concreteness, we conducted a normative study for 2100 concrete and abstract Serbian nouns. Four-hundred-and-fifty participants rated word concreteness, context availability, emotional valence, arousal, familiarity, age of acquisition and perceptual strength in five sensory modalities. As with previous studies, perceptual strength was operationalized as the extent of being able to perceptually experience an object by relying on individual sensory modality (i.e. if an object could be perceived by seeing, hearing, tasting, smelling, and touching). However, we also collected per-modality ratings for actual perceptual experiences (i.e. if a person has actually perceived an object by seeing, hearing, tasting, smelling, or touching). We provide analyses of inter-relations among the collected ratings and present several integrated measures of perceptual richness.

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(1035)

How The Comprehension Of Action-Related Sentences Is Grounded In Motor System: A tDCS Study. FRANCESCA VITALE and IVAN PADRON, *University of La Laguna*, ALESSIO AVENANTI, *University of Bologna*, MANUEL DE VEGA, *University of La Laguna* (Sponsored by Manuel de Vega) — According to the literature, understanding action language elicits motor process in the brain. However, evidences that the motor cortex is necessary for the comprehension are meager. In order to directly demonstrate the causal connection between motor activations and features of linguistic meaning, we are running experiments that externally perturb left motor cortex (M1) activity, before an action-language memory task. Anodal and cathodal transcranial direct current stimulation (tDCS) is been applied offline over M1, increasing and reducing the M1 activity respectively. The accuracy in the recall of action-sentences is registered and analyzed. After enhancing and reducing M1 activity, we expect to find improvement and impairment, respectively, on the performance in the task involving action sentences compared to sham session. No stimulation effect is expected for non-action. These findings would indicate that the left M1 is necessary for processing linguistic meanings, crucially showing that high-order cognitive functions are grounded in motor system.

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(1036)

Embodied Autobiographical Memory. RICHARD THOMAS and MARCELLE FERNANDES, *St Mary's University* — Previous evidence has shown that the autobiographical memories we retrieve are related to the actions we perform with our bodies



(Casasanto & Dijkstra, 2010). This study investigated the mechanism of sensorimotor simulation in explaining embodied effects in autobiographical memory. Participants were prompted to retell positive and negative autobiographical memories either following or during a period of prescribed movements up or down with their hands. Results demonstrated a facilitation effect when movement was congruent with the valence of the memory retrieved (e.g. upward movement produced faster recall of positive autobiographical memories) compared to incongruent, but only in the condition following a period of movement rather than when movement continued while they retold the memory. The lack of facilitation when participants continued to move whilst retelling memories can be explained by a sensorimotor simulation mechanism; where a concurrent task that engages the same resources as the simulation causes interference.

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(1037)

Is Motor Activation Necessary For Action Language Processing?

Evidence From EEG. ANA ZAPPA, *Aix-Marseille Université*, CHERYL FRENCK-MESTRE, *Centre National de Recherche Scientifique* — Semantic meaning has been shown to influence sensory-motor activation while processing action-related linguistic expressions and vice-versa, in line with embodied approaches. While proponents of embodied cognition argue that simulation is necessary for action-word processing, opponents claim that these effects are epiphenomenal. We explored the functional role of motor activity during language processing using EEG. Twenty participants listened to sentences implying either a movement away from or towards their body and responded with a movement that was either congruent or incongruent with that implied in the sentence. EEG results showed inhibited processing (N400 window) for incoherent trials in the Away but not in the Towards condition. No differences were found for early motor

preparation (RP). Behaviorally, participants responded faster to coherent trials in the Towards but not in the Away condition. These results suggest that motor processes can contribute to but are not necessary for language processing.

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(1038)

Effect Of Motor Action On The Formation And Consolidation Of Embodied Representations In Memory.

C. ALEJANDRA VARGAS, *University of Salamanca- Salamanca, Spain*, EMILIANO DIEZ, *University of Salamanca - Spain*, PEDRO EMMANUEL ALBURQUEQUE, *University of Minho- Portugal* (Sponsored by Cecilia Alejandra Vargas) — It has been argued that language and action share common conceptual representations in the brain. Sensorimotor codes are involved in the formation and consolidation of representations of persistent words in memory. The role of sensorimotor codes in the establishment of long-term semantic representations has now been emphasized. The aim of this series of studies was to replicate a congruency motor effect, which demonstrate that the reactivation of motor codes affects the process of memory consolidation and to analyze if the ability to imagine influences memory. It also analyzes the relationship between the level of imaginability of the participants and the performance of memory tasks, thus demonstrating the effect of imaginability in the process of memory consolidation. The participants were university students who were asked to memorize words from objects associated with the action of pressing, rotating and without association to any action. In the retention phase, they were asked to perform a go / no go numerical task requiring the execution of push and turn responses. Subsequently they performed a task of recognition. The results showed a congruence effect only in the participants with average level of imagination.

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Implicit Memory

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

IMPLICIT MEMORY

(1039)

Eye Movement Indices Of Memory Reveal Re-Processing Of Visual Information. YUH-SHIOW LEE, *National Chung-Cheng University*, HSIANG-CHUN CHEN, *National Tsing Hua University* — The purpose of this study was to examine the nature of the memory effect revealed in eye movements. Chinese characters were processed visually, phonologically or semantically during the study phase. The viewing time during the subsequent recognition test was compared between characters associated with different types of encoding. To eliminate the influence of response selection on eye movements, participants were asked to select the *nonstudied* item and make the selection after the viewing period ended. Results showed that the proportion of viewing time in the late period of the recognition test was larger for the visually encoded characters than the semantically encoded and phonologically encoded characters. Moreover, there was no significant difference in the proportion of viewing time between the phonologically and semantically encoded characters. These findings suggest that the memory effect as measured by the eye movement was most likely to reflect a visual re-processing effect.

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(1040)

Sequence Learning In The Hebb Repetition And Serial Reaction Time Paradigms: Two Sides Of The Same Coin?

FRANÇOIS VACHON, *Université Laval*, JEAN SAINT-AUBIN, *Université de Moncton*, ALESSANDRO POZZI, *Université Laval*, ANNIE HÉBERT-COUTURIER, *Université de Moncton*, ALEXANDRE MAROIS, *Université Laval* — Sequence learning has been studied using various techniques, notably the Hebb repetition and the serial reaction time (SRT) tasks. Since both paradigms have been investigated independently from each other, they are often deemed highlighting distinct memory processes. The present study tested this assertion by examining the nature of the long-term serial-order representation generated in each paradigm. More specifically, we sought to determine whether the consolidation of the representation of the repeated sequence in one learning task could be useful to the learning of the same sequential information in the other task. In the present experiment, participants performed a verbal version of the SRT task before completing the Hebb task in which the repeated sequence was either the same as in the SRT task or different. Results of the Hebb task showed that recall of the repeated sequence was better as of its first occurrence, improved faster over the first repetitions, and remained higher throughout the task when that sequence was previously encountered in the



SRT task. Such learning transfer from the SRT to the Hebb task suggests that common long-term consolidation mechanisms are involved in both paradigms.

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(1041)

Absolute Pitch Provides For Unique Learning Opportunities. BEAT MEIER, *University of Bern*, SOLANGE GLASSER, *University of Melbourne* — In this study, we investigated whether absolute pitch (AP) would facilitate statistical learning of sequences of tones and sequences of colors, as well as incidental learning of tone-color associations. Towards this goal, we used a statistical learning paradigm as a tool to learn tone-color associations. Fixed tone-color pairs were initially presented to participants in brief three-element sequences, with participants subsequently asked to distinguish between presented vs. not presented sequences. We compared AP possessing graduate music students to a group of relative pitch (RP) possessing music students, as well as a non-musician control group. The results showed a benefit in statistical learning for both absolute and relative pitch possessors. In contrast, AP-possessors outperformed both groups in the incidental learning of tone-color associations. These results indicate that AP provides for unique learning opportunities. The potential application of these results, including the prevention of age-related loss of AP in musicians, is discussed, as is statistical learning as a tool for training pitch memory.

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(1042)

Differential Effects Of Working Memory Load On Visual Priming And Recognition. JUDIT CASTELLÀ, ROCIO PINA, and JOSEP BAQUÉS, *Autonomous University of Barcelona* — Several studies have explored the effects of divided attention on priming, but little is known about the impact of WM load on implicit memory. The aim of the study was to determine whether there are differential effects of WM load on visual priming compared to recognition. At encoding, participants were presented with real-object pictures and asked to classify them

semantically. At retrieval, studied and new images were presented for 200 ms, partially masked by a stripe, and they had to type the name of the object. Each trial was followed by a recognition test, in which the full image was shown again and participants were asked to indicate whether it had been presented at encoding or not. Regarding WM load, an articulatory suppression task, an executive demanding task (counting backwards in 2s) and a tapping task were concurrently performed. WM load failed to diminish performance on both priming and recognition tests in the articulatory suppression condition. However, the backward counting and the tapping tasks influenced recognition, but not priming. Results suggest that visual priming is not affected by a concurrent load while recognition can be, especially when the WM task is executively demanding.

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(1043)

Procedural Learning And Everyday Life Skills. ORSOLYA PESTHY, *Eötvös Loránd University - Budapest*, KAROLINA JANACSEK and DEZSO NEMETH, *Hungarian Academy of Sciences - Budapest* (Sponsored by Karolina Janacsek) — Procedural learning underlies skill acquisition through extensive practice. It is thought to be related to everyday skills, including sports, playing instruments or language skills. Procedural learning, however, is not a homogenous process; it can be divided into at least two subprocesses: learning the order of specific elements or learning frequency-based regularities. Our aim was to test the relationship between these subprocesses and everyday skills. The Alternating Serial Reaction Time task was used to test procedural learning in healthy young adults who reported various aspects of their skills (age of start, years of experience, achieved level, etc.) in sports, music and language. We found only sporadic correlations between procedural learning measures and skills. These findings suggest that the measured subprocesses alone do not contribute to a large variability in skills but rather a larger set of cognitive functions (e.g., attention, short-term memory) and their interactions should be included in the model.

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Music Cognition

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

MUSIC COGNITION

(1044)

Memory And Perception Of Musical Form: Veridical And Schematic Elements. RICHARD ASHLEY, *Northwestern University* — Music theorists consider larger scale musical structure (musical "form") real and; empirical researchers' findings question musical form's perceptual and cognitive standing. Two experiments were run using university undergraduates (n=28), with a wide range of musical experience, as participants. In Experiment 1 (Memory), participants chose two songs from the "Top 10" for the last 6 years and recalled their forms, using colored blocks to represent musical units. In Experiment 2 (Perception), participants heard songs unfamiliar to them and coded their forms with the blocks. Responses were scored for accuracy relative to "ground truth" forms for the songs, as judged by three independent coders. Accuracy is significantly above chance (using a Monte Carlo method, $p < 0.001$). Responses strongly preserved primary

cycles of formal units (e.g. verse-prechorus-chorus), ($p < 0.001$), especially in two-cycle songs compared to three-cycle forms, reflecting this form's primacy in popular music (almost 2/3 of the "Top 10" since 1958). Our data support the claim that listeners do possess knowledge of musical form for both detailed and more abstract formal principles of popular songs.

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(1045)

Involuntary Cognitions Are Not Exclusive To Negative Or Fragmented Memories: Using Earworms To Understand The 'Intrusive'. ELLA K. MOECK and JOSHUA PETERS, *Flinders University*, IRA E. HYMAN, *Western Washington University*, MELANIE K.T. TAKARANGI, *Flinders University* (Sponsored by Ira Hyman) — Earworms (i.e., having a song stuck in your head) provide a window to the mind. Here, we induced earworms for instrumental film music to test two key assumptions of the view that trauma memory is 'special' (e.g., Brewin, 2016); first, that re-experiencing is exclusive to emotionally negative stimuli, and



second, that fragmented memories involuntarily recur more often than non-fragmented memories. Participants encoded positive or negative music that was deliberately fragmented (played in snippets out of order) or not. Participants who listened to positive music experienced more earworms than participants who listened to negative music ($d=.39$). Contrary to the special mechanisms view, participants who encoded fragmented music experienced less frequent earworms than participants who encoded non-fragmented music ($d=.35$). These findings support the basic mechanisms view (e.g., Rubin, Berntsen, & Johansen, 2008); that the same general memory processes underlie positive and negative involuntary cognitions. We therefore argue the special mechanisms view may be outdated, and general memory processes can explain the circumstances where traumatic memories become problematic.

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(1046)

Detection Of Wrong Notes In Familiarized Melodies With Out-Of-Key Notes In Them. RACHNA RAMAN, *University of Texas at Dallas* — In previous studies out-of-key wrong notes in familiar melodies were detected quickly and accurately. Here we introduced out-of-key notes into unfamiliar folksongs and familiarized listeners with them in four sessions over two weeks. We introduced out-of-key notes by raising or lowering by 1 semitone the second or the sixth degree of the major scale. Then we tested untrained and moderately trained listeners' detection of further alterations in those notes, as well as of notes that had remained in-key in the familiarized song. We found evidence both in response time and accuracy that the familiarized out-of-key notes were not as reliable a part of the memory representation of the familiarized song as were the originally in-key notes. The scale degree and direction of initial alteration also affected listeners' responses. There was little effect of musical training except for a slowing of musicians' responses to familiarized out-of-key notes that returned to in-key.

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Psycholinguistics

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

PSYCHOLINGUISTICS

(1047)

Shared Connotations As A Mechanism For Sound Symbolism.

DAVID M. SIDHU and PENNY M. PEXMAN, *University of Calgary* (Sponsored by Penny Pexman) — Sound symbolism refers to associations between certain phonemes and certain kinds of things. The most well known example involves associations between phonemes like those in *maluma* and round shapes, and those in *takete* and sharp shapes. The reason for these associations is still not well understood. One possibility is that a shared connotation (i.e., what the phonemes and the shapes imply or evoke) contributes to the associations. For instance, *maluma* and round shapes are both rated as "soft" and "passive". We tested this explanation by having a group of participants rate a set of nonwords on 25 different scales of connotative meaning. A separate group rated a set of abstract shapes on these same scales. A final group then rated the compatibility between these nonwords and shapes. We examine the contribution of shared connotations to sound symbolic associations between nonwords and shapes. We also explore patterns in the phonemes' connotations.

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(1048)

Are Shark Lawyers More Aggressive Than Lawyers Who Are Sharks Or Lawyers Who Are Like Sharks? Comparing Noun-Noun Metaphors, X Is Y Metaphors, And Similes. JUANA PARK, CHRISTINA L. GAGNE, and THOMAS L. SPALDING, *University of Alberta* — We analyzed three types of figurative language to examine how judgments about the intensity of the properties conveyed by these figurative expressions varied depending on the format of presentation: *X is Y* metaphors (*Lawyers are sharks*), noun-noun metaphors (*shark lawyer*) and similes (*Lawyers are like sharks*). Participants read figurative phrases and rated, on a scale of 0 to 100, how much they thought salient (being aggressive) or nonsalient (moving from one place to another) properties reflected the meaning of the expression.

We expect that: 1) ratings will be highest for the noun-nouns because the novelty and ambiguity of this format leaves room for richer interpretations (*shark lawyer* can be interpreted as a hybrid between a shark and a lawyer) 2) ratings will be higher for the salient property because of conventionality 3) people will be slower to understand the noun-nouns because the novelty and ambiguity require more interpretation.

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(1049)

The Processing Dynamics Of Hearing And Seeing Words Under (No) Time Pressure: Insights From Behaviour, ERPs, And Mixed-Effect Models. ROCÍO A. LÓPEZ ZUNINI, *Basque Center on Cognition, Brain, and Language*, BLAIR C. ARMSTRONG, *University of Toronto*, MARTIJN BAART, *Tilburg University*, ARTHUR G. SAMUEL, *Basque Center on Cognition, Brain, and Language* (Sponsored by Blair Armstrong) — We investigated how word recognition is modulated by modality of presentation (visual-text, auditory-speech, audiovisual-text+speech), and the time-constraints of generating a response (speeded, non-speeded). Forty-two participants performed either a speeded or a non-speeded lexical decision task (LDT), in which blocks of words and pseudowords were presented visually, auditorily, and audiovisually, while electroencephalogram was recorded. The N400 lexicality effect (the amplitude difference between words and pseudowords at ~400 ms) lasted longer in the speeded than in the non-speeded LDTs. In the visual modality, the effect was larger in the speeded than in non-speeded LDT, and was followed by an additional late lexicality effect at 2000-2150 ms in the non-speeded LDT only. Our results indicate that the urgency with which a response must be generated affects the duration of the N400 effect, and that—at least in the visual modality—part of the lexicality effect may be re-instantiated until a response is made.

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(1050)

Estimating The Size Of A Collective Lexicon Using Word Associations. ALIXANDER MW GALINSKY and JAN BERKHOUT, *University of South Dakota*, ANGELA STOKES, *Stokes and Associates Psychologica and Forensic Services* (Sponsored by Jan Berkhout) — We analyzed the vocabularies generated by word associations in three studies (1910, 1952 and 1997) using the Kent-Rosanoff word list. 1,000 subjects produced 5,677 different words in 1910 (New York); 4,393 in 1952 (Minnesota); and 6,622 in 1997 (Iowa). Novel words trended down through the sequence of 100 probe items. We could estimate the larger number of probe stimuli needed to exhaust the collective lexicon. Additional probe words would almost always generate associations that had already been offered. That value also provided an estimate of the size of each collective lexicon. We calculated a diminishing natural log curve modeling the number of new associations generated by each of the 100 KR stimulus words in these three studies. These curves indicated the point at which no new words would likely be generated. The collective lexicon projected for the 1910 group was 6,721 words; 1952: 5,626 words; 1997: 9,728 words. We ascribe the larger vocabulary of 1997 to numerous idiosyncratic references to 1990's pop culture. Common responses were more stable over the intervening 87 years. Goodness-of-fit values for the natural log curves compared to the raw data were all greater than $R^2 = 0.96$, confirming the validity of this model.

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(1051)

Word Frequency And Predictability Revisited: An Examination Of Interactive Effects When Reading In The Absence Of Parafoveal Preview. ADAM J. PARKER, JULIE A. KIRKBY, and TIMOTHY J. SLATTERY, *Bournemouth University* (Sponsored by Timothy Slattery) — Both word frequency and predictability are important input variables for models of eye movement control during reading. Numerous studies have reported only main effects of these variables without an interaction. This has led to the assumption that these variables operate at separate stages of processing. Typically, studies investigating these interactive effects present words in a situation where they are available for parafoveal processing. Therefore, the extent to which these variables interact for line initial words is unclear as these words are generally unavailable for parafoveal pre-processing. In this experiment, we manipulated the frequency and predictability of line initial words following a return sweep. Additive effects of frequency and practicability were noted in gaze duration, while an interaction was noted in total reading time. The time course of the word frequency by predictability interaction is considered for line initial words with reference to models of eye movement control.

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(1052)

Morpho-Orthographic Analysis Does Not Depend On Affix Frequency. MARA DE ROSA and DAVIDE CREPALDI, *International School for Advanced Studies* (Sponsored by Davide Crepaldi) — There is large support in the literature for orthography-driven morphological analysis of written words. One hypothesis is that this phenomenon is driven by letter co-occurrence regularity—morphemes are identified because they are recurrent clusters of letters, which would explain why segmentation does not depend on semantics. We tested this hypothesis in Italian through masked priming; we constructed nonword primes by combining a stem with: (i) a real suffix (e.g., “-izia”); (ii) a high-frequency non-morphological ending (e.g., “-erso”); (iii) a low-frequency non-

morphological ending (e.g., “-iaba”). We find comparable priming in all conditions, suggesting that segmentation depends on the extraction of edge-aligned stems rather than on the presence of an affix or a frequent, non-morphological word ending. We also find that priming does not depend on the semantic interpretability of the nonword primes, assessed separately through rejection times in lexical decision and explicit judgments on a 7-point scale.

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(1053)

Long-Lag Morphological Picture-Picture Priming. SASKIA E. LENSINK, *Leiden University*, RINUS VERDONSCHOT, *Hiroshima University*, NIELS O. SCHILLER, *Leiden University* — In morphological priming, morphologically complex words (e.g. *honeymoon*), prime their constituent parts (*moon*). Morphological priming, unlike phonological or semantic priming, can survive intervening lags of at least eight words. It has been argued not to originate from any form or meaning overlap, but from heightened activations at the morpheme level. In previous experiments, targets have been presented as pictures, whereas primes were presented as text. This presentation could lead to priming effects that did not originate at the morpheme level, but that are the result of orthographic form overlap. Therefore, we collected production latencies in a long-lag morphological priming experiment, where we presented both primes and targets as pictures. The latency data show a significant priming effect. These results replicate previous work on morphological priming. Moreover, they show that morphological priming (i) occurs without any intervention of the written word, and (ii) is not an orthographic but a morphological effect.

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(1054)

Syllable Retrieval Precedes Sub-Syllabic Encoding In Cantonese Chinese Spoken Word Production: An Event-Related Potential (ERP) Study. ANDUS WING-KUEN WONG and HO-CHING CHIU, *City University of Hong Kong*, JIE WANG, *Chinese University of Hong Kong*, SIU-SAN WONG, *City University of Hong Kong*, HSUAN-CHIH CHEN, *Chinese University of Hong Kong* — This study investigated the time course of syllabic and sub-syllabic processing in Cantonese spoken word production using the picture-word interference task with concurrent recording of event-related brain potentials (ERPs). Cantonese speakers were asked to name aloud individually presented pictures and ignore an accompanying auditory word distractor. Participants' naming responses were faster, relative to an unrelated control, when the target and distractor shared the same atonal syllable or syllable body. The syllable-related priming was larger in size than the body-related priming, regardless of the length of the target (i.e., monosyllable or disyllable targets). More importantly, the ERP effects associated with syllable-related priming appeared earlier than those associated with body-related priming. These results are consistent with the proximate unit hypothesis that the nature of the proximate phonological unit (the first selectable phonological unit following lexical access) is language dependent, and that syllable retrieval precedes sub-syllabic specification in phonological encoding of Cantonese Chinese.

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(1055)

Fixation-Related Potentials As A Tool For Studying Attentional Bias In Smokers And Non-Smokers. JULIEN DAMPURÉ and HORACIO A. BARBER, *University of La Laguna* — We present two visual search experiments in which the Fixation-Related



Potentials (FRP) were used, a technique which consists in the simultaneous recordings of eye movements and EEGs. In the first experiment, participants (non-smokers) searched for target-words among successive three-words displays: one in the center and two in the parafovea (either semantically-related or unrelated). The second experiment was designed in order to study smoking-related attentional bias in former smokers. Accordingly, the parafoveal semantic distractors were replaced by smoking-related words. The boundary paradigm was applied so that participants could not be aware of the experimental manipulations. In both experiments, N1 and P2 amplitudes were modulated prior to saccade triggering. These results demonstrate how FRP may help solving current controversies dealing with fast parafoveal semantic processing and more generally with attentional bias in smokers and non-smokers. Email: Julien Dampuré, julien.dampure@hotmail.fr

(1056)

The Impact Of Healthy Ageing In Lexicalization Of New Words. TÂNIA FERNANDES, *Universidade de Lisboa*, EDUARDO XAVIER, *Universidade de Lisboa*, ANA RAPOSO, *Universidade de Lisboa* (Sponsored by Leonel Garcia-Marques) — Word learning is a lifelong skill with two facets. *Phonological configuration* is swift, depends on hippocampus, and involves recollection. *Lexicalization* emerges slowly, with neocortical underpinning, and involves integration into lexical dynamics. Ageing is accompanied by hippocampus shrinkage and declarative-memory decline but expansion of vocabulary. Yet, no study has hitherto examined its impact on lexicalization. Young (<30 years old) and older (>60 years old) adults were exposed to spoken new words with a visual item: orthographic (new-word's form) or semantic (a picture). The two facets were assessed in Days 1, 2, and 8. Lexicalization was indirectly studied with semantic categorization of real words: if the new item (e.g., daffadat) were lexicalized, recognition of base-words (e.g., daffodil) would be slower than of control words (e.g., pelican). Phonological configuration was less influenced by the visual context in older than young adults. In contrast, lexicalization was affected by the visual context in older adults. Both groups showed robust lexicalization effects on Day 8 but, for older adults, only for items in the semantic context. Lexicalization is preserved along ageing thanks to semantic information. Email: Tânia Fernandes, taniapgfarnandes@gmail.com

(1057)

Bilingual False Recognition: The Effects Of Orthographic And Semantic Similarities. MARISOL PARRA-TATGE, *University of Central Florida* — This study investigated whether false recognition driven by semantic and/or orthographic similarities crosses languages, and whether bilingual false recognition is modulated by language proficiency. Spanish-English bilinguals studied words in English and Spanish. Next, they completed a yes/no recognition test that included words in both languages. Words at recognition were studied words, words similar in meaning and/or orthography to studied words, and words unrelated to studied words. False recognition occurred for words in one language that were related in meaning and/or orthography to words studied in the other language. Furthermore, false recognition based on semantic and orthographic similarities was more frequent in the more-proficient language. Results indicate that activation of semantic and orthographic representations of words in a bilingual's two languages leads to false recognition, and that bilinguals are more likely to access meaning, and less likely to create distinct orthographic representations in their more-proficient language. Email: Marisol Parra-Tatge, Marisol.Parra-Tatge@ucf.edu

(1058)

Using Bilingualism As A Tool To Study Recognition Memory For Form And Meaning. PAOLA DUSSIAS, *Penn State University*, MICHAEL JOHNS, *Pennsylvania State University*, ALIZA WINNEG, *Penn State University* — Even when the meaning of a sentence is remembered, its formal properties are quickly forgotten (Sachs, 1967). However, the syntactic priming literature shows that speakers reuse structures they have recently heard, and that reuse is boosted by lexical overlap. In an eye-tracking study, we employ bilingualism to clarify these seemingly conflicting findings. Highly proficient Spanish-English bilinguals read sentences that began in Spanish and ended in English. In the critical trials, a comprehension question followed that included a target noun appearing in the same language as the sentence (stay trials) or in the bilingual's other language (codeswitch trials). The question either immediately followed the sentence or appeared after a math problem. Results show that the form of the target noun (i.e., its language) interfered only when the question immediately followed the sentence, resulting in a cost to codeswitch. This cost disappeared when the math problem intervened between the sentence and the question.

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(1059)

Distinguishing Between Semantic And Morpho-Syntactic Language Processing In Sentence Reading. KATARINA MARJANOVIC and DAVIDE CREPALDI, *International School for Advanced Studies* (Sponsored by Davide Crepaldi) — The present study assesses cross-word semantic and morpho-syntactic priming in *natural sentence reading* using eye-tracking. 44 participants read 160 grammatically correct sentences in which a target word was preceded by a prime word that could be either congruent or incongruent, either semantically (i.e., related in meaning) or morpho-syntactically (i.e., inflected in the same number). This design makes up four conditions: "Bob went out for a run and noticed [a dog/a ball/some dogs/some balls] and a cat outside his door". Experiment was run in Slovenian, where no determiner is available to cue the reader on morpho-syntax, i.e., the sentence was identical in all conditions up to the prime word. Linear mixed effect models showed a significant semantic priming effect ($\chi^2(1)=6.3$, $p=.01$) on gaze duration, with no effect of morpho-syntactic congruency ($\chi^2(1)=0.3$, $p=.5$) nor interaction between the two factors ($\chi^2(1)=0.5$, $p=.4$). The results of this eye-tracking experiment suggest cross-word priming during sentence reading, but only at a semantic level and with no morpho-syntactic modulation. This may suggest locally encapsulated processing for grammatical number; and dynamic, sentence-wise exploration of lexical space.

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(1060)

Electrophysiological Correlates Of The Influence Of Visual Perspective On The Ability To Hold In Mind Autobiographical Memories. TODD R. FERRETTI, JEFFREY P. HONG, and DOMINIQUE SKUBNIK, *Wilfrid Laurier University* — We investigated how adopting a first-person (looking from own eyes) and third-person visual perspective (looking at self) influences the ability of people to hold in mind autobiographical events. Participants read sentence cues that described ongoing accomplishment events (e.g., *I was packing the suitcase*) and were cued to retrieve a related personal memory from either a first or third person perspective. Slow cortical brain potentials demonstrated that people had more difficulty holding memories



in mind when they had adopted a third versus first-person perspective. These results suggest that actively maintaining an autobiographical memory is easier from a more embodied visual perspective. Behavioral measures also demonstrated a trend for memories retrieved with a first-person perspective to be more vivid, while memories retrieved with a third-person perspective to be dated as older. Our results provide novel insight into the ability to retrieve and hold in mind autobiographical events.

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(1061)

Top-Down Influences Of Language Categorization On Face Processing. ELISA RUIZ-TADA, CRISTINA BAUS, and ALBERT COSTA, *Universitat Pompeu Fabra* (Sponsored by Albert Costa) — Social categorization is an automatic process which

consequences include lower recognition for out-group members. We asked whether language is a cue for social categorization, and whether this affects early perceptual processing of faces. To do this, we used an Oddball paradigm to test face visual processing. Participants were presented with a string of faces (standards), which were previously categorized as one of two languages (Spanish or English). The string of standard faces was from one language category, followed by one of two deviant types: the same language as the standards (deviant within-language) or the other language (deviant between-language). ERP results showed an early effect of deviancy (standard vs two deviant types) in the vMMN time window (120-160ms). Differences between language deviants were observed at a post-perceptual level (180-310ms). This suggests that categorization by language affects early and late perceptual processing of faces.

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Recognition Memory

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

RECOGNITION MEMORY

(1062)

Accounting For The Revelation Effect: Criterion Flux Or Discrepancy Misattribution? DEVON CURRIE and GLEN E. BODNER, *University of Calgary* — The revelation effect is a memory illusion that occurs when items preceded by an initial task are more likely to be deemed “old” on a recognition task than items not preceded by an initial task. A recent meta-analysis evaluated several accounts of the revelation effect, and concluded that two were most supported by the extant data: criterion flux and discrepancy misattribution. These two accounts make different predictions about two key moderating variables: whether a revelation effect is expected in non-memory-based tasks, and whether initial task difficulty should moderate its size. Unfortunately, there was insufficient evidence available for the meta-analysis regarding these two moderators. Therefore, we conducted a well-powered test of the influence of the same initial task (solving anagrams) on both recognition and truth decisions, and whether task difficulty (easy vs. harder anagrams) moderates the revelation effect. Our findings help adjudicate between the accounts.

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(1063)

Stereotype Reliance In Source Guessing: Stable Across Time And Stereotype Domains? LILIANE WULFF and BEATRICE G. KUHLMANN, *University of Mannheim* (Sponsored by Beatrice G. Kuhlmann) — If people do not remember the source of information (e.g., who said it), they rely on prior knowledge such as stereotypes to guess the source. In two experiments, we investigated whether stereotype reliance in source guessing is a stable trait or fluctuates situationally. In Experiment 1, participants worked on two independent source-monitoring tasks with age-stereotypic material, separated by an interval of ten minutes or 7 days. In Experiment 2, participants first completed a source-monitoring task with age-stereotypic material followed by one with gender-stereotypic material. We applied Bayesian-hierarchical multinomial processing tree models to estimate cross-task correlations of source guessing parameters. Overall, there was stereotype reliance in source guessing with notable

inter-individual differences. There was at best weak evidence for stereotype-reliance across time and domain, although old/new-guessing bias and memory processes were stable. Perceived source-item contingency predicted stereotype reliance in source guessing across domains and in the first task of Experiment 1.

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(1064)

Tonic Arousal Amplifies The Selective Effects Of Emotion On Memory. JASMINE APRIL LOUISE RAW, JUDI ELLIS, and MICHIKO SAKAKI, *University of Reading* (Sponsored by Michiko Sakaki) — Phasic arousal induced by emotional events is known to enhance some aspects of memory, while impairing others (Sakaki, Fryer & Mather, 2014). According to the arousal-biased competition (ABC) theory, information that corresponds with our top-down goals (high-priority information) is enhanced by emotional arousal, whereas information that does not (low-priority information) is impaired (Mather & Sutherland, 2011). However, it remains unclear how the effects of phasic emotional arousal on memory are modulated by tonic/state arousal levels. In this study, we addressed this issue by manipulating tonic and phasic arousal. Participants were asked to either strongly squeeze a hand-dynamometer or relax before viewing high- and low- priority stimuli that were followed by either a negative arousing, or neutral non-arousing tone. The results indicate that tonic arousal increases overall memory for high-priority stimuli. The significant interaction between tonic and phasic arousal suggests that phasic arousal impaired memory for low-priority items only when tonic arousal was high. These results extend the ABC theory and suggest that tonic arousal amplifies the selective effects of phasic emotional arousal.

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(1065)

Comparisons Of The Sensitivity Of Yes-No And Forced-Choice Associative Recognition. WILLIAM E. HOCKLEY and GARRETT SCHLIEWINSKY, *Wilfrid Laurier University* — Young adults show an associative recognition advantage for compound word pairs (e.g., sea shell) over random pairings of these words on a forced-choice but not on a yes-no test whereas older adults show a discrimination advantage on both recognition tests (Ahmad, Fernandes, & Hockley, 2015). We examined the effects of familiarity



on associative recognition. Word pairs (Experiment 1) or individual words (Experiment 2) were first presented on a familiarization list. Participants then studied familiarized and non-familiarized word pairs followed by a yes-no or forced-choice associative recognition test. In Experiment 1, there was a discrimination advantage for familiarized word pairs that was greater on the forced-choice than on the yes-no test. In Experiment 2, there was no difference in assessments of discrimination performance between the two types of tests. Differences in yes-no and forced-choice recognition performance may arise because of different contributions of familiarity and recollection on each type of test.
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(1066)

Associative-Strength Impact On Behavioral And ERP Correlates Of Familiarity And Recollection. SOPHIE TINARD, *Aix-Marseille Université and Laboratoire de Psychologie Cognitive*, BAIER SOPHIA, *Université de Nice Sophia Antipolis and Laboratoire d'Anthropologie et de Psychologie Cognitive et Sociale (EA 7278)*, GUILLAUME FABRICE, *Aix-Marseille Université & Laboratoire de Psychologie Cognitive (LPC, UMR 7290 & CNRS)* (Sponsored by Arnaud Rey) — Performance in associative recognition memory is generally thought to require recollection while familiarity cannot support memory for associations. However, recent research suggested that familiarity contributes to associative memory when the to-be-associated stimuli are unitized during encoding. The aim of the present study was to contribute to resolving controversies about the ERP correlates of familiarity by manipulating semantic relatedness and conceptual features in the same task. We explored the process of associative memory (familiarity and recollection) underlying the recognition of word-line drawing pairs that are semantically related or unrelated. Study-test word change decreases the amplitude of the FN400 old/new effect, confirming associative memory effects on the familiarity-related potential. However, we obtained a dissociation concerning the influence of the associative-strength, while the FN400 was obtained regardless of the semantic relatedness of the pair, posterior N400 was obtained only with related pairs.
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(1067)

The Power Of A Smile: Enhanced Old New Recognition But No Source Memory Advantage For Happy Faces. MEIKE KRONEISEN, *University of Koblenz-Landau* — In social situations, the emotional expressions of faces are important and very salient aspects of nonverbal communication. Previous work has shown that the facial expression (positive vs. negative) influences the memory of this face in a later recognition test. It is possible that positive expressions facilitate facial processing, therefore, more cognitive resources are available to process facial identity. The results concerning the influence of facial expression on source memory are inconclusive. Some studies demonstrate an influence, some studies do not. In two experiments, this effect was examined more closely. A multinomial model was used to measure old-new discrimination, source memory, and guessing biases separately. A recognition test indicated that old-new discrimination but not source memory was affected by whether a face was presented with a happy or an angry expression. These findings support the idea that happy expressions facilitate automatic facial identity processing. However, happy expressions have no influence on memory for these expressions.
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(1068)

The Relationship Between Oral Contraceptive Hormone Composition And Emotional Memory—An Electroencephalographic Study. MARGARET DUNLAP, *Pennsylvania State University, Erie*, VICTORIA A. KAZMERSKI, *Pennsylvania State University-Erie* — Comparisons were made based on menstrual cycle phase, birth control status, and salivary hormone levels on recognition performance for emotional stimuli. Women were recruited from the campus subject pool and signs posted at the health center. Salivary assays were obtained at the beginning and end of the study. Participants viewed positive, negative, and neutral pictures from the IAPs data base. During the study phase participants identified whether a person was in the picture or not. Following a brief attentional task, the participants completed a recognition task. Event-related potentials were recorded from 64 channels during both study and recognition phases. Salivary analysis was conducted for estradiol levels. There were hormonal effects on recognition accuracy. The N200 and P300 amplitudes varied based on birth control composition and salivary hormone concentrations. Women should understand possible effects of birth control to make informed decisions regarding whether or not it is right for them.
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(1069)

Changes In Fluency Attribution Across Childhood. MARIE GEURTEN and SYLVIE WILLEMS, *University of Liège*, MARIANNE LLOYD, *Seton Hall University* — Although there is ample data about fluency attribution to memory decisions in adults, less is known about the developmental trajectory of the fluency heuristic in children. In an experiment with children ages 4, 6, and 8, we tested whether attribution changed as a function of age and familiarity. Participants viewed a sequence of familiar and unfamiliar cartoon characters at encoding. During the recognition memory test, half of the items were preceded by a brief (17ms) identical prime. In adults, such primes typically increase the rate of “yes” responses, particularly for lure items. Instead, we found evidence of strong priming effects for targets relative to lures. These effects decreased with age as did the gap in memory for familiar and unfamiliar characters. Collectively, the results of the study provide evidence of perceptual fluency attribution to memory decisions in a way that is similar to conceptual fluency attribution across childhood (Geurten, Lloyd, & Willems, 2017). From a developmental perspective, this pattern suggests age-related differences in how children used fluency to guide their memory decisions.
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(1070)

Improving The Generation Effect: Fewer Generation Constraints Enhance Relational Processing. MATTHEW P. MCCURDY, ANDREA N. FRANKENSTEIN, ALLISON M. SKLENAR, and ERIC D. LESHIKAR, *University of Illinois at Chicago* (Sponsored by Eric Leshikar) — Our prior work has shown that fewer generation constraints can improve the generation effect. Studies on the generation effect have hypothesized a two-factor theory for how self-generation improves memory over read controls: 1) increasing item distinctiveness; 2) enhanced relational processing. This study aimed to determine if the effects of generation constraint (lower > higher) might be tied to either mechanism of the two-factor theory. Across two experiments, participants encoded word pairs presented in two generation tasks (lower- and higher-constraint) and a read control task. Experiment



I tested the item distinctiveness factor by using a recognition test, whereas Experiment 2 tested the relational processing factor by using a cued recall test. Experiment 1 showed that both generation tasks led to similar item recognition benefits over read controls, suggesting a similar increase in item distinctiveness over read controls for both lower- and higher-constraint tasks. Experiment 2, however, showed that lower-constraint generation led to greater cued recall compared to higher-constraint and read control, suggesting that fewer constraints improves the generation effect via enhanced relational processing.

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(1071)

The Biasing Effect Of Unintentional Recognition On Intentional Recognition: Modulatory Effects Of Working Memory. FATMA EBRU ATES, DINKAR SHARMA, and ZARA BERGSTRÖM, *University of Kent* (Sponsored by Dinkar Sharma) — Research suggests that unintentional recognition of distracting stimuli might affect the goal-related, intentional recognition processes. This study investigates how previously seen or not-seen distractors affect recognition of targets when the working memory (WM) resources are limited by a secondary task. ERPs were recorded to investigate the neural correlates and Memory Stroop task was used to measure the effects of distraction on target recognition. Behavioural results indicate reduced recognition of targets paired with previously seen distractors, which creates familiarity signals, compared to not-seen distractors. Both targets

and distractors elicited the familiarity-related ERPs, whereas, only target recognition elicited ERP marker of conscious recollection. Interestingly, a late posterior negativity which reflects response monitoring was modulated by WM load only in the left posterior area. The findings suggest that the interaction of recollection and familiarity processes are not affected by WM in behavioral and neural responses, however monitoring triggered by response conflict only when WM resources are available.

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(1072)

Outlasting Memory Advantage In Synaesthesia: Evidence After One Year. KATRIN LUNKE and BEAT MEIER, *University of Bern* (Sponsored by Fred Mast) — This study investigated the trajectory of the memory advantage in synaesthesia across a one year retention interval. We systematically compared recognition memory of four groups of synaesthesia, namely grapheme-colour-, sound-colour-, grapheme-colour-and-sound-colour-, and sequence-space-synaesthesia and yoke-matched control groups with three different kinds of stimuli (words, music, colours) when tested immediately and when tested one year later. The results showed a general memory advantage in synaesthesia for both sessions and across test materials. This general advantage supports the theory that rather than the synaesthetic experience itself, global differences in cognitive style and a richer world of experience might enhance memory in synaesthesia.

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Reward, Motivation and Decision Making

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

REWARD, MOTIVATION AND DECISION MAKING

(1073)

Increasing Reward Prospect Motivates Switching To The More Difficult Task: A Case Of Motivation Efficiency? VANESSA JURCZYK, KERSTIN FRÖBER, and GESINE DREISBACH, *University of Regensburg* (Sponsored by Kerstin Fröber) — In human decision-making, is it considered a cost to waste motivational arousal? Motivation intensity theory (Brehm & Self, 1989) suggests that motivation increases with increasing task difficulty. Here we test whether an extension of this theory holds true as well: Does an already established motivational arousal have an influence on task choice when people can choose between tasks of different difficulty? In a series of three voluntary task switching experiments, reward magnitude (low vs. high) was varied randomly between trials while people could choose between two tasks (easy vs. difficult). Recent studies from our lab have shown that an increase in reward prospect is associated with a higher proportion of voluntary switches (Fröber & Dreisbach, 2016). Thus, here we hypothesized that the increase in reward prospect should especially promote voluntary switches to the more difficult task. The results of all three experiments confirmed this prediction, suggesting that participants avoid wasting the higher motivational arousal on the easier task. The results will be discussed in light of recent theorizing on effort-based decision making.

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(1074)

How Psychological Roles Impact Social Judgments And Decision Making. ELITZA AMBRUS, *The University of Huddersfield*, RENATA HEILMAN, *Babes-Bolyai University*, PETKO KUSEV, *The University of Huddersfield* — Adopted roles and social identity influence individuals' behaviour and choices (Akerlof & Kranton, 2010; Zimbardo, Haney, Banks, & Jaffe, 1972). However, previous research assumes that social identities are learnt and influence behaviour in a stable/persistent manner (Akerlof & Kranton, 2010). Moreover, role adoption impacts behaviour when agents are forced to experience full immersion in the role (Zimbardo et al., 1972). In contrast, we propose that psychological roles are adopted and switched swiftly, serving as a cognitive decision-making tool that shapes respondents' judgements and choices. Our results showed that in bargaining experiments, individuals assumed the suggested psychological roles instantly, adjusted their judgements on what constitutes a fair income split and revealed role utilization rather than utility maximisation choices. Importantly, there was no association between the indicated split offers and the self-reported understanding of the role. Therefore, roles triggered an implicit psychological mechanism shaping agents' social judgements and choices.

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(1075)

Choosing To Choose: Memory-Based And Choice-Dependent Preference For Choice. ROY SHOVAL and BARUCH EITAM, *University of Haifa* (Sponsored by Baruch Eitam) — The outcomes of a situation in which people chose for themselves and one in which the computer chose for them were kept objectively identical.



Experiencing both, a large majority of participants preferred choosing (~86%) and was willing to pay real money for it. Preference for choice was predicted only by greater enjoyment and not by the subjective perception of obtaining superior outcomes. Follow-up experiments presented the exact same conditions and measured, in lieu of actual experience with the situation, people's preference toward choice and their estimations of their expected enjoyment and outcomes. Results revealed a muted preference toward choice that was predicted by greater expected enjoyment and outcomes. Taken together, it seems that contrary to current models of choice our strong preference for choosing is not a 'default' tendency but largely stems from the effect that recent choices have on the subjective experience of the situation.

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(1076)

Neural Mechanisms Underlying Learning Efficacy In Aging. TINEKE DE HAAN and BERRY VAN DEN BERG, *University of Groningen*, MARTY WOLDORFF, *Duke University*, ANDRE ALEMAN, *University Medical Centre Groningen*, MONICQUE LORIST, *University of Groningen* — The ability to use feedback to optimize behavioral decisions forms a core element of learning. However, it is largely unknown how age affects the neural mechanisms underlying such feedback-guided learning. We compared a group of young (age 18-30) and older (age 60-75) participants, performing a probabilistic learning task (10 blocks of 20 trials) while fMRI data was acquired. On each trial participants choose between either a house or a face, after which they received visual feedback (loss vs. gain). Within each block either house or face images had a higher probability of yielding a gain (62.5% vs. 37.5%). Participants were instructed to maximize their gains. Behavioral data revealed slower learning rates for the elderly compared to the younger group. In addition, we observed increased behavioral adjustments in elderly. Taken together with the fMRI results this study provides additional insight into the underlying mechanisms of lower learning rates in elderly.

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(1077)

Learning About A Reciprocating Opponent In An Iterated Prisoner's Dilemma. PEI-PEI LIU, *Kessler Foundation*, CHRISTIAN C. LUHMANN, *State University of New York-*

Stony Brook — Research has shown that reciprocation increases individuals' willingness to cooperate. This study investigates how individuals learn to cooperate with reciprocating opponents. To do so, we evaluated individuals' expectations about the behavior of their opponents during an iterated Prisoner's Dilemma (PD). In two experiments, participants played with a Tit-For-Tat (TFT) algorithm that occasionally failed to reciprocate. In Experiment 1, we first established whether individuals actually develop expectations about their opponents by utilizing a concurrent tone discrimination task. Our results indicate that the opponents' non-reciprocative behavior slowed responses to the concurrent task, suggesting that such behavior violated participants' expectations. Experiment 2 examined whether delayed reciprocation affects expectations about reciprocation using similar methodology. Our results indicate that participants' expectations were weaker when opponents' reciprocation was delayed. These findings suggest that learning the strategy of a reciprocative opponent involves the processes described by traditional theories of learning.

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(1078)

Anhedonia And Motivation From Control Among Clinically Depressed Individuals. SHIREL BAKBANI-ELKAYAM, SIGAL ZILCHA-MANO, and BARUCH EITAM, *University of Haifa* (Sponsored by Rutie Kimchi) — Anhedonia and blunted motivation are core symptoms in Major Depressive Disorder (MDD); the current study aimed to explore whether people suffering with MDD are motivated by information about the effectiveness of their actions. Clinically depressed participants were asked to respond to cues with a specific key press with their responses leading to 'effects' or no such 'effects' (i.e. control feedback). While higher levels of depression were related to slower reaction time (psychomotor retardation) control feedback significantly improved reaction time. Surprisingly, this difference was two times bigger (~79ms) than the one established in the same task with healthy individuals (~40 ms). The results strongly suggest that motivational sensitivity to control (vs. to outcomes) is preserved in MDD. This conclusion has implications for the understanding and treatment of MDD as well as the human motivational system.

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Vision

Thursday

Grote Zaal

Viewing 17:00-18:40, Author Present 17:00-18:40

VISION

(1079)

Unfolding Of Lateralized Neural Responses To Facial Information. SANNE G. BREDEROO, BERRY VAN DEN BERG, MARK R. NIEUWENSTEIN, and MONICQUE M. LORIST, *University of Groningen* (Sponsored by NVP member NVP member) — To elucidate the neural processes underlying lateralized face processing, we recorded EEG in a visual mismatch-paradigm in which deviant half-faces appeared in the left (LVF) or right (RVF) visual fields. LVF-deviants caused a negative deflection (~200ms) over right occipital electrodes, followed by broad bilateral negativity for both LVF- (~330ms) and RVF-deviants (~360ms). Following this mismatch negativity there was a decrease in alpha-power in the hemisphere contralateral

to the visual field in which the deviant appeared, for both LVF- (~400ms) and RVF-deviants (~450ms). No lateralization effects were observed for word stimuli in this paradigm, indicating that these lateralized processes are face-specific. These results suggest that right cortical regions detect changes in facial information more rapidly than their left homologues. Timing differences in the observed changes in alpha-power suggest an increase in contralateral cortical activity in processing of the deviant face information for the LVF-deviant versus RVF-deviant.

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(1080)

The Flushturation Count Illusion: Attribute Substitution Tricks Our Interpretation Of A Simple Visual Event Sequence. CYRIL THOMAS and ANDRE DIDIERJEAN, *University of Bourgogne-*



Franche-Comté, GUSTAV KUHN, Goldsmiths University — When faced with a difficult question, people will sometimes work out an answer to related, easier question without even realizing that a substitution has taken place (e.g., Kahneman; 2011). In two experiments, we investigated whether this attribute substitution effect could also affect lower-level cognitive process such as the interpretation of a visual event sequence. We used a magic trick called the “Flushturation Count Illusion,” which refers to a technique used by magicians to give the illusion of having seen multiple cards with identical faces, when in fact only the face of one card (the bottom card) is repeatedly shown. In Experiment 1, we demonstrated that most participants are susceptible to the Illusion, even if they have the visual and analytical reasoning capacity to correctly process the sequence. In Experiment 2, we demonstrated that participants build a biased and simplified representation of the Flushturation Count by substituting some attributes of the event sequence. We discussed of the psychological processes underlying this attribute substitution effect.

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(1081)

The Role Of Mid-Level Visual Features In Image Memorability.

LORE GOETSCHALCKX and JOHAN WAGEMANS, *KU Leuven* (Sponsored by Johan Wagemans) — Recent studies suggest that images consistently differ in their probability of being remembered and recognized later – referred to as their intrinsic image memorability. The visual characteristics underlying this property are not fully understood. Here, we investigate the role of mid-level visual aspects. More specifically, we looked at features put forward in the image quality literature, such as visual balance, composition, etc. We trained a support vector regression (SVR) on two image sets pre-quantified on memorability: LaMem and a subset of SUN. The preliminary finding is that the SVR-predictions based on the proposed mid-level features show a Spearman's rank correlation with the observed memorability scores of .46 (LaMem) and .36 (SUN). We will further investigate the relative contributions and directions of the different individual features and discuss how the results can elucidate some of the variance left unexplained by the more low- and high-level factors addressed in the literature so far.

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(1082)

Mental Imagery And Visual Perception: Shared Cognitive Mechanisms And Similar Time Course. MARTIN MAIER, *Humboldt-Universität zu Berlin*, ROMY FRÖMER, *Brown University*, JOHANNES ROST, *WERNER SOMMER*, and RASHA ABDEL RAHMAN, *Humboldt-Universität zu Berlin* (Sponsored by Werner Sommer) — Visual mental imagery shares representations in the brain with visual perception. However, while overlap in the neural substrates is well documented, little is known about the time course and speed of mental imagery relative to perception. Here, we extracted event-related potentials from the EEG to characterize temporal aspects of imagery. Furthermore, we localized influences of semantic knowledge, a cognitive factor known to modulate low-level processes during visual perception. ERPs reflecting activity in early visual areas revealed a comparable overall time course of imagery and perception, albeit with imagery yielding a later onset and longer duration of the N1 component, which has been associated with high-level perception. Semantic knowledge modulated the P1 component similarly during perception and mental imagery, revealing shared mechanisms related to low-level perception. These findings demonstrate considerable cognitive and temporal similarities of imagery with

perception, suggesting similar underlying mechanisms regarding sensory activity and malleability to top-down influences. They also suggest rapid formations of complex mental images within less than 250 ms.

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(1083)

Capacity Constraints On The Extraction Of Multiple Summary Representations.

HARUN YÖRÜK and AYSECAN BODUROGLU, *Bogazici University* (Sponsored by Aysecan Boduroglu) — People initially process item sets by averaging their features into summary representations. Previous studies have shown that low and high-level features are independently summarized. The current study investigated whether mean estimation relies on a feature-specific or a feature-general mechanism by asking people to attend and summarize one of two simultaneously available visual features. Viewers estimated either the mean size or the orientation of a set of randomly oriented lines of various lengths based on a cue that identified the target dimension (size or orientation). Viewers adjusted the length/orientation of a response stimulus. Because the cue appeared subsequent to the offset of the visual display, successful performance necessitating both summaries to be extracted performance. Performance on the mean length and orientation tasks were negatively correlated suggesting that there was competition between the summarization of two basic visual features.

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(1084)

Object Detection Is More Resilient Than Face Detection.

DEAN G. PURCELL, *Oakland University*, ALAN L. STEWART, *Stevens Institute of Technology* — Observers can detect a picture of an upright face more quickly than an inverted face, or a face with rearranged features. We call this phenomenon the Face Detection Effect. Faster detection also occurs when two-dimensional drawings appear to be three-dimensional objects rather than collections of lines (the Object Detection Effect). We measured the detection thresholds for faces and objects in trials that intermixed faces (upright and rearranged) and objects (seen as 2-D collections of lines or 3-D objects). Unexpectedly, intermixing the presentations of faces with the presentation of objects impaired observers' ability to detect normal upright faces. The threshold to detect a normal face increased to match those of rearranged faces and 2-D patterns. But, observers could still detect 3-D representations more quickly than any other stimuli. Intermixing trials of faces and objects eliminates the Face Detection Effect. The visual system appears biased toward the detection of 3-D objects.

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(1085)

Did Rubens Correct For The Poggendorff Illusion?

OLGA DANEYKO, *Sheffield Hallam University*, NATALE STUCCHI and DANIELE ZAVAGNO, *University of Milano-Bicocca* — In almost all pictorial artworks, edges of partially occluded figures are always collinear despite they might not always appear so because of the Poggendorff illusion. We are aware of only two cases in which this is not true. One is Rubens's “Descent from the cross” (1612-13) in Antwerp. According to the literature, two visible portions of a ladder's right rail were geometrically misaligned to correct for the Poggendorff illusion. To test such claim we conducted an experiment with actual size projections of the painting, in which participants aligned a thick line replacing the upper portion of the rail to a thick line superimposed on the lower portion of the



rail. We found that the Poggendorff illusion affected perceived alignment, however mean displacement was significantly less than Rubens's displacement. A second experiment was conducted with projections of Rubens's "Descent from the cross" (1616-17) conserved in Lille. Again alignments were affected by the Poggendorff illusion, but Rubens ignored the perceptual misalignment and painted the visible portions of the occluded rail perfectly aligned. Results from both experiments do not support Rubens's awareness of the Poggendorff illusion. An alternative account is offered.

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(1086)

(Withdrawn) The Role Of Shape Recognition In Figure/Ground Perception In Infancy. RAMESH BHATT, HANNAH WHITE, and RACHEL JUBRAN, *University of Kentucky* — Figure/ground parsing is a critical mechanism for focusing the viewer on relevant information in a scene. This study examined whether infants, like adults, are able to utilize previous experience to guide figure/ground processing. Results demonstrate that by five months of age figure/ground processing is sensitive to shape recognition, whereby infants preferentially attended to the side of an ambiguous test stimulus corresponding to the shape they had been exposed to previously. The failure of infants to exhibit such a preference in a control condition in which both sides of the test stimulus were cued as figures, removing the ambiguity, indicates that results were not due to preference between two figure shapes. These findings demonstrate that figure/ground processing in infancy is sensitive to top-down influences. To our knowledge, this is the first study to demonstrate effects of top-down processing on figure/ground perception in infancy.

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(1087)

Order, Complexity, And Aesthetic Preferences For Neatly Organized Compositions. ELINE VAN GEERT and JOHAN WAGEMANS, *University of Leuven* (Sponsored by Johan Wagemans) — Which factors can predict aesthetic preferences for images of neatly organized compositions, collected on blogs like Things Organized Neatly® (<http://thingsorganizedneatly.tumblr.com/>)? We focused on stimulus and person properties related to order, complexity, and the balance between order and complexity.

Participants ($N = 415$) indicated their preference for one of two simultaneously presented images (100 pairs) and completed some personality questionnaires. In a second, optional part of the study, participants ($N = 84$) rated how ordered, complex, soothing, and fascinating they perceived each of 184 images to be. In pairs of neatly organized images, preferences related to differences in soothingness and fascination ratings between the images in a pair. Additionally, soothingness and fascination ratings of the images showed differential relations with ratings of order and complexity. Fascination ratings of the images related positively with measures of order and complexity, whereas soothingness ratings related positively with order and negatively with complexity measures. Besides the main data collected in a Western context, new data collected in a Chinese context will also be presented.

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(1088)

Spatial Memory Capacity Influences The Process Of Visual Diagnostic Reasoning. ANJA KLICHOWICZ, *Chemnitz University of Technology*, AGNES SCHOLZ, *University of Zurich*, SASCHA STREHLAU, *University of Kassel*, JOSEF F. KREMS, *Chemnitz University of Technology* (Sponsored by Josef Krems) — Understanding how people find an explanation for a set of observations is central to understanding human thinking. In "real world"-diagnostic reasoning tasks the amount of relevant information likely exceeds the processing capacities of the reasoner. Therefore, the reasoner's memory capacity is a crucial factor during the reasoning process. In one experiment ($N = 29$) participants solved a visual reasoning task where critical information had to be retrieved from memory and manipulated the appearance of unexplained symptoms during 48 trials (the so-called Black Box task). We assessed working memory capacity with span tests such as reading and spatial span, the dot memory test and raven matrices. We expect participants to rely more on spatial compared to verbal capabilities when engaging into a visuo-spatial task. The results are discussed with regard to abductive visual reasoning tasks compared to the deductive verbal material used in the existing body of research.

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POSTER SESSION 2

Bilingualism

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

BILINGUALISM

(2002)

A Multi-Component Perspective In Cognitive Control And Simultaneous Interpreting: Evidence From ERPs. JULIA MORALES, *Universidad Loyola Andalucía*, TERESA BAJO, *University of Granada* — Novel approaches in the study of cognitive control in bilingualism recent findings support the necessity to consider a multi-component perspective that goes beyond the analysis of single components of executive functioning. We extend this view to the case of simultaneous interpreting, as it is a complex form of bilingualism that requires the coordination of multiple cognitive control resources. We report a study in which we compared a group of interpreters and a group of controls in a number of tasks aimed to evaluate isolated components of executive functioning (e.g., working memory, inhibitory control) and tasks that required the coordination between them (e.g., proactive and reactive control). The pattern of both behavioral and ERP data indicates that novel approaches on executive functioning and cognitive training should not only focus on quantitative evaluations of specific skills (in terms of capacity, speed, or blood flow) but also on qualitative measurements (in terms of connectivity, interactions and efficiency between multiple cognitive mechanisms).

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(2003)

How Does Un Modelo Computacional Learn To Code-Switch? Simulating Code-Switching In A Bilingual Sentence-Production Model. CHARA TSOUKALA, STEFAN FRANK, and MIRJAM BROERSMA, *Radboud University, Nijmegen*, ANTAL VAN DEN BOSCH, *Radboud University Nijmegen* — People who speak multiple languages are able to switch from one language to the other (a phenomenon called code-switching) and they seem to do so effortlessly and unconsciously. Although much is known about factors that facilitate or inhibit code-switching in both comprehension and production, the underlying mechanisms are not very well understood. Using computational cognitive modeling one can simulate code-switching behavior in multilinguals with the goal to explain the code-switching process. For this reason, we have extended Dual-path (Chang, 2002), a computational model of monolingual sentence production, in order to be able to handle two or more languages. Using the bilingual Dual-path model we have simulated sentence production in early and late Spanish-English bilinguals. We then manipulated language control to allow the model to produce sentences in either language or to code-switch. The model shows how code-switching patterns differ between early and late bilinguals.

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(2004)

Individual Differences In Frequency And Predictability Effects In First And Second Language: An Eye-Movements Study. BILLY MOR and ANAT PRIOR, *University of Haifa* (Sponsored by Anat Prior) — The current study explored reading processes in second language (L2) among Hebrew-English bilinguals. This population

is of special interest due to the prominent orthographic distance between the languages, thus limiting cross-language interactions. Our main and important question is to what degree L2 processing is encapsulated and thus independent from first-language (L1) processing, and to what degree it recruits general language abilities also evident in L1 processing. Participants' eye-movements were recorded during sentence reading in both languages, and we measure the impact of two well established factors on reading – word frequency and word predictability within the sentential context. Further, we assess participants' L1 and L2 proficiency and exposure levels. Results are discussed by mapping the effect of frequency and predictability across L1/L2. Further, we adopt an individual differences perspective to link these effects with exposure and proficiency levels in both languages.

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(2005)

The Impacts Of Added Interword Spacing On The Processing Of Chinese Texts By Native English Speakers: An Eyetracking Study. ALBA GARCIA ALONSO and PAOLA E. DUSSIAS, *The Pennsylvania State University* (Sponsored by Paola E Dussias) — Research on reading in logographic languages has explored first (L1) and second language (L2) reading processes across various spacing conditions. Mandarin Chinese is featured prominently in these studies due to its unspaced nature. Whereas for L1 readers some studies suggest benefits to altering spacing conditions, there is little research focusing on these for L2 beginners. This study utilized eyetracking to examine how inserting word-delimiting spaces in Mandarin Chinese sentences impacts the reading processes of L2 Chinese readers. Participants were L1 English speakers enrolled in second year Mandarin Chinese courses at a US university. They read simple transitive sentences across three spacing conditions. Preliminary results show overall longer reading times and higher fixation counts in spaced sentences, suggesting that the insertion of spaces hinders reading processes even at beginning stages.

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(2006)

Activation Of English During Recognition Of American Sign Language By Deaf And Hearing Bimodal Bilinguals: An ERP Study. BRITTANY LEE and GABRIELA MEADE, *San Diego State University and University of California, San Diego*, MEGAN MOTT, KATHERINE J. MIDGLEY, PHILLIP J. HOLCOMB, and KAREN EMMOREY, *San Diego State University* (Sponsored by Karen Emmorey) — We investigated co-activation of English words during recognition of American Sign Language (ASL). Deaf and hearing signers viewed pairs of ASL signs and judged semantic relatedness. Half of the semantically unrelated signs had form-related English translations (e.g., bar-star) and half did not (e.g., nurse-star). Classic N400 and behavioral semantic priming effects were observed in both groups. There also appeared to be an effect of English form-relatedness for hearing signers; target signs in English form-related pairs elicited smaller amplitude late N400s (between 700-1000 ms at occipital sites) than targets in English unrelated pairs. These effects were not observed for deaf signers. This N400-like effect mirrors rhyme priming in spoken language



and shows that hearing (English dominant) signers are more likely to co-activate English when processing signs than deaf (ASL dominant) signers. Thus, language dominance modulates the strength and direction of lexical associations between a bilingual's languages, regardless of language modality.

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(2007)

Pupil Dilation As An Index To Language Switching. MICHAEL A. JOHNS and PAOLA E. DUSSIAS, *Pennsylvania State University* (Sponsored by Judith Kroll) — Changes in pupil size are linked to mechanisms underlying attention and cognitive load during linguistic processing (Byers-Heinlein et al., 2017). Using a picture-naming task, our goal here is to determine if the task-evoked pupillary response (TEPR) is sensitive to asymmetric switch costs (Meuter & Allport, 1999; Gollan and Ferreira, 2009) when switching from the non-dominant language into the dominant one. Results (paired two-sample t-tests on the values binned for each trial) for 21 English-dominant heritage speakers of Spanish revealed two processes being reflected by the TEPR: in the case of naming in Spanish, the TEPR captures a classic “switch cost”, with greater dilation being associated with greater cognitive effort when switching into the weaker language. In the case of naming in English, however, the TEPR may be capturing attention or arousal—as opposed to cognitive effort—with greater dilation associated with the consistent activation of the dominant (more familiar) language.

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(2008)

Stimulus-Response Binding In Language Switching. ANDREA M. PHILIPP and IRING KOCH, *RWTH Aachen University* — In language-switching experiments, participants usually have to name an object in one of two languages. In the present experiments, such a variable stimulus-response (S-R) mapping (each picture had to be named in German and English, depending on the language cue) was compared against a constant S-R mapping (each picture was associated with only one language and, thus, had to be named in German OR English). Yet, the constant S-R mapping was present in the learning blocks only and was reversed in the final test block so that each stimulus had to be named in the other language. The performance was better and language switch costs were smaller in the constant S-R mapping group as compared to the variable S-R mapping group. Furthermore, with constant S-R mapping, we observed a substantial DEcrease of switch costs during the learning blocks and an even larger INcrease in the test block. These results demonstrate a remarkable influence of S-R bindings on language switch costs and indicate that S-R bindings can influence between-language interference and control in bilingual language switching.

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(2009)

The Role Of Between-Language Competition In Foreign Language Attrition. ANNE MICKAN, *Radboud University Nijmegen, Max-Planck Institute for Psycholinguistics Nijmegen*, KRISTIN LEMHÖFER and JAMES M. MCQUEEN, *Radboud University Nijmegen* (Sponsored by James McQueen) — Recent advances in memory research suggest that forgetting is primarily driven by interference and competition from other memories. Regarding L2 attrition (the decline of L2 skills with time), the question arises whether it is interference from translation equivalents in other, more recently used languages, like the native language (L1) or other foreign languages (L2+), that causes

subsequent retrieval failure in L2. The current study manipulated the presence of L1/L2+ interference and assessed its consequence for L2 vocabulary retention. On day 1, Dutch native speakers learned 40 new Spanish words. A day later, they performed a number of naming tasks in either Dutch (L1) or English (L2+) on half of these words. Finally, memory for all items was tested again in Spanish. Results show that, as expected, recall was slower and less complete for words that received interference than for words that did not. Moreover, in naming speed, this effect was larger for L2+ compared to L1 interference. These findings suggest that competition from more recently used languages is indeed one force causing L2 attrition. EEG recordings on day 2 at final test in Spanish are currently being analysed for neural markers of competition.

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(2010)

The Influence Of Levels Of Processing On Memory Retrieval In French-English Bilinguals. ASTRID AERNOUDTS, *Leiden University*, LORIELLE DIETZE and MYRA FERNANDES, *University of Waterloo* (Sponsored by Myra Fernandes) — We used the levels of processing (LoP) framework to infer overlap in lexical stores in English (L1)-French (L2) bilinguals. If two languages share lexical stores, the magnitude of the effect should be similar, regardless of whether retrieval is in L1 or L2. The magnitude of the LoP effect was compared when encoding and retrieval were in L1, to when encoding was in L1 but retrieval was in L2. In Experiment 1, the classic LoP effect was larger when the recognition test was in L1 than L2, suggesting independent stores. In Experiment 2 we examined whether encoding objects, would eliminate this Test language X Encoding condition interaction, as these stimuli more reliably activate a conceptual store, which may be shared across L1 and L2. The interaction was maintained. Our findings suggest that bilinguals have independent lexical stores for L1 and L2, as the LoP effect did not transfer across languages.

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(2011)

A Multi-Component Perspective In Cognitive Control And Simultaneous Interpreting: Evidence From ERPs. JULIA MORALES, *Universidad Loyola Andalucía*, TERESA BAJO, *University of Granada* — Novel approaches in the study of cognitive control in bilingualism recent findings support the necessity to consider a multi-component perspective that goes beyond the analysis of single components of executive functioning. We extend this view to the case of simultaneous interpreting, as it is a complex form of bilingualism that requires the coordination of multiple cognitive control resources. We report a study in which we compared a group of interpreters and a group of controls in a number of tasks aimed to evaluate isolated components of executive functioning (e.g., working memory, inhibitory control) and tasks that required the coordination between them (e.g., proactive and reactive control). The pattern of both behavioral and ERP data indicates that novel approaches on executive functioning and cognitive training should not only focus on quantitative evaluations of specific skills (in terms of capacity, speed, or blood flow) but also on qualitative measurements (in terms of connectivity, interactions and efficiency between multiple cognitive mechanisms).

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Cognitive Aging

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

COGNITIVE AGING

(2012)

A Diffusion Model Analysis Of Effects Of Normal Aging And Dual-Task On Directed Forgetting. JULIO MENOR and JOAQUÍN MORÍS, *University of Oviedo* — The data from an intentional forgetting experiment using a directed forgetting procedure (item-method) was analyzed with Ratcliff's (1978) diffusion model. A group of older adults as well as two groups of young adults were included, one that performed a simultaneous secondary task and one that did not. The proportion of to-be-forgotten (TBF) words correctly recognized did not differ between groups. However, older adults and the dual-task group showed a reduced directed forgetting effect compared to the single-task group. The adjusted diffusion model showed higher drift rates (parameter v) and memory bias for TBF-items in the older adults and the dual-task group. This suggests that due to a reduction of processing resources in the dual-task condition or as a result of normal aging TBF items are processed more extensively, causing an increased familiarity and an extraction of information of more quality.

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(2013)

Risk Tolerance And Financial Decision Making In The Elderly: The Role Of Stereotypes. SAMANTHA LACEY, *University of Connecticut*, PATRICK DOLAN, *Drew University* — Financial scams that prey on older adults are widespread and on the rise, collectively costing the elderly \$15 billion annually in the US alone. The present study investigated the hypothesis that older adults' financial decision-making strategies and tolerance for risk may be influenced by negative cultural beliefs about the impact of aging on financial decision-making (e.g., stereotype threat). Adults over the age of 65 were first reminded of a negative, positive, or no stereotype associated with increased age. Participants were then assessed on their tolerance for risk, financial knowledge, experience and confidence in making financial decisions, and the extent to which they identify with their age group and agree with the stereotype. Among the findings, participants reminded of the negative stereotype were more risk averse compared to those who were not. Further, participants who were reminded of either the positive or negative stereotype reported being more conservative in their attitudes about money and how they approach financial decisions. These results suggest that reminding older adults of age-based stereotypes may lead them to make better, more conservative financial decisions.

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(2014)

Age Differences In Selective Memory Monitoring Of Emotional Information. SARA GALLANT and LIXIA YANG, *Ryerson University* — The positivity effect, a processing bias for positive over negative information, in older adults has been well-reported in the attention and memory literature. The present research aimed to examine whether this bias could be extended to selective monitoring of memory with young and older adults with a cue-based (Experiment 1) or value-based (Experiment 2)

item-directed forgetting task for emotional and neutral words. At encoding, words were either cued as to-be-remembered (TBR) or to-be-forgotten (TBF) in the cue-based paradigm, or assigned a number signaling a gain (+10) or loss (-10) of value in the value-based paradigm. Selective memory monitoring was indexed by retrospective attributions of items to the cue or value sources at retrieval. The results showed that both age groups demonstrated consistent directed forgetting effects regardless of valence. However, older adults, but not young adults, differentially attributed higher value sources (i.e., TBR or +10) to positive items and/or lower value sources (i.e., TBF or -10) to negative items, reflecting an age-associated positivity effect.

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(2015)

Using Stereotype Threat To Reverse The Gap Between Younger And Older Adults On Associative Learning Tasks. MARIE MAZEROLLE and NICOLAS AIMÉ, *University Bourgogne Franche-Comté*, FRANÇOIS MAQUESTIAUX, *Institut Universitaire de France* — There is now ample evidence that age-related stereotypes can alter older adults' memory performance. For example, under stereotype threat, older adults recall and recognize less words (Kang & Chasteen, 2009; Hess, Emery, & Queen, 2009), or demonstrate smaller working-memory capacity (Mazerolle, Régner, Morisset, Rigalleau, & Huguet, 2012). Here we aim at reversing the gap between younger and older adults on a classic associative learning task inspired from Touron & Hertog (2004). More precisely, participants were randomly assigned to high-threat condition or a reduced-threat condition. In older adults, stereotype threat was induced/reduced by emphasizing/de-emphasizing the relevance of the test to examine memory capacity, whereas in younger adults, stereotype threat was induced/reduced by emphasizing/de-emphasizing the relevance of the test to examine intellectual abilities. Results show that stereotype threat may in part, be responsible for the "classic" gap observed between younger and older adults on memory tests. Practical implications for older adults' memory assessment will be considered.

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(2016)

Roles Of Reminiscence Reconstructed With Personal Interpretations In Cognitive Aging From The Life-Span Perspective. AYA HOSOKAWA and MAKIKO TOMIDA, *National Center for Geriatrics and Gerontology* — Reviewing individual life with reminiscence has varied functions in later life. A part of the current study yielded outcomes that regular participation in group reminiscence had positive effects on memory and cognition in later life. Simultaneously, it was imperative to focus on content analyses of life narrative to parse factors which might have engendered improvement in memory and cognition. The content analyses of 100 transcribed life narratives from infancy to late adulthood including current life established thematic categories related to life events and found that most autobiographical depictions were reconstructed with personal interpretations including feelings, acceptance, learning lessons, awareness, meaning-making, identity, personality development, spirituality, self-control, goal, and so on. These personal interpretations frequently occurred in reminiscence in middle adulthood (95%), late adulthood including



current life (75%), adolescence (65%), and early adulthood (60%), respectively. The results implied further discussion on reminiscence reconstructed with personal interpretations with theoretical functions serving cognitive aging.

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(2017)

How Personality Can Modulate The Effect Of Age-Based Stereotype Threat On Memory In Older Adults. LAURENCE TACONNAT and TIMEA KUTASI, *University of Tours, UMR-CNRS 7295 CeRCA* — Several factors have been found to modulate the effects of age on memory and memory strategy use. Among these moderators, two personality dimensions (Openness and Neuroticism) have been found to contribute to cognitive older adults' performance. However, unknown are the mechanisms underlying these moderating effects when they occur. The present experiment tested whether Openness and Neuroticism might modulate the effect of age-based stereotype threat (ABST) on memory performance and on the use of organizational strategy, a resource dependent strategy. ABST creates intrusive thoughts which consume working memory capacities and reduce the ability to use memory strategies. Young and older adults learned an unrelated word-list and had to recall it. An organizational strategy index was then computed. Our results showed that effect of ABST on memory performance and strategy use was indeed larger for participants with a high score in Neuroticism, while this effect was lower for participants of high level in Openness.

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(2018)

Negativity Bias On Directed Forgetting In Young Adults But Not In Older Adults. JULIO MENOR and PAULA ALFONSO, *University of Oviedo* — The effects of age on the intentional forgetting of negative emotional words were analyzed. Negative and neutral words were presented using the directed forgetting procedure (item-method). A visual detection task after memory

instruction to measure the cognitive demand of instantiate an R (Remember) vs F (Forget) instruction was used. Post-F probe RTs were longer than post-R probe RTs for both negative and neutral words in young group which shows that F-instruction was more demanding than R-instruction. However, no differences were found in the older group possibly due to the cognitive demand of the processing of R- vs F-instructions was similar. In the recognition test, the directed forgetting effect was significantly reduced for negative words in young adults due to more negative than neutral to-be-forgotten words were recognized. However, the older group processed negative words in a manner similar to neutral words, which did not alter the directed forgetting effect.

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(2019)

Latent Patterns Of Environmental Modifications Strategies Use In Older Women. LESLIE VAUGHAN and DANIEL BEAVERS, *Wake Forest School of Medicine* — Cognitive and physical activity limitations decrease older adults (OAs) ability to age in place. Environmental Modifications (EM) ranging in cost and complexity (increasing lighting; installing a wheelchair access ramp) increase OAs participation. Latent class analysis (LCA) was used to analyze mail-in survey data from N=71,257 US community-dwelling women enrolled in a Women's Health Initiative (WHI) 2013-2014 survey supplement with 10 EM items. Functional independence (FI) survey items were collected yearly from 2013-2016. The study examines EM latent classes; risk factors including falls; and conditional probabilities of concurrent and distal FI in approximately 70,000 community-dwelling women mean (SD) age 77.1 ($\pm$ 6.4) years. LCA indicated a 4-class solution with a good fit: Log-likelihood= 209273.90; G^2 =1462.65; AIC=1540.65; BIC=1898.44; Adjusted BIC=774.50; Df=472. Fifty-three percent demonstrated a low EM use pattern (UP); 20.4% demonstrated difficulty-standing EM UP; 17.9% used simple, low-cost cognitive preventative strategies, and 5.3% had a moderate EM UP.

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Cognitive Control I

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

COGNITIVE CONTROL I

(2020)

The Role Of Source Monitoring In Resolving Cognitive Disequilibrium On Texts With Controversial Topics. SHI FENG and ARTHUR GRAESSER, *University of Memphis* (Sponsored by Arthur Graesser) — The purpose of this study is to examine the effect of text position (i.e. the position that the author of the text argues for on a controversial issue), agent roles, and agent positions on source monitoring and how these factors impact comprehension in a learning environment with conversational agents. Previous research on learning from text with conversational agents has found that agent disagreements stimulate a state of cognitive disequilibrium and confusion in the participants. When the participants resolve the confusion, deep learning occurs. Previous research has also found that when dealing with texts that conflict with the learner's prior beliefs, source monitoring is one reading strategy to resolve the conflict. This study combines these two lines of research to investigate the interacting effect of both agent disagreements with each other and with the texts on

controversial topics. The study will investigate alternative models and hypotheses that relate cognitive disequilibrium, source memory, and comprehension, results will follow

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(2021)

The Effects Of Color Vision And Spontaneous Eye Blink Rate On The Attentional Blink. ANNE C. TRUTTI, ZSUZSIKA SJOERDS, and BERNHARD HOMMEL, *Leiden University* (Sponsored by Cristina Cacciari) — The Attentional Blink (AB) has been related to the limitation of resources for stimulus processing in working memory (WM). Due to the role of (striatal) dopamine (DA) in WM findings suggest dopaminergic mediation of individual performance in the AB task. Further, recent work suggests DA affects color vision (CV) performance (Jongkees & Colzato, 2017). In this study we aimed to relate for the first time CV to performance in an AB task and to test whether we can replicate an earlier finding that sEBR predicts the individual magnitude of the AB (Colzato et al. 2008). CV and sEBR data of seventy subjects was assessed prior to measuring performance in an AB task. As a potential confounding variable, mood data was collected at both,

sEBR and AB assessment, respectively. Results suggest no relation ship between AB magnitude and quantitative CV ($\rho = 0.04$, $p = 0.73$), nor between AB and qualitative CV (chi-squared = 1.62, p -value = 0.656), but between sEBR and AB ($R^2 = 0.083$, p -value = 0.02). Both, sEBR and mood at sEBR were significant predictors of AB magnitude ($F(3,66) = 6.98$, $p < .001$; $R^2 = 0.21$). Taken together, the results strengthen the evidence supporting the relation ship between sEBR and AB magnitude, but not CV and AB magnitude. Email: Anne Trutti, annetrutti@gmail.com

(2022)

Sequential Congruency Effect Generalizes Across Contextual Features When S-R Contingency Is In Another Set. ASLI BAHAR INAN, *Cankaya University*, NART BEDIN ATALAY, *TOBB University of Economics and Technology*, MINE MISIRLISOY, *Middle East Technical University* — Sequential congruency effect (SCE) is demonstrated by a larger Stroop effect following incongruent trials compared to congruent trials. Evidence has shown that alternation of a contextual feature eliminates SCE. In our previous study, we observed that stimulus-response contingency mediated the effects of the contextual feature on SCE: when there is a contingency, SCE generalizes across feature dimensions; but when there isn't, SCE is restricted to the contextual feature repetitions. In the present study, we directly compared the effects of repetition of the contextual feature and contingency on SCE in the same design. We used a Stroop task with four items and divided the stimuli in two sets. Stimulus organization created an S-R contingency in the first set, but not in the second set. The contextual feature was implemented by presenting Stroop words with small letters or all capital letters. Results demonstrated that the SCE was observed with both sets, and it generalized across contextual features within sets. Results suggested that the SCE generalizes across feature dimensions even when the S-R contingency was in another set in the same task. Email: Nart Bedin Atalay, natalay@etu.edu.tr

(2023)

Can Conflict Adaptation Generalize From One Task To Another? ANISHA KHOSLA, NICHOLAS CADMAN, JOEY LEGERE, SHANNON O'MALLEY, and JUDITH M. SHEDDEN, *McMaster University* (Sponsored by Karin Humphreys) — Cognitive control helps us pay attention to features of a stimulus that are relevant to a given task and ignore features that are irrelevant. When we encounter irrelevant information or any conflict, the conflict-monitoring hypothesis predicts that the brain first detects the conflict and then triggers feedback mechanisms to deal with the conflict. Previous research suggests that this conflict adaptation mechanism is task-specific—experience with conflict in one task will not prepare us for an upcoming conflict in another task. In a series of experiments, we manipulated the sources of conflict in alternating tasks to study the extent to which conflict adaptation is task-specific. We saw that conflict adaptation generalizes when two different alternating tasks have similar sources of conflict. Email: Anisha Khosla, khosla@mcmaster.ca

(2024)

Meditation-Induced Cognitive-Control States Affect The Top-Down Control Of Feature Binding. LUISA PROCHAZKOVA, *Leiden University and Leiden Institute for Brain and Cognition*, ROBERTA SELLARO, *Leiden University*, LORENZA CALZATO, *Ruhr University Bochum*, and University of Kassel, BERNHARD HOMMEL, *Leiden University* (Sponsored by NVP member Dont need Sponsor) — Mounting evidence has shown that different

forms of meditation can have an immediate and systematic impact on an individual's metacontrol state, thereby affecting performance in subsequent, unrelated tasks. Specifically, whereas focus attention meditation (FAM) was found to bias an individual's metacontrol state towards persistence, open monitoring meditation (OMM) has been found to bias it towards flexibility. The aim of the present study is to assess whether meditation-induced cognitive control states can affect the top-down control of feature binding. Healthy young adults underwent a single session of either FAM or OMM before performing an event-file task, which assesses feature integration and retrieval. Results showed that FAM, as compared to OMM, reduced the retrieval of task-irrelevant features. These results are consistent with previous findings showing that FAM can boost top-down control and confirm previous observations that engaging in meditation instantly induce cognitive control states that have impact on the individual processing style. Email: Luisa Prochazkova, luiska.prochazkova@gmail.com

(2025)

Executive Function In Cystinosis: Behavioral And EEG Evidence. ANA ALVES FRANCISCO and DOUWE JOHN HORSTHUIS, *Albert Einstein College of Medicine*, JOHN J. FOXE, *The Ernest J. Del Monde Institute for Neuroscience, University of Rochester*, SOPHIE MOLHOLM, *Albert Einstein College of Medicine* — Behavioral research suggests that executive functioning might be an area of particular risk in Cystinosis, a rare lysosomal storage disorder known to impact brain function. Here, we investigated the neural dynamics of executive function in individuals diagnosed with Cystinosis. Participants performed a go/no-go task, while their neural responses were recorded using high-density scalp electrophysiology. Preliminary analyses indicate that, behaviorally, individuals with Cystinosis perform similarly to their typically developing controls: Both groups took the same time to respond and made a similar number of errors. In contrast, the electrophysiological data suggest processing differences between the groups. Thus, despite neural processing differences in executive function, individuals diagnosed with Cystinosis seem to compensate such that they respond similarly to the typically developing controls. These results will be considered in the context of findings from neurocognitive assessments in the same participants of impaired executive function. Email: Ana Alves Francisco, ana.alvesfrancisco@einstein.yu.edu

(2026)

Multimedia-Minded, But Mindful: Media Multitasking Is Not Associated With Worse Performance Due To Increased Distractibility Or Reduced Task-Engagement. WISNU WIRADHANY and MARK R. NIEUWENSTEIN, *University of Groningen* (Sponsored by Mark Nieuwenstein) — In the advent of the recent increase in media-multitasking – consuming multiple media streams simultaneously – researchers have begun to characterize the phenotype of the habitual media multitasker by examining correlations with performance on various cognitive tasks. While the majority of these studies did not find significant correlates, a subset of studies suggests that media multitasking might be associated reduced task-engagement whereas another subset suggests that it might be associated with increased vulnerability to distraction. To test these opposing views, we conducted several replication studies and a meta-analysis. The former used different methods (i.e., an extreme-groups comparison or a large-scale correlational design), and they probed the association between different indices of media-multitasking and different indices of distractibility and task-engagement. The



latter summarized findings from different studies to create a better estimation for the association. Together, these tests did not produce convincing evidence for these associations and the meta-analysis made clear that previously found associations were largely confined to small-sample studies.

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(2027)

Microdosing Psychedelics: The Key To Creativity?

DOMINIQUE P. LIPPELT, *University of Leiden*, LUISA PROCHAZKOVA, *Leiden University*, LORENZA S. COLZATO, ZSUZSIKA SJOERDS, and BERNHARD HOMMEL, *University of Leiden* (Sponsored by Susanne Jaeggi) — Sub-perceptual doses of psychedelics such as psychedelic truffles are claimed to have various beneficial effects including creativity-enhancement, possibly through their affinity for serotonergic 5-HT_{2A} receptors. However, due to a lack of reliable past research on the microdosing of psychedelics it is challenging to draw definitive conclusions. The aim of our study was to evaluate the cognitive enhancing potential of microdosing truffles in healthy adults. We examined the effect of truffles on convergent thinking and divergent thinking, and assessed potential changes in fluid intelligence. The tasks were administered once before taking a microdose of psychedelic truffles and once while the effects were manifested. Ingestion of psychedelic truffles improved convergent and divergent thinking performance, whereas performance on the intelligence test was spared. Given that creativity, but not intelligence, was enhanced in both tasks, we suggest that microdoses of psychedelics might impact cognitive metacontrol by optimizing the balance between cognitive persistence and flexibility.

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(2028)

Switch To Survive: Two Exploring Tasks Capturing Exploring Tendencies That Might Have Been Crucial In Ancestral Environment.

CHARLOTTE VAN DEN DRIESSCHE, *École Normale Supérieure-Paris Science Lettre Research University* (Sponsored by Jérôme Sackur) — Rapidly shifting attention and impulsivity are nowadays considered as dysfunctional behaviours (DSM-5, APA, 2013). But, in a threatening environment the ability to react and switch might be crucial for survival. In this evolutionist framework, unconscious reflex behaviour might be valued over conscious but slower cognitions. In this experiment we explore in a population of 60 healthy children and 50 young adults the association of ADHD traits and deficit of executive function (inhibition) with tendency to switch in their exploration strategy. By means of two validated tasks – visual search and semantic fluency – we aimed to capture a cognitive tendency to switch in exploration strategies. We evidenced an association between ADHD traits with lower inhibition skills and switch rate in both tasks and links this results with the bio-evolutionist framework (Jensen et al., 1997) and difficulty to report mental content in ADHD (Van den Driessche, Bastian et al., 2017).

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(2029)

Investigating The Contribution Of Contingency Shifts To Post-Conflict Slowing.

MATE GYURKOVICS, *University of Sheffield*, ALODIE REY-MERMET, *Catholic University of Eichstätt-Ingolstadt*, LIAT LEVITA, *University of Sheffield* (Sponsored by Julie Bugg) — Recently, Rey-Mermet and Meier (2017, Attention Perception Psychophys) have demonstrated the long-lasting nature

of post-conflict slowing (i.e., the performance slowing occurring after conflict). In that study, task-irrelevant features on non-conflict trials were predictive of the correct response. Thus, conflict trials triggered not only a change in conflict magnitude but also in distractor-response contingency. We investigated the impact of these contingency changes on post-conflict slowing in an online study. Participants (N = 135) completed a flanker task, which required identifying a central letter among flankers. Conflict trials (i.e., target letters flanked by alternative targets, such as KHK) were occasionally presented among non-conflict trials (i.e., targets flanked by non-target symbols, such as %H%). Non-conflict trial distractors were predictive of the correct response in one group of participants, but not in another. Findings revealed similar post-conflict slowing in both groups. This suggests that shifts in contingency do not contribute significantly to post-conflict slowing.

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(2030)

Color Vision Predicts Individual Differences In Dopamine Function And Metacontrol States.

BRYANT J. JONGKEES, *Leiden University*, LAURA STEENBERGEN, *University of Amsterdam*, ANTONINO VALLESI, *University of Padova*, LORENZA S. COLZATO, *Leiden University* (Sponsored by Lorenza Colzato) — Dopamine is one of the most important neuromodulators of metacontrol, i.e., the ability to adaptively balance a flexible versus a persistent cognitive control strategy. Probing the dopaminergic system typically requires very expensive and/or invasive research methods, which is why there is great interest in non-invasive and cost-efficient markers of individual differences in dopamine function. Previous studies focused on spontaneous eye blink rate as predictor of (presumably striatal) dopamine activity. However, another aspect of our eyes may inform us of dopamine function: color vision, i.e., the ability to discriminate between colors. I will present studies relating color vision to cognitive flexibility and discuss the relationship between color vision and metacontrol.

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(2031)

Extending The Neurovisceral Integration Model: Vagal Tone And Action Cascading.

LAURA STEENBERGEN, *University of Amsterdam*, ROBERTA SELLARO, *Leiden University*, ANN-KATHRIN STOCK, *Technical University of Dresden*, BART VERKUIL, *Leiden University*, CHRISTIAN BESTE, *Technical University of Dresden*, LORENZA COLZATO, *Leiden University* — The neurovisceral integration model suggests that individual differences in heart rate variability (HRV), an index of vagal tone, may relate to prefrontal cortical activity and predict performance on cognitive control tasks. I will present two studies aimed at further verifying this model by investigating the relationship between vagal tone and action cascading, a crucial cognitive control function which refers to the ability to cope with multiple response options when confronted with various task goals. In study 1 we demonstrated participants with high HRV, compared to individuals with low resting-state HRV, showed enhanced action cascading performance. In study 2, we demonstrated that transcutaneous stimulation of the vagal nerve improved action cascading performance, both when a disruption (stopping) and change towards an alternative response were required simultaneously, and when requirements were cascaded (i.e. when the stopping process had already finished at the time the change

was required). Our findings represent an important step towards extending our understanding of the neurovisceral integration model in cognitive control.

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(2032)

Determining Self-Regulation Depletion On The Letter-Crossing And Executive Functioning Tasks.. GERRY TEHAN and JESSICA MARRINGTON, *University of Southern Queensland*, GEORGINA ANNE TOLAN, *Australian Catholic University* (Sponsored by Gerry Tehan) — Self-regulation, or ego depletion, is the ability to regulate one's emotions, behaviours, thoughts, and

actions. It is thought to be a limited resource of energy and when fatigued, requires rest to recover. Depletion can be induced via the letter-crossing task, which requires participants to cross off any 'e' that appears next to a vowel, excluding 'i', in a series of short texts. While the task is widely used in the literature, performance on the task is rarely measured. Letter-crossing task performance was compared to performance on executive functioning tasks (Stroop, OSPAN, Immediate Serial Recall, and Immediate Serial Recall with Proactive Interference) in a sequential task paradigm. The findings suggest that not all measures on the letter-crossing task are related to executive function and not all executive functions are reflected in performance on the letter-crossing task.
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Event Cognition

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

EVENT COGNITION

(2033)

The Role Of Knowledge In Age-Related Changes In Event Segmentation And Memory. KIMBERLY NEWBERRY, MAVERICK SMITH, and HEATHER BAILEY, *Kansas State University* (Sponsored by Heather Bailey) — The ability to parse ongoing activity into discrete events and later remember them declines with age, which is likely due to changes in working memory. However, semantic knowledge improves with age and may be used as a resource to improve these processes. The current experiment investigated the role of knowledge in age-related changes in segmentation and memory for everyday activities. Knowledge was manipulated by varying the familiarity of activities, such that older adults were more familiar with some activities and young adults were more familiar with others. All participants watched and segmented videos and completed a series of memory measures. Knowledge significantly interacted with age to predict segmentation; however, it did not predict memory. Additionally, segmentation predicted memory, but only for younger adults. These results suggest that older adults use relevant knowledge to help segment and encode an activity, but their improved segmentation behavior does not benefit memory.
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(2034)

Grammatical Aspect And Motion Event Endpoints In Dutch And Chinese Language. YIYUN LIAO, *Erasmus University Rotterdam*, MONIQUE FLECKEN, *Max Planck Institute for Psycholinguistics*, KATINKA DIJKSTRA and ROLF A. ZWAAN, *Erasmus University Rotterdam* (Sponsored by Rolf Zwaan) — Recently, researchers have shown that progressive aspect (e.g. the English suffix *-ing*) directs speakers' attention to the "ongoingness" of an event, thereby defocusing the boundaries of an event (e.g., motion event endpoints). Chinese has a progressive marker ZAI to describe motion events with a potential endpoint (e.g., a person walking toward a car), while Dutch typically does not use progressive aspect for motion. Thus, we examined whether Chinese speakers encode motion events with verbal references to endpoints less often than Dutch speakers. Subjects verbally described 20 video clips of everyday motion events. Our results showed that Dutch and Chinese speakers showed similar proportions of mentioning of potential endpoints (both around 45%). A possible explanation

is that grammatical aspect is not fully grammaticalized in Chinese. In our data only about 31% of Chinese participants used the progressive marker ZAI in their descriptions. We will also present data from an additional psychophysical experiment, tapping into participants' degree of endpoint orientation. This experiment uses a novel slider-technique based on real elicited descriptions, providing a detailed picture of motion conceptualization in these two languages.

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(2035)

Effects Of Sociopolitical Identity Of The Structure And Narratives Of Collective Memory. ALI TEKCAN, AYSECAN BODUROGLU, AYSU MUTLUTÜRK, and ASLIHAN IKIZOGLU, *Bogazici University*, ELIF SOZER, *The New School*, EKIN TUNÇOK, *Bogazici University* — We previously showed that while a few public events seem to dominate Turkish collective memory (Tekcan et al., 2017), there is also considerable variation in the set of events reported as a function of sociopolitical identity. In the present studies we addressed the impact of sociopolitical identity on the organization and justification narratives in collective memory. In Study 1, participants rated the perceived similarity of 225 pairs of public events; using multidimensional scaling we showed that sociopolitical identity (measured by voting behavior) affects the dimensions around which public events were clustered. Study 2 revealed that the characteristics of justification narratives (e.g. cognitive complexity, meaning-making) varied across sociopolitical identity, suggesting that collective memory organization and content are heavily impacted by identity.
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(2036)

Using Location-Based Event Structure To Improve Prospective Memory. ANDREA E. O'REAR and GABRIEL A. RADVANSKY, *University of Notre Dame* (Sponsored by Gabriel Radvansky) — Event cognition research shows that the way events are structured influences whether retrospective memory for those events is helped or harmed. However, studies of prospective memory (memory for actions to be done in the future) have not focused on event structure. The present study bridged this gap, using the event dimension of location to form the structures. Participants (N = 192) in a virtual shopping mall had an ongoing task of delivering messages from store to store, and two prospective memory tasks on each trial. Instructions for the prospective tasks were provided



in one or two locations, and the tasks were to be completed in one or two locations (i.e., 1-1, 1-2, 2-1, or 2-2). Performance in the 2-1 condition was significantly higher than in all other three, suggesting that event structure does influence prospective memory. Results are interpreted in terms of event cognition theory.
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(2037)

Observing Activity Streams: Temporal Gaps Influence Perceived Duration Of Actions. BAERBEL GARSOFFKY, *Leibniz-Institut für Wissensmedien-Tübingen*, STEPHAN SCHWAN, *Leibniz-Institut für Wissensmedien* (Sponsored by Stephan Schwan) — While observing everyday activities, we often shift attention among several activities and therefore perceive each activity piecemeal with temporal gaps in between. Two studies presented film clips depicting activities interrupted by short versus long temporal gaps and examined whether the gaps' length influences processing of the activities. Participants either estimated how long the last action of each clip would normally take if it were to take place in reality (Experiment 1) or judged presentation duration – i.e., how long the last action was presented in the clip (Experiment 2). Results showed that target actions following long instead of short gaps were estimated to take longer in reality (Experiment 1), but the depictions themselves were estimated to be shorter

(Experiment 2). Actions following long gaps seem to be processed as placeholders for longer segments in the stream of events, but in contrast, the depictions themselves appeared to be shorter.
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(2038)

Disappearance Of The Conformity Effect. DIANA KIM and BERNHARD HOMMEL, *Leiden University* (Sponsored by Bernhard Hommel) — In our first study, we (Kim & Hommel, 2015) have challenged existing social-psychological accounts of conformity by arguing that what looks like conforming behavior might simply emerge from a failure to distinguish between observations of one's own behavior and that of others. However, in their commentary, Ihmels and Ache (in press) convincingly demonstrate in a reanalysis of our data, that statistically correcting for possible regression-to-the-mean effects makes the conformity effect disappear. While this does not challenge our event-file approach, it suggests that the effect it intended to explain may not be real. In three experiments, we indeed (a) successfully tested a direct prediction from their account, (b) sought for conformity effects in a novel paradigm that prevents regression-to-the-mean effects, and (c) attempted to replicate the findings obtained with this paradigm. Taken altogether, the actual conformity effect does not seem to be sufficiently robust to invite testable theoretical accounts.
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Learning and Memory I

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

LEARNING AND MEMORY I

(2039)

Do Monetary Rewards Improve Unfamiliar Face Matching Accuracy? KASUMI OGAWA and SHINJI KITAGAMI, *Nagoya University* — Matching two images of unfamiliar faces is known to be a much more difficult task than matching images of familiar faces. Despite this, personal identification using an image, like in the case of a passport or criminal scene, is widespread in real society, and accurate judgment of unfamiliar faces is demanded. In the present study, we attempted to improve the discriminability of unfamiliar faces. Therefore, we investigated the effect of motivation that improved the results of various cognitive tasks (i.e., spatial attention, working memory, and problem solving) in many previous studies. In the experiment, we manipulated motivation using a monetary reward. Participants were asked to compare two different images of unfamiliar faces and judge whether it was the same person or not. The results showed that the accuracy of personal identification could be improved by monetary rewards. We discussed possible implications for these results.
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(2040)

The Mere Exposure Effect For Visual Images Is Sensitive To The Consistency Of Processing Between The Exposure And Rating Phases. KAZUYA INOUE, *University of Tsukuba*, YOSHIHIKO YAGI, *Rissho University*, NOBUYA SATO, *Kwansei Gakuin University* — We investigated whether the mere exposure effect for a visual image is sensitive to a difference in processing strategy between the exposure and rating phases. In the exposure phase, half of participants repeatedly imagined and memorized the

shape of invisible polygons. In the rating phase, the participants imagined the shape of invisible polygons and rated the preference for them. In contrast, the other half of participants did not imagine the shape of invisible polygons either in the exposure phase or the rating phase. Results showed that repeatedly imagined polygons in the exposure phase were more preferred than the polygons previously not imagined, indicating that the mere exposure effect occurred only when participants imagined the shape of the invisible polygons in both the exposure and rating phases. This implies that consistency of processing between the exposure and rating phases plays an important role in the mere exposure effect for visual images.

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(2041)

Effects Of The Key Psychoactive Ingredient Of Cannabis (THC) On Emotional Memories. MANOJ K. DOSS, *University of Chicago*, MICHAEL E. BALLARD, *University of California, San Francisco*, HARRIET DE WIT and DAVID A. GALLO, *University of Chicago* — Cannabis is one of the most widely used psychoactive drugs in the world, ostensibly because it increases positive affect, but its effects on emotional episodic memories are poorly understood. We conducted two rigorous, placebo-controlled, double-blinded experiments administering the main psychoactive ingredient, Δ^9 -tetrahydrocannabinol (THC), during either the encoding or the retrieval of neutral and emotional pictures. In the encoding experiment, we administered THC or placebo during encoding, and tested memory 48 hours later when participants were sober. Relative to placebo, THC impaired recognition memory accuracy, especially for positive and negative pictures. In the retrieval experiment, we administered THC or

placebo during retrieval, 48 hours after participants encoded the materials while sober. THC at retrieval increased false recognition of nonstudied pictures, regardless of emotionality, although this effect was somewhat larger for positive pictures. Taken together, these results show that THC impairs the processing of emotional memories at both encoding and retrieval.

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(2042)

Effects Of Stress And Sleep On Memory For Emotional Scenes.

KELLY A. BENNION, *California Polytechnic State University*, SANDRY M. GARCIA and ELIZABETH A. KENSINGER, *Boston College* — Although stress and sleep have independently been shown to enhance emotional memory, their interactive effect is less defined. Here, participants underwent a stress induction (cold-pressor test) prior to encoding scenes composed of a negative or neutral object on a neutral background either in the morning (preceding 12 hours awake; Wake group) or evening (preceding 12 hours including a night of sleep; Sleep group). At retrieval, participants viewed objects and backgrounds separately, distinguishing new objects and backgrounds from those studied. Consistent with work that has not induced stress at encoding, results showed a main effect of sleep on memory and an emotional memory trade-off (enhanced memory for negative vs. neutral objects at the cost of memory for backgrounds paired with negative vs. neutral objects). Interestingly, this trade-off was greater for the Wake than Sleep group, suggesting that stress prior to sleep may affect the way encoded information is prioritized during consolidation.

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(2043)

Can Eye Movement Data Predict The Accuracy And Confidence Of Eyewitnesses?

BRYAN A. ROBSON, *Swansea University* (Sponsored by Christoph Weidemann) — Knowledge of eyewitness decisions have improved recently, but understanding how a witness examines the line-up to arrive at their decision has not received as much attention. Across two experiments, we used eye movement data to investigate how line-ups were examined and if the data could be used to predict accuracy and confidence. Dwell time on the chosen image (measured as a percentage of trial time) and the first fixation time upon the images were recorded to investigate if there was any pop out effect and how witnesses examine line-ups. Results indicate that the dwell time is a useful predictor of accuracy, confidence and response times. This was replicated across different sized line-ups, suggesting that, when correct, witnesses spent more time fixating on the target, regardless of the number of fillers. First fixation times were not significant predictors. This suggests that eye movement data could improve understanding of line-up decisions.

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(2044)

The Effect Of Cued Memory Recall Strategies On Word Identification And Voice Recognition.

TIFFANY ELMORE and MARTIN A. CONWAY, *City, University of London* (Sponsored by Martin Conway) — In the US, more than 70% of men and women were wrongfully convicted largely due to inaccurate eyewitness identification. At present, both eyewitness and earwitness testimony are permitted in court trials. The questions remain as to how much reliance can be placed on the accuracy of this information and whether it should be regarded as reliable evidence in police lineups and subsequent court testimony. At least

17 people in the U.S. have been wrongfully convicted of crimes based earwitness misidentification. Using the criteria established by the U.S. Supreme Court, the focus of my research investigated: (1) the opportunity of the witness to view the criminal [or hear the suspect's voice] at the time, (2) the witness' degree of attention, and (3) the length of time between the crime and the confrontation. Thus far, the results did not show any significant effect on speaker gender or participant gender. The final research project will culminate in a mobile application that will generate a crime report based on information provided to them detailing the facts of a crime. The ultimate goal of my doctoral studies is to contribute to ongoing research in order to greatly reduce misidentifications that lead to wrongful convictions.

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(2045)

Police Lineups That Maximize Memory Performance.

TRAVIS M. SEALE-CARLISLE, *Royal Holloway, University of London*, STACY A. WETMORE, *Butler University*, DAVID P. MORGAN, MIRELA VELIKOVA, RANA BANAI TIZKAR, and LAURA MICKES, *Royal Holloway, University of London* — What police lineups maximize memory performance? A comparison of US versus UK identification (ID) procedures showed that memory was better when tested on the former (Seale-Carlisle & Micks, 2016). Deciphering the reason for the advantage was not possible because the procedures differ on a number of factors. In a series of follow-up experiments ($N > 10,000$), we compared simultaneous vs. sequential presentations, 6- vs. 9-members, photos vs. videos, and 1-lap vs. 2-laps vs. lap choice. The fillers, lineup members who bear some physical resemblance to the suspect, were selected by a UK police officer trained in ID procedures. Only one comparison revealed a difference in memory performance: simultaneous presentation yielded better performance than sequential presentation. This replicates recent experiments that found a simultaneous advantage. Moreover, the findings support the diagnostic feature-detection hypothesis (Wixted & Micks, 2014), which suggests that further maximizing memory performance will depend on filler choices.

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(2046)

The Role Of Emotional Words In Learning Dense And Sparse Categories.

TATYANA KOTOVA, *Russian Presidential Academy of National Economy* — The goal of the present study was to assess the influence of the emotional words on the learning different types of categories. Subjects were given classic category formation tasks with feedback. We used two types of categories - statistically dense and statistically sparse. After feedback participants were given emotional words from two semantic groups, happiness or sadness. Those words were related to feedback directly (e.g., happy word after positive feedback), or inversely (e.g., sad word after positive feedback), or randomly. We found that in the case of dense categories formation, the relation between feedback and an emotional word had no impact on the learning. In the case of sparse categories formation, performance was much better in direct relation condition than in the inverse or random relation conditions. The results of the experiment will be discussed in the framework of the COVIS model of multiple systems of categorization.

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(2047)

Interleaving And Blocking Multiple Dimensions In Category Learning. XINYI LU, *National University of Singapore*, SEAN H.K KANG, *Dartmouth College*, TREVOR B. PENNEY, *Chinese University of Hong Kong* (Sponsored by Sean Kang) — Interleaving the presentation of exemplars from different categories, rather than blocking exemplars by category, often enhances inductive learning. The current research explores the effects of introducing multiple category dimensions into the learning task. In Experiment 1, participants learned to classify car images along two category dimensions: their brand and decade of manufacture. Interleaving exemplars along one dimension did not improve performance for that category; instead, the performance for the other, blocked category, was improved. In Experiment 2, participants learned and classified the same images as in Experiment 1, except that participants were required to classify new exemplars by brand only. Interleaving by brand then improved brand categorization performance significantly compared to interleaving by decade. These results suggest that interleaving promotes effortful between-category discrimination, which can be beneficial when processing demands are simple, but detrimental under higher cognitive load. On the other hand, blocking promotes within-category commonality abstraction, which is cognitively less demanding, and may be suitable for situations that require multiple categorization dimensions.

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(2048)

Contrast Comparison, Strategy Usage, And Working Memory In Inductive Category Learning. ERIN N. GRAHAM and CHRISTOPHER WAS, *Kent State University* (Sponsored by Christopher Was) — Previous work suggests that presenting contrasting exemplars simultaneously can impact the way in which individuals represent information during an inductive category learning task. However, research examining the mechanisms by which contrast comparison influences categorization is inconclusive. The presented series of studies was motivated by two goals. The first goal was to examine whether the relationships between working memory, strategy usage, priming, and variations in contrasting exemplar comparison (i.e. presenting a novel category name and asking participants to choose from three exemplars or presenting an exemplar word and asking participants to choose from three category names) are similar for both semantic and perceptual category learning tasks. The second goal was to use eye-tracking technology to investigate whether differences due to variations in contrasting exemplar comparison could be explained through perceptual mechanisms. Results indicated that exemplar presentation variation does impact the way in which participants represent their knowledge about categories and exemplars.

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(2049)

Distinct Transfer Effects Of Working Memory Training Components In Older Adults. TOM FREY, ANTONIA BRIGITTA HOGREFE, and BARBARA STUDER-LUETHI, *University of Bern*, WALTER J. PERRIG, *University of Bern* — The study disentangles the transfer effects of different working memory (WM) training components in a sample of older adults (N = 30). Transfer effects of simple span training (storage component) and complex span training (storage and processing component) were directly compared and effects contrasted with a passive control group. After two weeks of training (14 training sessions) training groups showed training component specific near transfer effects on different WM measures. Furthermore, the complex span training

elicited higher far transfer on a face-memory task. No differences in transfer on self-reported daily cognitive failures between the two training groups were found. Our results demonstrate the specific effects of different WM training components. These should be considered when aiming to stabilize the effect of cognitive training in the population of older adults.

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(2050)

Exploring A New Way Of Training The Brain—A Randomised Control Trial. PER TRADS ØRSKOV and ERIN L. BEATTY, *University of Southern Denmark* — Vocational and upper secondary students (N=320) completed brain training as part of their weekly class schedule. The brain training devised in this study was diverse and involved different games and tasks. Some of the games were ball games or gymnastics while others involved mental puzzles combined with physical movement. The training was primarily done in small groups. The focus was on adaptive training of attention, simultaneous capacity, and working memory rather than on skill mastery. The training emphasised metacognitive skills such as remaining engaged with difficult tasks and persistence in response to failure. The hypothesis being that these metacognitive strategies may show greater transfer to other contexts than specific skills. The variations in learning context were designed to increase the generalizability of the skills acquired. Students were tested before and after a 12-week intervention which included a control group. We will be examining transfer to multiple complex cognitive tasks including working memory matrix span. Analyses are ongoing.

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(2051)

Is Subjective Organization Based On Associative Processes In Episodic Memory? An Aging Study. LAURENCE TACONNAT, *University of Tours, UMR-CNRS 7295, CeRCA*, VINCENT FERRANDEZ, LUCIE ANGEL, and BADIÂA BOUAZZAOUI, *University of Tours UMR-CNRS 7295, CeRCA*, ERIKA BORELLA, *University of Padova*, SÉVERINE FAY and SANDRINE VANNESTE, *University of Tours UMR-CNRS 7295, CeRCA* — Organizational processes, quantified by the Pair Frequency index, PF, are revealed when participants recall some items in the same order from a trial to another, suggesting newly formed associations among list items. Creation of new associations is based on associative memory processes. Both subjective organization and associative memory are impaired in old age. Decline in associative memory could be explained by low capacities in working memory (WM). However, no study has yet explored the link between subjective organization and associative memory. Young and older adults performed episodic memory tests and WM tests. WM, recall, PF, and recognition of word-pairs were impaired in old age. PF index was correlated to the performance to the word-pairs recognition and to WM, but not to the recognition of words alone. Our results suggest that subjective organization and recognition of word-pairs are based on similar cognitive mechanisms and underlined by WM.

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(2052)

Learning Non-Utilitarian Moral Rules: Preference Reversals In Utilitarian Choice. ROSE MARTIN and PETKO KUSEV, *The University of Huddersfield*, PAUL VAN SCHAIK, *Teesside University* (Sponsored by Petko Kusev) — Previous decision-making research has investigated factors that influence moral utilitarian choice involving human life including: personal

involvement (Greene et al., 2001), accessibility to utilitarian information (Kusev et al., 2016), utility content (Gold et al., 2013), and utility ratio (Martin & Kusev, 2016). However, no experimental studies have investigated the influence of associative learning on moral choice, despite associative learning having been found to influence rational choice in non-morally sensitive decision-making tasks (Kusev et al., 2017). Accordingly, we devised an associative learning method/task in order to investigate whether newly learned moral rules induce rational utilitarian choice. Our results revealed that respondents who learned non-utilitarian moral rules were less utilitarian/rational than respondents who did not receive moral rule learning. We further demonstrated a preference reversal in utilitarian choice - from utilitarian-rational to utilitarian-irrational. The results therefore indicate that respondents follow learned non-utilitarian moral rules as opposed to utilitarian rules and strategy.

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(2053)

Trial Sequencing Influences Rule-Based Transfer In Human Contingency Learning. HILARY DON, MICAH GOLDWATER, JUSTINE GREENAWAY, ROSALIND HUTCHINGS, and EVAN LIVESEY, *University of Sydney* (Sponsored by Micah Goldwater) — The ability to recognize relational rules and transfer this knowledge to novel contexts is critical for higher-level cognition, yet people often rely on superficial features in learning. This research investigated ways to encourage rule-abstraction and transfer in contingency-learning. Participants learn a series of cue-outcome contingencies that follow an abstract rule. In patterning discriminations, two cues individually predict one outcome, while the compound of those cues predicts the opposite outcome (A+/B+/AB-). In biconditional discriminations, four cues are presented

as four pairwise compounds, two reinforced (AB+/CD+), and two non-reinforced (AC-/BD-). After learning these contingencies, participants respond to combinations of previously experienced cues, where feature- and rule-based learning predict different patterns of responding. Patterning discriminations tend to be acquired readily, and show moderate rates of rule-transfer, but biconditional discriminations tend to be more difficult to learn, and show low rates of rule-transfer. The effect of manipulating trial frequency differed depending on discrimination difficulty.

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(2054)

Training Can Enhance Precision Of Color-Representations In Visual Long-Term Memory. REBECCA OVALLE FRESA and NICOLAS ROTHEN, *University of Bern* (Sponsored by Nicolas Rothen) — Training can enhance higher cognitive functions (e.g., memory). Due to binary response space paradigms, enhancements are almost exclusively observed on quantitative levels (e.g., probability of successful recall from memory). However, it remains to be elucidated if training can also result in qualitative enhancements (e.g., precision of recalled memory representations). Using an object-color association task and a mixture modeling approach to estimate recall precision and recall probability, we investigated if training can enhance color representations in visual long-term memory (VLTm). Over the course of several training sessions, participants learnt specific object-color associations. Thereafter, participants' recall abilities were tested for novel object-color associations. Interestingly, improvements in recall precision and probability were not only observed for trained associations but also for novel associations. We conclude that training can also lead to qualitative enhancements of higher cognitive functions.

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Metamemory and Metacognition

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

METAMEMORY AND METACOGNITION

(2055)

Defending And Reducing Belief In Memories: An Experimental Laboratory Analogue. ALAN SCOBORIA, *University of Windsor*, GIULIANA MAZZONI, *University of Hull*, HENRY OTGAAR, *Maastricht University* — When receiving disconfirmatory social feedback about recollected events, people sometimes defend and sometimes reduce belief that the event genuinely occurred. These studies examined the effect of social challenges made to correctly recalled memories for actions performed in the lab. Adult participants performed, imagined or heard action statements. One week later they completed a source monitoring test and rated actions on belief in occurrence and recollection. Four correctly recalled performed actions were challenged prior to making the ratings during the test (Study 1, $N=44$) or after making the initial ratings (Study 2, $N=85$). Across studies challenges were associated with lower belief in occurrence and recollection ratings compared to control items, and belief was affected to a greater extent than recollection. Challenges during the test produced more instances of defense, while challenges following the test produced more instances of reduction. A closer analysis showed that some participants always defended, some always reduced, and some

both defended and reduced belief. Responses to the first challenge positively predicted subsequent responses. The procedure in Study 2 produced a variety of types of nonbelieved memories.

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(2056)

Failures In Metacognition: Reducing Errors In Performance And Learning Through Subtle Cues. DEREK J. HANSON and VERONICA X. YAN, *University of Texas at Austin* (Sponsored by Veronica Yan) — We use metacognitive processes to monitor and control our learning, but what happens when they let us down? When students perform poorly on exams, sometimes it may be because they do not know the answer. But other times, it is because they misread questions or fall prey to intuitive lures. These errors can happen even when they possess the requisite knowledge to answer the question; the errors may have been avoided had they engaged a deeper level of processing. Experimentally, these types of slips may be represented by associative, intuitive (i.e., 'system 1') responses to semantic illusions or cognitive reflection test questions. In our research, we examine several educationally-relevant cues that may guide students toward engaging more systematic, deliberate (i.e., 'system 2') processing and reasoning. Our studies ask whether there are subtle things that teachers may do in the classroom to elicit deeper thinking from their students.

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(2057)

Social Desirability: When Others Have Confidence In Me. YOONHEE JANG, *University of Montana*, HEUNGCHUL LEE, *NI Research*, ABIGAIL FEINBERG and LISA K. SON, *Barnard College, Columbia University* — The goal of the study was to explore whether another's confidence judgments in our own abilities affect our views of them. Participants were presented with a 2-session survey. For each session, they were asked to imagine having taken an exam and then told that four class peers would predict the participant's performance on the exam. Two of the peers predicted that the participant would receive a high score; the other two, a low score. Self-predictions of each participant varied as well, resulting in 4 scenarios: *Person A 90%; you 90%, Person B 90%; you 70%, Person C 70%; you 90%, Person D 70%; you 70%*. In all cases, participants were then told their actual performance was 80%. Across the 2 sessions, respectively, participants were asked to rank Persons A-D for "who they would get along with better" and "who they thought noticed them better". Results showed that participants ranked Person B as highest in session 1, suggesting that when other's confidence surpasses self-confidence, they appear more likeable, but Person D as highest in session 2, suggesting that matching confidence drives the ranking. These data are the first to suggest that the confidence that we receive from others is crucial in how we choose our social groups. Email: Yoonhee Jang, yoonhee.jang@umontana.edu

(2058)

How Does Mood Influence Monitoring Of Learning For Emotional Material? AMBER E. WITHERBY, SARAH "UMA" TAUBER, and MICHAEL GOODRICH, *Texas Christian University* (Sponsored by Sarah "Uma" Tauber) — People typically give higher judgments of learning (JOLs) to emotional items (e.g., bomb, circus) relative to neutral items (e.g., fabric, cork). Although this emotional salience effect has been replicated multiple times, few researchers have investigated how it is influenced by one's mood. From the mood-congruent perspective, participants should give higher JOLs to items that match their mood (e.g., negative mood, negative item) relative items that do not (e.g., negative mood, positive item). To investigate this issue, participants either underwent a negative mood induction procedure or did not. Participants who did not receive the induction procedure were in a neutral mood. Participants studied and made JOLs for positive, negative, and neutral material. Finally, participants took a free-recall test. Of most interest, no mood-congruent effects were evident on JOLs. Instead, participants gave higher JOLs to emotional items relative to neutral items. Of less interest, mood had inconsistent effects on memory. Email: Amber Witherby, amber.witherby@tcu.edu

(2059)

Judgments Of Learning Influence Memory: Evaluating The Changed Goal Hypothesis. MICHELLE L. RIVERS, JESSICA JANES, and JOHN DUNLOSKY, *Kent State University* (Sponsored by John Dunlosky) — When learners make *judgments of learning* (JOLs) for some items but not others, how is recall performance affected? To address this question, we evaluated the *changed-goal hypothesis*: The act of making JOLs leads learners to notice differences in item difficulty and allocate more resources to learning easier items, which leads to higher recall performance for these items. Participants studied related (i.e., easier items) and unrelated word pairs and made JOLs for half of the pairs. Pair type was either mixed in a list or blocked, with all related pairs being presented first followed by unrelated pairs for one group or vice-

versa for the other. Recall for the mixed list was greater for related pairs that were judged than not judged. However, results suggest JOLs do not always increase memory performance. As predicted by the changed-goal hypothesis, no recall differences occurred between judged and nonjudged pairs for the blocked lists. Email: Michelle Rivers, mlrivers3@gmail.com

(2060)

Effect Of Prior Task Success Vs. Failure On Organizational Memory Strategies In Young And Older Adults. LAURENCE TACONNAT and FLORENT PINARD, *University of Tours, UMR-CNRS 7295 CeRCA* — Negative aging stereotypes (e.g., memory decreases with aging) can lead older adults to perform poorly on memory tests, but success to a previous test can lead them to increase their performance to a subsequent memory test relative to control. Stereotype threat creates intrusive thoughts which consume working memory capacities and reduce the ability to use memory strategies success on a cognitive test helps counter older adults' negative performance expectations and, in turn, leads to subsequent memory advantages. In this study, we compared the effect of failure and of success to a working memory task (WMT) on a recall test from which an index of organizational strategy was computed (PF index) in young and older adults. This index reflects the subjective organizational strategy, a strategy highly resource dependent. Our results that success to the WMT increased memory performance and organizational strategy in comparison to control, while failure to the WMT decreased them. Email: laurence.taconnat, laurence.taconnat@univ-tours.fr

(2061)

Effects Of Delayed Judgments Of Learning In Metamemory Illusions: A Meta-Analysis. KARLOS LUNA, *University of Minho*, BEATRIZ MARTIN-LUENGO, *Higher School of Economics*, PEDRO ALBUQUERQUE, *University of Minho* — Perceptual characteristics of studied items (e.g., font size) affect judgments of learning (JOLs) and restudy decisions. We tested whether delayed JOLs could reduce or eliminate that effect. We conducted a meta-analysis of 28 experiments in which participants studied items presented in either large or small font. JOLs and, sometimes, restudy decisions were collected either immediately or after a delay. Finally, participants completed a memory test. The results confirmed the effect of the font size on JOLs and restudy decisions. Delayed JOLs reliably reduced the effect of perceptual characteristics on JOLs, although the effect was still significant after a delay. For restudy decisions, the delayed procedures only reduced numerically the effect. A very subtle memory advantage for items presented in large font was also found. We conclude that, after a delay, information about font size is not available for some items, causing a reduction in the effect. Email: Karlos Luna, karlos.luna.ortega@gmail.com

(2062)

Word Frequency And Judgment Of Learning: The Role Of (In)congruent Prompts. PEDRO SIMÃO MENDES, KARLOS LUNA, and PEDRO B. ALBUQUERQUE, *School of Psychology, University of Minho* (Sponsored by Karlos Luna) — Judgments of Learning (JOLs) are usually higher for High Frequency words (HFW) than for Low Frequency words (LFW). These findings have been attributed to the belief that HFW will be better remembered than LFW. However, in Study 1, participants were presented with lists of words with increasing differences in word frequency and results showed that they did not notice differences in word frequency. In Study 2, we made explicit the presence of words

with different frequencies through incongruent and congruent prompts. Pre-study JOLs were higher when participants believed they would see a HFW rather than LFW; Immediate JOLs were higher for HFW than for LFW, regardless of previous prompt. Correct recall was higher for HFW than for LFW, and higher for congruent than incongruent prompts. Together, these results suggest that word frequency may only affect JOLs if participants notice it as an observable cue.

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(2063)

A Winner-Takes-All Confidence-Calculation For Forced-Choice Recognition Memory. KIYOFUMI MIYOSHI, AYUMI KUWAHARA, and JUN KAWAGUCHI, *Nagoya University* — Using a brand-new signal-detection-theory-based approach, Experiment 1 of this study revealed that the internal confidence for two-alternative forced choice (2-AFC) recognition memory is calculated in a winner-takes-all manner; signal strength for either of a pair of stimuli selectively determines confidence. Similar winner-takes-all confidence-calculation has been reported in different kinds of visual perception tasks, which confirms it as a domain-general metacognitive heuristic. Furthermore, using a less common 2-AFC recognition memory task to select a new stimulus, Experiment 2 elucidated the underlying mechanism of this confidence-calculation heuristic. Previous studies assumed that the signal strength for the selected stimulus selectively determines confidence and that for the unselected stimulus is

disregarded (post-decisional confirmation bias). However, the present study demonstrated that the strength of stronger signal selectively determines confidence and that of weaker signal is disregarded. That is, a winner in signal competition, not in response selection, takes all.

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(2064)

Metacognitive Accuracy In Working Memory Task: Domain Specific Or Domain General. SEOK SUNG HONG, *Ajou University*, JINHEE BAE, *Catholic Kwandong University International St. Mary's Hospital and Incheon St. Mary's Hospital*, SANGWOO CHOI, SEULGI SON, and SUNHWA LEE, *Ajou University* (Sponsored by Yoonhee Jang) — This study investigated whether there is a relationship between one's metacognitive monitoring ability and task performance, and whether the monitoring ability was domain-specific or domain-general. Participants performed working memory tasks in two domains: verbal and nonverbal-spatial. After studying the presented stimuli, they took a recall test and made retrospective confidence judgments on their accuracy. The results indicated that the better the performance, the higher the monitoring accuracy. In addition, both performance and monitoring accuracy differed significantly between domain areas. Our data suggest that metacognitive ability, like other cognitive functions, may also be domain specific.

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Neural Mechanisms

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

NEURAL MECHANISMS

(2065)

Did I Do That? Placebo tDCS Affects Feelings Of Agency And Neural Responses To Errors (ERN). SUZANNE HOOGEVEEN, *University of Amsterdam*, UFFE SCHJOEDT, *University of Aarhus*, MICHEL VAN ELK, *University of Amsterdam* — This study examined the effects of expected transcranial stimulation on the error-related negativity (ERN) and the sense of agency in individuals performing a cognitive control task. Placebo transcranial direct current stimulation (tDCS) was used to elicit expectations of transcranially-induced cognitive improvement or impairment. The improvement/impairment manipulation affected both the ERN and the sense of agency (i.e., whether participants attributed errors to oneself or the brain stimulation device): Expected improvement increased the ERN in response to errors compared to both impairment and control conditions. Expected impairment made participants falsely attribute errors to the brain stimulation. These results show that expectations about brain stimulation impact users' neural response to self-generated errors and sense of agency. The findings suggest that violations of positive performance expectations elicit a prediction error signal which might reflect extra distress in response to errors. Additionally, brain stimulation devices may falsely relieve users of their sense of responsibility when actions lead to negative outcomes.

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(2066)

Executive Control Training Benefits Context Processing In Healthy Older Adults. MARÍA JESÚS MARAVER, *University of Granada*, CARLOS J. GÓMEZ-ARIZA, *University of Jaén*, ERIKA BORELLA, CLAUDIA CERUTTI, and EUGENIO FRANZESE, *University of Padova*, M. TERESA BAJO, *University of Granada* (Sponsored by Carlos J. Gómez-Ariza) — Aging entails a progressive decline in executive functions and, in particular, in the ability to maintain contextual information and task-related goals. Because the brain remains plastic throughout the lifespan, recent research is showing that age-related deficits could be compensated by cognitive training. Here, we explored the effects of a program of executive control training in healthy older adults as compared to an active control condition that only targeted speed processing. As an outcome measure, we used the AX version of the Continuous Performance Task, and looked at behavioral performance and brain activity through event-related potentials. Only executive-control training made older adults more efficient at responding to contextual cues and led to increased amplitude in prefrontal cortical regions. In contrast, no benefits were found after speed training. Our results suggest that executive-control training benefits goal maintenance and context processing and further support the existence of brain plasticity during healthy aging.

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(2067)

Cingulate Cortex And Calcarine Grey Matter Volumen Reduction In Neglectful Mothers. INMACULADA LEÓN and MARÍA JOSEFA RODRIGO, *Universidad de La Laguna*, ILEANA QUIÑONES, *BCBL*, SONIA BYRNE, *Universidad de La Laguna* — Although many studies have evidenced that early neglect or abuse alter the child's gray and white matter brain organization, the neurological bases that underpin and sustain maternal neglectful behavior remain quite less explored. Previous studies have investigated white matter deficits or a attenuated response to infant crying faces in Neglectful mothers. In this study 24 Neglectful Mothers and 24 Control Mothers underwent an anatomical MRI brain scans. Using Voxel Based Morphometry Analysis we show that Neglectful Mothers renders substantial changes also in brain structure. Primarily reductions in gray matter volumen in regions subserving visual processing like calcarine area or maternal behavior like cingulate cortex were found. Our data provide the first evidence of structural gray matter deficits in Neglectful mothers. All together with white matter alterations in visual tracts and reduced activation in face-related processing areas our present results help further to elucidate the neural basis of inadequate parenting.
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(2068)

Neural Substrates For Rapid Automatized Naming In Chinese Poor Readers: An Optical Imaging Study. HSIN-CHIN CHEN CHEN, ZIH-YUN YANG, and PENG-YU CHEN, *National Chung Cheng University* — Although performance on rapid automatized naming (RAN) has been suggested to be highly related to reading abilities in children, no previous hemodynamic study has specifically examined the neural correlates of RAN, probably due to motion artifacts. The present study examined different brain activation patterns in RAN between children with normal and poor reading abilities applying near infrared spectroscopy (NIRS), which measures blood flow changes in the brain and is more susceptible to motion artifacts compared to fMRI. A group of normal children and a matched group of poor readers were recruited. Both groups of children were tested with the traditional RAN while neuroimaging measures were obtained using NIRS. Comparing to normal children, poor readers generally showed weaker activation in the inferior frontal cortex and stronger activation in the occipito-temporal cortex, suggesting their increasing efforts in compensating deficits in integrating symbols and names. Our results also revealed cross-linguistic neural differences.
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(2069)

Exploring The Neural Substrates Of Misinformation Processing. ANDREW JAMES GORDON, STEPHAN LEWANDOWSKY, SUSANNE QUADFLIEG, and JON BROOKS, *University of Bristol*, ULLRICH ECKER, *University of Western Australia* (Sponsored by Stephan Lewandowsky) — Information that is initially thought to be correct but then revealed to be false often continues to influence human judgement despite people being aware of the retraction. Yet little research has examined the underlying neural substrates of this 'continued influence effect of misinformation' (CIEM). To address this question, 26 adults underwent functional magnetic resonance imaging (fMRI) while listening to narratives which either involved a retraction of prior information or not. Following each narrative subjects' inclination to rely on retracted information was probed. It was found that retracted information

continued to affect participants' reasoning. In addition, the fMRI data indicated that the CIEM may be due to a breakdown of narrative-level integration and coherence-building mechanisms implemented by the precuneus and posterior cingulate gyrus.
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(2070)

A Model-Based Cognitive Neuroscience Account Of Individual Differences In Cognitive Abilities. ANNA-LENA SCHUBERT, *Heidelberg University*, MICHAEL D. NUNEZ and JOACHIM VANDEKERCKHOVE, *University of California, Irvine* — Previous research has shown that both neural processing speed and reaction times are related to general cognitive abilities. In the present study, we constructed a hierarchical Bayesian mediation model to assess the latent relationship between latencies of ERP components associated with higher-order processing (P2, N2, P3), drift rates in three binary choice tasks, and performance in two cognitive abilities tests. We observed a strong association between neural processing speed and general cognitive abilities in the way that individuals with greater cognitive abilities showed shorter ERP latencies. Moreover, we found that individuals with greater neural processing speed also showed a greater velocity of evidence accumulation. However, the association between neural processing and general cognitive abilities was not mediated by individual differences in drift rates. These results contradict the idea that a greater speed of neural information processing facilitates evidence accumulation, and that this increase in the velocity of evidence accumulation directly translates to advantages in general cognitive abilities.
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(2071)

Stopping Speed And GABAergic Activity In The Motor Cortex. NAHIAN SHAH, AT CHOWDHURY, EVAN JAMES LIVESY, and JUSTIN ANDREW HARRIS, *University of Sydney* (Sponsored by Evan Livesey) — In our project, we determined whether GABAergic activity in the motor cortex, as measured using paired-pulse transcranial magnetic stimulation, could distinguish people who had fast stop signal reaction times (SSRT) from those who had slow SSRTs. In two experiments, participants completed the Stop Signal Task while we measured GABAergic activity from the motor cortex. In Experiment 1, GABAergic activity was measured at fixed time points after the onset of the stop signal (50ms, 100ms, 150ms, 200ms); in Experiment 2 GABAergic activity was measured at fixed time points before the end of the SSRT interval (-25ms, -75ms, -125ms). We performed a median split of the SSRT scores for the 30 participants in each experiment to classify participants as fast vs. slow stoppers. Participants classified as fast stoppers had stronger GABAergic activity than those classified as slow stoppers across both response execution (Go) trials and inhibition (Stop) trials. We also found that fast stoppers could more effectively control GABAergic activity to inhibit motor cortical excitability when stopping a response and disinhibit excitability when executing a response. These results further our understanding of the biological basis for cognitive control.
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(2072)

Attention Modulates Event-Related Spectral Power In Multisensory Self-Motion Perception. BEN TOWNSEND, JOEY LEGERE, SHANNON O'MALLEY, MARTIN VON MOHRENSCHILDT, and JUDITH M. SHEDDEN, *McMaster*

University (Sponsored by Scott Watter) — Humans combine visual and physical cues to motion during self-motion perception. Theta and alpha-band oscillations have been associated with the processing of visual motion (optic flow). Beta-band oscillations have been shown to be associated with sensory-motor processing (walking, etc.). The present study provides evidence that attending to a specific unisensory cue during passive self-motion modulates theta, alpha, and beta oscillations. We recorded event-related spectral power within a motion simulator controlled by a MOOG Stewart platform. Participants were given simultaneous visual and

physical motion stimuli and made heading direction judgments while attending to either the visual or physical cues. We found greater occipital theta desynchronization when stimuli were presented spatially incongruent while participants judged their physical heading. Within the motor cortices we found greater beta desynchronization and later theta synchronization when subjects attended to physical motion, and greater alpha desynchronization and earlier theta synchronization when subjects attended to visual motion.

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Reasoning and Problem Solving

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

REASONING AND PROBLEM SOLVING

(2073)

Too Much On My Mind - Inhibiting Irrelevant Information Impairs Reasoning Ability. GIDON T. FRISCHKORN, ANNA-LENA SCHUBERT, and DIRK HAGEMANN, *Heidelberg University* (Sponsored by Jan Rummel) — Recent theories of intelligence (e.g. Process-overlap theory, Kovacs & Conway, 2016) emphasize the role of attentional control mechanisms or executive functions as one of the core processes underlying reasoning ability and general intelligence. This poster presents an experimental approach that investigates the role of inhibition in a matrix reasoning task. Specifically, we introduced an additional color rule to the figural matrices that could have the same correct response (i.e. congruent) or another response (i.e. incongruent). Participants solved fewer matrices with incongruent color rules than matrices with congruent color rules, indicating that inhibition may play an important role in matrix reasoning. Moreover, the manipulation of inhibition with color rules was successful, as participants selected the correct colored distractor in incongruent matrices more often than other distractor items. All in all, these results support the theoretical idea that attentional control mechanisms, such as inhibition, may underlie complex cognitive abilities such as reasoning or general intelligence and provide a possibility for an experimental design investigating cognitive processes underlying reasoning and intelligence.

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(2074)

Answering Singular Causation Queries: The Role Of Temporal And Mechanistic Information. SIMON STEPHAN and MICHAEL R. WALDMANN, *University of Göttingen* (Sponsored by Michael Waldmann) — Causal queries about singular cases are ubiquitous, yet the question of how we assess whether a particular outcome was actually caused by a specific cause factor turns out to be difficult to answer. For example, the mere fact that two factors are generally causally connected (e.g., smoking causing lung cancer) does not imply that a singular instantiation of these factors (e.g., Peter's smoking and his lung cancer) represents a causal relationship — it might be a mere coincidence. Relying on the causal power approach, Cheng and Novick (2005) proposed a model of causal attribution intended to help answering singular causal queries. We challenge this model, both conceptually and empirically. One central problem is that the model treats the presence of sufficient causes as necessarily causal in singular

causation and thus neglects that causes can be preempted in their efficacy. Another shortcoming of the model is that it does not address the question why mechanism information appears to be particularly valuable when it comes to singular causation judgments. We present a new model (SISC) that provides answers to these two questions. We present several experiments that support the predictions made by SISC.

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(2075)

Conspiracy Theories In Transitional Society: Cognition, Personality, Or Culture-Which Contributes The Most? MIRJANA TONKOVIC, JASMINA TOMAS, and ANDREA VRANIC, *University of Zagreb* — Research on conspiracy theories finds stable individual differences in general tendency towards conspiracist ideation. This tendency is associated with other relatively stable cognitive and personality traits, as well as sense of powerlessness, anomie or support for democratic principles which could be culturally specific. The aim of this study was to investigate potential predictors of beliefs in conspiracies' theories on a Croatian adult sample ($N=340$; 51% female). The Generic Conspiracist Beliefs Scale (Brotherton, French & Pickering, 2013), Rational and Experiential Multimodal Inventory (REIm; Norris & Epstein, 2011), Right-Wing Authoritarianism Scale (RWA; Zakrisson, 2005) and Powerlessness Scale (Neal & Groat, 1974) were used. In line with hypotheses, results showed positive correlation of generic conspiracist ideation with intuitive thinking style, powerlessness and right-wing authoritarianism and negative correlation with rational thinking style. Taken together, along with the level of education and experience with conspiracy theories, these predictors explain 28% of the variance of generic conspiracist ideation.

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(2076)

Group Creativity And The Incubation Effect. QICHEN ZHAO and BEVERLY ROSKOS, *University of Alabama, Tuscaloosa* (Sponsored by Beverly Roskos) — Nearly all previous studies of incubation effect in creativity have focused on individual creativity. In this study, we tested whether there is an incubation effect in group creative activities, and whether it matters what one does during incubation period. Participants (dyads) worked on an alternative uses task (AUT) for 3 min, then "incubated" for 2 min, and then worked another 3 minutes on the same AUT item. Four incubation conditions were tested: no incubation (continuous working), rest, and low- vs. high-cognitively demanding activities. Tests of responses creativity (uniqueness) showed that (a) there



is an incubation effect for dyads, (b) creativity is higher after cognitive activity vs no activity, and (c) there was no difference in creativity between the low- vs. high-cognitive demanding tasks. Overall, this study can shed light on ways we can increase group creativity in various real-life environments (e.g., schools, factories, organizations, etc.).

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(2077)

The Role Of High-Level And Low-Level Mechanisms Of Changing The Format Of Representation In Insight Problem Solving. ALEXANDRA CHISTOPOLSKAYA, *P.G. Demidov Yaroslavl State University*, NATALIA LAZAREVA, *PG Demidov Yaroslavl State University* — Introduction. Specific mechanisms of the adequate representation constructing in the insight problem solving are investigated in this paper. Two mechanisms of changing the problem representation are proposed in the Ohlsson's model, there are the chunk decomposition and the constraint relaxation. The chunk decomposition is mainly visual, perceptual, low-level process. The constraint relaxation is mainly conscious, propositional, high-level. We have made an attempt to expand this model and add two mechanisms of problem representation changing. There are the propositional chunk decomposition and the perceptual constraints relaxation. Thus, we obtain a complete model of possible variants of the problem representation changing. Method. S.Ohlsson used only visual insight problems. In our studies, we use problems of different representation formats. Results. The results allow to conclude an important role of the problem representation format in the process of problem restructuring in insight problem solving. We have shown that S. Olsson's model is not complete, and the mechanisms proposed by him are not universal.

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(2078)

You Can't Always Know What You Need: A Concurrent Think Aloud And Eye Tracking Analysis Of A Tool Design Process. ALEKSANDRA KASZOWSKA, QIANWEN WAN, KAREN

PANETTA, WILLIAM C. MESSNER, and HOLLY A. TAYLOR, *Tufts University* (Sponsored by Holly Taylor) — Human factors design provides an interesting venue for understanding problem solving. Designed solutions address the problem at hand and also ideally account for end user characteristics. But what happens when the designer possesses little knowledge about the end user, yet must still design a solution? We invited 45 engineering and human factors design students to design a tool aiding completion of a mundane sorting task (organizing varied Lego blocks according to a reference image). Participants designed a tool for a known (human), unknown (robot), or team (human + robot) operator. Current work compares how participants conceptualize a known (human) versus unknown (robot) end user capabilities while designing. Cognitive discourse analysis on verbalizations accompanying early stages of tool design demonstrated that designers strongly rely on mental models of their end users in conceptualizing solution paths. Further analysis incorporates mobile eye tracking data from design sessions.

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(2079)

Role Of Movements In Insight Problem Solving. NIKITA LOGINOV and ANDREY KURGANSKY, *Russian Academy of National Economy and Public Administration* — Our research is aimed to demonstrate the functional role of the motor activity in insight problem-solving. We investigate the classical insight nine-dot problem. In contrast to well-known approaches in cognitive psychology, in which motor activity in problem-solving is considered just as a way for implementing a solution (for example, drawing the correct sequence of lines in case of the nine-dot problem), we assume that movements of a solver enter the "core" of the solving process. A tablet was used to register the motor activity parameters (length of the motor units, velocity of implementation of the motor units, duration of the pauses between the motor units) and to present conditions of the problem. As a result, significant difference in motor activity between successful and unsuccessful solvers in the final stages of the solving was found. It was found out that the solvers significantly exceed the non-solvers in on-line planning on the last third of the solving (distinction between on-line and off-line planning proposed in Wilson, 2002).

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Speech Perception

Friday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

SPEECH PERCEPTION

(2080)

The Effect Of Orthography On The Perception Of Pronunciation Variants. JEANNE CHAROY and ARTHUR SAMUEL, *Stony Brook University* (Sponsored by Arthur Samuel) — Previous research has shown that canonical pronunciations of spoken words are recognized as well as their reduced pronunciations, even when the latter are more frequent (e.g. *pre/t/y* vs. *pre/v/y*). The current study investigated the influence of orthography on the recognition of pronunciation variants. Listeners learned novel words presented with the reduced pronunciation (e.g. *pre/r/y*), in one of three orthographic conditions: (1) no accompanying orthography, (2) spelling consistent with the canonical pronunciation (e.g. "pretty"), or (3) spelling consistent with the reduced pronunciation (e.g. "preddy"). Listeners erroneously accepted the canonical

pronunciation of words at a higher rate when they had learned spellings consistent with it. These results remained robust after a consolidation period of 48 hours. Our findings suggest that orthography plays an important role in the recognition of spoken words and that it is a significant factor driving the canonical pronunciation advantage observed in previous studies.

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(2081)

Perceptual Tolerance To The Temporal Degradation Of Speech In L1 Vs. L2. MAKOTO ISHIDA, *Japan Society for the Promotion of Science*, TAKAYUKI ARAI, *Sophia University*, MAKIO KASHINO, *NTT Communication Science Laboratories* — The current study examines the perceptual tolerance of native and non-native speakers towards the two kinds of temporal degradation of speech. The first degradation was generated by dividing speech

signal into equally-timed segments from the onset of speech (e.g., 110 ms), and flipping every segment on a temporal axis. The second degradation was generated by filtering the modulation frequency components of speech signal (e.g., 8 Hz as cut-off frequency), which leads to the alteration of shape of the temporal envelope of speech. Participants were native English speakers and native Japanese speakers who spoke English as a second language. They listened to degraded speech in English, and transcribed what they heard. The results suggest that native speakers are generally better at decoding degraded speech than non-native speakers, but the gap between native and non-native speaker's performance gets smaller as higher degradation is imposed – longer reversed segment length and lower cut-off frequency.

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(2082)

Do Individual Differences In Brain Potentials Reflect L2 Learning Potentials? LISETTE JAGER and JURRIAN WITTEMAN, *Leiden University Centre for Linguistics*, JAMES MCQUEEN, *Donders Institute for Brain, Cognition, and Behaviour*, NIELS OLAF SCHILLER, *Leiden University Centre for Linguistics* (Sponsored by Niels Schiller) — The present study will examine whether individual variation in ERP components during L2 perception predicts subsequent L2 pronunciation proficiency. We will investigate this by examining perception and production of L2 while measuring ERPs, once in the beginning of the first academic year (T1) of Dutch students' classes in English, and once at the end of the academic year (T3). We will use a passive oddball paradigm with simultaneous EEG recordings to present /ε/ as standards. As deviants, we will present Dutch /ɪ/, English /æ/ (a contrast reflecting phonological interference between L1 and L2) and English /ε/ (a contrast reflecting sub-phonemic differences in surface realization between languages). Critically, we will test for the first time whether individuals who show a larger increase in neural discrimination over time will improve more in L2 pronunciation. Preliminary results indicate that students are able to discriminate the control and phonological contrast at T1 (i.e. /ε/ - /ɪ/ and /ε/ - /æ/), but are unable to do so for the phonetic contrast (i.e. Dutch /ε/ and English /ε/). At the final session, participants also show a large increase in neural discrimination for the phonetic contrast.

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(2083)

Lip-Read Speech But Not Sentential Context Produces Top-Up Effect On Lexical Bias. MARTIJN BAART, *Tilburg University, and Basque Center on Cognition, Brain, and Language*, JEAN VROOMEN, *Tilburg University* (Sponsored by Jean Vroomen) — Speech perception is supported by various types of context such as lip-read information, the internal lexicon, and sentential information. Here, we determined how lexical bias (i.e., an ambiguous phoneme /ʔ/ in between /p/ and /t/ embedded in 'ark' will be perceived as /p/, not as /t/) is affected by additional lip-read information and sentence context. Lip-read information increased the lexical bias effect, but sentence context did not. Although sentence context is thus subsidiary to lexical information, the top-up effect of lip-read information on lexical bias supports the general notion that multi-sensory percepts are more reliable than uni-sensory ones.

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(2084)

Tasks, Talkers, And The Perceptual Learning Of Time-Compressed Speech. MARAM TARABEIH-GHANAYIM, *University of Haifa*, YIZHAR LAVNER, *Tel-Hai College*, KAREN BANAI, *University of Haifa* — Many auditory skills (e.g., the recognition of perceptually-difficult speech) improve with training, but the generalization of this learning to untrained materials is limited. This study examined the effects of the trained task and of talker variability on the perceptual learning of time-compressed speech. Five groups of participants (n=80) were tested twice on the recognition of time-compressed speech. One group was an untrained control group; the other groups completed 45 minutes of training between the two tests. The Trained task was either semantic verification or accent judgement. One of the groups trained on each task was exposed to 6 different talkers during training while the other was exposed to two talkers only. Across groups, training led to substantial learning of the trained tokens and to generalization across talkers but not to untrained sentences. Semantic training yielded more learning and better retention over time than acoustic training. Talker variability had only marginal effects. These results suggest that learning of time-compressed speech is robust and only partially task specific, but its generalization to untrained tokens is limited.

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(2085)

Spatial Unmasking Of Speech In The Absence Of Attention. BENJAMIN H. ZOBEL, RICHARD L. FREYMAN, and LISA D. SANDERS, *University of Massachusetts Amherst* (Sponsored by Lisa Sanders) — Spatial separation between target and masking speech helps listeners solve the cocktail party problem. Researchers have posited that when target and masker are confusable, significant masking release comes from perception of spatial separation, allowing listeners to better direct attention to the target and ignore the masker. Recent ERP evidence, however, shows dramatic improvement in target representation at early perceptual stages, suggesting that the spatial cue may facilitate bottom-up processing of target speech (Zobel et al., 2016). The present ERP study examined the role of attention in the spatial unmasking of speech. Target words were presented with masking speech when 1) target and masker were co-located, and 2) target and masker were separated perceptually by adding an identical masker at another location. When listeners attended to the sounds, auditory evoked potentials were elicited by target words only when they were perceptually separated from the maskers, replicating previous findings. Importantly, similar modulation of ERPs was observed when listeners directed attention away from the auditory modality. These results suggest that spatial unmasking of speech begins at preattentive stages of perceptual processing.

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(2086)

Voice Imagination Priming Of Voice Recognition. BRYAN SHILOWICH and IRVING BIEDERMAN, *University of Southern California* (Sponsored by Irving Biederman) — A web-based behavioral task assessed the psychophysics of voice recognition as primed by voice imagination. Prior research (Xu et al, 2015; Shilowich & Biederman, 2016) of phonagnosia (the auditory homologue of prosopagnosia) revealed a correlation between voice recognition abilities and voice imagination abilities. In the present study, subjects performed a voice recognition task. Cued by a celebrity headshot, a 1-2 second voice clip played, and subjects had to choose whether or not the spoken voice matched



the cued identity. In the imagination priming condition, the task was the same, but before each trial the celebrity identity and the words spoken in the auditory sample were printed on the screen; subjects were prompted to imagine the celebrity target speaking the target phrase before continuing. For trials with the

most familiar celebrities (familiarity with targets was assessed by separate pretest), subjects performed 393 ms faster with 8% greater accuracy on priming trials. To the authors' knowledge, this is the first exploration of voice recognition facilitation by voice imagery. Email: Bryan Shilowich, shilowic@usc.edu

POSTER SESSION 3 Action and Perception

Friday
Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

ACTION AND PERCEPTION

(3002)

Modulation Of Visually-Guided Action By The Image Size And Known Size Of Real-World Objects. CHRISTINE GAMBLE and JOO-HYUN SONG, *Brown University* (Sponsored by Joo-Hyun Song) — We investigated how two aspects of real-world object size perception —the *image size* presented on a screen and *known size* in the real world—affect goal-directed action. Participants reached to touch one of two simultaneously presented objects based on either their image or known size, which could be *congruent* or *incongruent* (e.g., an elephant image was larger or smaller than a rabbit image, respectively). We observed that compared to congruent, incongruent sizes led to slower movements, with trajectories that curved towards the incorrect object. This effect occurred in both the image and known size tasks even though each measure was independent, suggesting interference between the two. However, the disadvantage was more pronounced in the known size task, and increased as the known size difference between the objects increased. Taken together, this suggests that both image and known size automatically modulate action towards real-world objects, with greater influence from image size.
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(3003)

The Simon Effect In The Presence Of Avatars. CHRISTIAN BÖFFEL and JOCHEN MÜSSELER, *RWTH Aachen University* (Sponsored by Jochen Müsseler) — Confronting avatars in the virtual world sometimes causes spatial dissociations between the user and the avatars. In Experiments 1 and 2 we examined visual perspective taking towards task-irrelevant avatars in an orthogonal Simon task. We observed a spatial compatibility effect relative to the avatar's perspective, overwriting the typical right-up advantage of orthogonal stimulus-response ensembles, and argued that this effect is a result of visual perspective taking. In Experiments 3 and 4 we increased stimulus laterality by using a larger variety of avatar rotations. A Simon effect aligned with spatial SR correspondence from the participant's point of view was observed, which was influenced by the avatar's perspective after avatar hand movements were added as action effects. Overall results indicate that visual perspective taking towards avatars can occur, even when those avatars are task-irrelevant. This effect is situational and strongly enhanced by the presence of corresponding action effects.
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(3004)

Action Plans For Forced-Choice And Free-Choice Responses Share The Same Representational Domain. LISA R. FOURNIER, EZANA TADDESE, and BENJAMIN RICHARDSON, *Washington State University* — Executing an action to one event can be delayed by an action plan to another event retained in working memory if the two action plans partly overlap (partial repetition cost, PRC). PRCs are found when the current and retained action plans are learned, forced-choice responses, based on stimulus identity (forced choice). It is unclear, however, whether PRCs generalize to action plans in which one or both are voluntary or self-generated (free-

choice). We addressed this question to determine whether action plans generated by forced- and free-choices are qualitatively similar and share the same representational domain. Participants planned and retained an action to the first stimulus (A) in a sequence while executing an immediate response to a second stimulus (B), and then executed the retained action. We manipulated the feature overlap between actions A and B (partial or no overlap) and whether actions A and B required forced- or free-choice responses. Results showed that PRCs occurred when one or both actions required forced- or free-choice responses. This suggests that action plans for forced- and free-choice responses share the same representational domain and compete for selection within the same action control system.
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(3005)

Dynamics Of Cooperation: Complexity Matching In A Collaborative Fitts' Task. DANIEL S. SCHLOESSER, *University of California Merced*, CHRISTOPHER T. KELLO, *University of California, Merced* — Individuals can coordinate their movements to cooperate in complex tasks like team sports. Complexity matching is a new measure of coordination that captures perceptual-motor coordination as well as mental coordination in language interactions. The present study investigated whether complexity matching reflects the degree to which two people can effectively perform a joint action task. Dyads performed a joint version of the classic Fitts' task in which individuals took turns reaching and hitting circular targets on a touchscreen. Target positions drifted either randomly or according to the locations of participant responses. Performance was measured in terms of joint speed and accuracy, and complexity matching was measured in terms of correlations in power law exponents that quantified 1/f scaling relations in the fluctuations of inter-response-intervals. Dyadic performance was compared with a monad condition in which complexity matching was measured between the left and right hands of individuals performing the task.
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(3006)

Dynamics Of Perception Of Affordances For Reaching For Self And Other. ALEX DAYER and JEFFREY B. WAGMAN, *Illinois State University* — Perceivers are sensitive to the boundaries at which they must transition from one behavior to another. As in other self-organizing systems, such transitions occur at a critical parameter value with continuous changes in that parameter. In general, behavioral transitions occur at larger values when that parameter increases than when it decreases (positive hysteresis), and perceptual transitions occur at larger values when that parameter decreases than when it increases (negative hysteresis). We investigated whether this pattern also occurs in perceptual and behavioral transitions involving another person. Participants reported when they (or another person) would need to transition from reaching with their arm to doing so with an implement. Participants also attempted to reach with their arm or the implement. Consistent with our hypotheses, we found negative hysteresis in the former task and positive hysteresis in the latter. The results support a dynamical systems perspective on perception of affordances.
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(3007)

Action Effect Anticipation Of Flickering Lights: Electrophysiological Evidence For The Ideomotor Theory Of Action Control. BERNHARD PASTÖTTER, *University of Trier*, DAVID DIGNATH and ANDREA KIESEL, *University of Freiburg*, CHRISTIAN FRINGS, *University of Trier* — Ideomotor theory proposes that performing an action results in a bidirectional association between the action's motor code and the sensory effects of the action. Once acquired, these associations can be used and actions can be selected by anticipating the actions' perceptual consequences. Two EEG experiments were conducted that tested the idea of effect anticipation in action control. EEG oscillatory dynamics were examined in manual forced-choice (Experiment 1) and free-choice tasks (Experiment 2). In both experiments, actions were contingently followed by distinct visual effects, consisting of pictorial stimuli presented on flickering backgrounds (6 or 10 Hz). The perception of flickering effects entrained steady-state visual responses at either 6 or 10 Hz. Importantly, in both experiments, similar frequency signatures re-emerged after acquisition, already during the preparation of responses over occipital and frontal electrode sites, suggesting that sensory effects were anticipated during response selection. These findings support the ideomotor theory of action control.

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(3008)

Task-Irrelevant Novel Sounds Facilitate Continuous Motor Tracking Performance. ENRIQUE MOLINA and FABRICE B.R. PARMENTIER, *Universidad de las Islas Baleares* — In discrete tasks where target stimuli are preceded by a task-irrelevant sound, unexpected changes in a train of otherwise repeated sound sequence (novel among standard sounds) consistently lengthen response times to the targets (novelty distraction). In contrast, the effect of novel sounds on a continuous task remains unexplored. Here we report the first study measuring the impact of novel sounds on a continuous motor tracking task and contrast two recent and opposite hypotheses. The global motor inhibition hypothesis argues that novel sounds trigger a temporary but general inhibition of motor activities. In contrast, some have argued that novel sounds facilitate action due to a temporary increase in arousal. The results from our tracking task support the latter and not the former: We observed no negative effect of the novel sounds on tracking performance; instead, tracking performance improved significantly around 500 ms following the onset of novel sounds relative to that of the standard sound. We tentatively argue that the distractive effect of novel sounds may only occur when action initiation and execution follow these sounds, not when it precedes them.

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Attention and Performance

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

ATTENTION AND PERFORMANCE

(3009)

Differences In Perspective Taking: The Effects Of Priming Similarity. JAMES EDWARD CANE, *Canterbury Christ Church University*, HEATHER FERGUSON, *University of Kent* — Research has shown that less familiarity between interlocutors leads to increased use of perspective cues in a perspective taking task. We build on this by examining whether priming similarity between two people with underlying differences impacts an individual's ability to take another's perspective. Thirty-nine female participants completed an ice-breaker task with a male confederate purporting to be from a competing university. Participants were then asked to consider similarities (prime similarity) or differences (prime difference) between themselves and the confederate and then complete a visual perspective taking task incorporating the confederate's visual perspective with their own responses. Participants showed effective integration of the confederate's perspective similarly across prime conditions when integrating the confederate's instructions with their responses. However, participants were more likely to ignore perspective-irrelevant objects in anticipation of instructions from the confederate when differences were primed. In line with previous research, these findings indicate an increased tendency to anticipate another's perspective when differences, rather than similarities, are primed.

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(3010)

Using Political Symbols To Study Semantic Inconsistency In Scene Viewing. NIKITA A. KHARLAMOV and HEMA SCHMIDT, *Aalborg University*, ALEKSANDRA KASZOWSKA,

Tufts University — Semantic inconsistency occurs when meanings in different dimensions mismatch (Stroop, 1935) or when a scene contains parts that do not typically co-occur, such as a farm tractor on a football field (Davenport & Potter, 2004). Inconsistency generally leads to slower and less accurate stimulus processing. While semantic consistency is commonly defined as regular co-occurrence, it is not known whether such effects will occur when meanings are more abstract. For example, national identity involves both concrete and abstract semantic relations. Participants (N = 30) viewed artificial scenes with prominent European politicians presented centrally, with matching or non-matching national/EU flags in the periphery, while having their eye movements recorded. We explored the serial allocation of visual attention, particularly with respect to cases when EU flag is presented with pro- or anti-EU politicians, thus engaging more abstract semantic relationships. We discuss the relationships between overt attention allocation, scene consistency, and semantic structures.

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(3011)

An Eye-Tracking Investigation Of Real-Time Social Interaction. MARTINA DE LILLO, VICTORIA BRUNSDON, ELISABETH BRADFORD, and HEATHER FERGUSON, *University of Kent* (Sponsored by Heather Ferguson) — Social interactions characterize a large part of our lives. Previous research has typically used static pictures or computerized lab tasks to analyse these social components. Here we explore social interactions using more ecologically valid methods. Specifically, we used eye-tracking glasses to record the gaze of participants as they navigated the real-world (Experiment 1), and while they were engaged in a short interview-style conversation with an experimenter (Experiment 2). In addition, we examined visual biases to three posters depicting social (direct vs. averted gaze) and non-social scenes during

the conversation. Results reveal peoples' real-time gaze biases towards dynamic social and non-social objects in Experiment 1, and eye movement patterns that underlie joint attention and gaze allocation to a conversational partner's eyes/face in Experiment 2. Email: Martina De Lillo, md559@kent.ac.uk

(3012)

Detecting The Onset Of Mind-Wandering: Insights From Pupillometry. CLAUDIA PELAGATTI, *University of Florence*, PAOLA BINDA, *University of Pisa*, MANILA VANNUCCI, *University of Florence* — Mind-wandering (MW) refers to the shift of attention away from a primary task towards thoughts unrelated to the task. A question still facing the research on MW concerns the moment that MW begins, namely the processes and events that control the occurrence (onset) of a MW episode. Here, we aimed to examine physiological indices of MW onset by using pupillometry. We continuously recorded pupillary measures during a monotonous vigilance task with irrelevant verbal cues that may potentially act as triggers for MW episodes. Thought-probes were presented throughout the task to collect participants' thoughts and the trigger of these thoughts, if any. The main finding was that baseline pupil diameter (PD) distinguished MW onset: PD was larger for trials immediately following verbal cues that acted as triggers for spontaneous MW episodes compared to trials following verbal cues that were not reported as triggers. Possible implications for research on MW are discussed. Email: Claudia Pelagatti, claudia.pelagatti@unifi.it

(3013)

Interactions Between Executive Attention And Conscious Perception In Functional Connectivity Of Fronto-Parietal Regions. MAR MARTÍN-SIGNES, *University of Granada*, PEDRO M. PAZ-ALONSO, *Basque Center on Cognition, Brain, and Language*, ANA B. CHICA, *University of Granada* — The executive control network is involved in the voluntary control of processing in novel or complex situations (Petersen & Posner, 2012). Solving conflict situations or detecting errors can impair conscious perception of near-threshold stimuli (Colás et al. 2017). The aim of the present study was to explore the neural mechanism underlying executive control and its interaction with conscious perception. We used magnetic resonance imaging during a dual task involving a Stroop task and a conscious detection task with near-threshold Gabor stimuli. A set of prefrontal and frontal regions were more strongly engaged for incongruent than congruent trials while a distributed set of fronto-parietal regions were more strongly engaged for consciously perceived than non-consciously perceived trials. Functional connectivity analysis revealed an interaction between executive control and conscious perception in frontal and parietal nodes. These results demonstrate the importance of frontal lobe contributions to conscious perception as proposed by some influent models (Dehaene et al. 2011). Email: Mar Martín Signes, msignes@ugr.es

(3014)

Do Your Eyes Give It Away? Eye Movements As Indicators Of Mindless Reading. LENA STEINDORF and JAN RUMMEL, *Heidelberg University* — In general, mind-wandering is found to direct attention away from our external environment. During mindless reading, this attention-shift is assumed to be reflected by eye movements being (partially) decoupled from ongoing text processing. We review the literature comparing eye movements during normal and mindless reading and report a newly conducted high-powered experiment. We conclude that identifying objective

measures of mind-wandering in contrast to widely used subjective self-reports still seems to be work in progress: Different studies identify various eye-movement measures as mind-wandering indicators. However, there is little consensus on what measures are associated with mind-wandering and not even on the direction of effects on the same measures. Additionally, in our high-powered study only three interdependent measures (reading time, fixation count, and first fixation duration) positively predicted mindless reading in multilevel logistic regressions. Interestingly, besides these single measures, the word-frequency effect was found to be less pronounced during mindless-reading episodes. Email: Jan Rummel, jan.rummel@psychologie.uni-heidelberg.de

(3015)

Wandering Mice: Computer Mouse-Tracking As A Behavioral Measure Of Mind Wandering. MARIANA RACHEL DIAS DA SILVA and MARIE POSTMA-NILSENOVÁ, *Tilburg University* (Sponsored by Emmanuel Keuleers) — The covert nature of mind wandering proves to be a challenge for its investigation, as the use of subjective reports relies on the corroboration of behavioural measures such as event-related potentials and eye-tracking. In this study, 183 students completed a mouse-based operation span task, during which their thoughts were probed and their mouse movements recorded. This research demonstrates that computer mouse-tracking proves to be an additional behavioural measure of self-generated cognition. As a behavioural methodology, it provides unique insight into a person's mind wandering thoughts during a working memory task, seeing that mouse-trajectories towards a particular response on the screen are continuously updated by time-dependent and temporally-dynamic cognitive processes. Most prominently, area under the curve, velocity, and idle time provide valuable information concerning mind wandering in real time. Email: Mariana Rachel Dias da Silva, m.r.diasdasilva@tilburguniversity.edu

(3016)

Effects Of Conceptual Masking In Visual Working Memory. LISA D. BLALOCK, *University of West Florida* — The present study investigated the effects of higher-level knowledge on consolidation in visual working memory (VWM) by varying the categorical similarity of mask stimuli. To-be-remembered items and masks were taken from categories controlled for perceptual distinctiveness and distinctiveness in kinds (e.g., many kinds of cars and few kinds of coffee mugs). Participants completed a change detection task in which the memory array consisted of exemplars from either a similar or distinctive category followed by a mask array of items from the same category (conceptually-similar versus conceptually-distinct categories), a different category, or no mask. Prior research in our lab showed greater interference from conceptually similar masks with minimal effects of stimulus-onset asynchrony (SOA). However, the longer encoding time used may have reduced the masking effect. In the current experiment, encoding time was reduced to 400-ms. Interference was found in both the similar and distinct mask categories at the shortest SOA. Email: Lisa D. Blalock, lblalock@uwf.edu

(3017)

Cultural Differences In The Top-Down Control Of Information Processing In The Peripheral Vision. HAEJIN KIM and DONGHOON LEE, *Pusan National University*, MYEONGHO SOHN, *The George Washington University* — The present research investigated cultural differences in the top-down control



in the peripheral vision using a change detection task with three different detection criteria. In all experiments, eight circles with different colors and sizes arranged in a circular manner were presented twice either close to or far from the center. The secondly presented stimuli may or may not contain a change of color or size in one circle. In Experiment 1, the target change was only in color regardless of size change (inclusive). In Experiment 2, the target change was in both color and size (conjunctive). In Experiment 3, the target change was in color but not size (exclusive). Overall, Koreans were more sensitive to changes than Americans. Further, the hit and the false alarm rates differed by distances and detection criteria. We argue that the collective culture of East Asia biases people to develop a top-down control process for the peripheral vision.

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(3018)

Are Ideomotor-Compatible Tasks Processed Automatically, Even In Old Age? FRANÇOIS MAQUESTIAUX, *Université Bourgogne Franche-Comté*, ERIC RUTHRUFF, *University of New Mexico*, GUILLAUME CHAUVEL, *Université Paris Est* — Ideomotor (IM) compatibility refers to tasks in which the stimulus resembles sensory feedback from the response, such as when pressing a left or right key to an arrow pointing left or right. Here we reexamined the controversy of whether responses for an IM-compatible task can be automatically activated, without requiring central attention. Our procedure consisted of varying the SOA between a *long* Task 1 with a *short* Task 2. This means that, at short SOAs, Task 2 automaticity would result in very fast response times and response order reversals (R2 before R1), but non-automaticity would result in very long response times (due to the central bottleneck). In two experiments, we manipulated whether Task 2 was IM-compatible or non-IM-compatible (e.g., identifying one of

two shapes). We also tested 64 older adults, along with 64 younger adults, to examine whether automatic activation is still within reach in old age. Even though the evidence was consistent with *some* automatic processing of the IM-compatible task in both age groups, it was restricted to less than half of the trials. Automaticity is difficult to achieve, even with the easiest of tasks.

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(3019)

Garner Interference And Intersectionality Effects In Face Perception. D. VAUGHN BECKER, *Arizona State University*, KEELAH E.G. WILLIAMS, *Hamilton College*, CARI M. PICK, *Arizona State University*, HANSOL RHEEM, *Arizona State University* — Garner interference is a method with considerable potential to reveal separable and integral processing in face perception. This is especially important because increasingly, social cognition is interested in intersections of separate dimensions of social evaluation, like age, gender, race and other more transitory qualities like expression, class and health. Several experiments illustrate the promise and pitfalls of the Garner design. Some show full Garner interference. Age and gender yield configural interference. Different operationalizations of race illustrate the importance of equating choice discriminability. Even failing this, inferences are possible, particularly to Stroop-like effects. Such effects may reveal stereotypes, but could instead suggest that two dimensions of evaluation reflect some emergent higher-level judgement. Alternatively, a bottom-up concordance of easily resolved features could drive multiple judgement processes (e.g. neotenous features influencing both age and gender decisions). Best practices for making inferences to intersectionality and basic-level category effects will be discussed.

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Cognitive Control II

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

COGNITIVE CONTROL II

(3020)

Executive Functions And Gender Differences: Behavioral And Anatomical Data. LISA S. ARDUINO, *Lumsa University-Roma*, FRANCESCA ELEUTERI, *Donders Institute for Brain, Cognition, and Behaviour-Nijmegen*, ASHOK JANSARI, *Goldsmiths, University of London*, MARGHERITA DI PAOLA, *IRCSS Fondazione Santa Lucia Roma* — The study aimed to investigate along which components of executive functions male and female young adults differ, both behaviorally and anatomically. 26 Subjects (11 males) were administered a virtual reality assessment of EFs known as JEF(©) alongside the BADS task. Participants were examined via magnetic resonance imaging. Males scored significantly higher than females on JEF function Creative Thinking ($p < .01$). There were positive correlations between Planning and the subcomponent Rule Shift Cards Test (BADS) ($p < .05$) and between Adaptive Thinking and Rule Shift Cards Test (BADS) ($p < .01$). Cortical thickness analysis showed the two groups differ significantly ($p < .05$) in the superior frontal lobe, post central gyrus and paracentral area. Specifically, females have thicker cerebral cortex in these areas compared to males. On average there is a positive correlation between these three brain areas and Planning (JEF) and Temporal Judgment Test (BADS).

This study suggests that individual differences in executive function include some gender-specific factors and the brain anatomy underpinnings of executive function are not limited to the prefrontal cortex.

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(3021)

Successfully Controlling Intrusive Memories Is Harder When Control Must Be Sustained. KEVIN VAN SCHIE, *Erasmus University Rotterdam*, MICHAEL C. ANDERSON, *University of Cambridge* (Sponsored by Michael Anderson) — After unpleasant events, people often experience intrusive memories that undermine their peace of mind. In response, they often suppress these unwanted memories. Such efforts may fail, however, when inhibitory control demands are high due to the need to sustain control, or when fatigue compromises inhibitory capacity. Here we examined how sustained inhibitory demand affected intrusive memories in the Think/No-Think paradigm. To isolate intrusions, participants reported on each (short or long duration) trial whether they experienced an intrusion of the memory they intended to suppress. We found that longer duration trials increased the probability of an intrusion. Moreover, on later No-Think trials, control over intrusions suddenly declined, with longer trial durations triggering more relapses of items that had

been previously been purged. Thus, the challenges of controlling retrieval appear to cause a decline in control over time, due to a change in state, such as fatigue. These findings raise the possibility that characteristics often true of people with psychiatric disorders – such as compromised sleep, and increased demand on control – may contribute to difficulties in suppressing intrusive memories.
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(3022)

Cognitive Control Of Irrelevant Sound: Acoustic Distinctiveness Of Distracters Exacerbates Semantic Auditory Distraction. JOHN EVERETT MARSH, *University of Central Lancashire, University of Gavl*, MELISSA E. BARKER, *University of Central Lancashire*, HELEN M. HODGETTS, *Cardiff Metropolitan University*, TOM CAMPBELL, *University of Helsinki* — This study investigated the role of the acoustic distinctiveness of spoken distracters in semantic auditory distraction. Experiment 1 showed that when sequences of auditory distracter words were semantically related to words presented visually for free recall, presenting them in seven vs. one voice increased the erroneous recall of those distracters but failed to modulate their disruption of veridical recall. To investigate whether the increased erroneous recall attributable to the acoustic distinctiveness of distracters was caused by failures of output-monitoring (back-end control) or by affecting the processing of distracters during their presentation (front-end control), a recall instruction that eliminates requirement for output-monitoring was used in Experiment 2. Although rates of erroneous recall were much greater than in Experiment 1, the disruptive effects attributable to the acoustic distinctiveness of distracters on their erroneous recall was eliminated. We speculate that voice information is used as a cue to determine membership of candidate items covertly retrieved during recall and that this vocal information can be more readily accessed when distracters are presented in a single voice, as compared to seven voices.
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(3023)

Task Switching Hurts Memory Encoding. MICHÈLE FRIEDLI and BEAT MEIER, *University of Bern* (Sponsored by Beat Meier) — Research consistently shows that task switching slows down performance on switch compared to repeat trials, but the consequences on memory are not clear. In the present study, we investigated the impact of task switching on subsequent memory performance. Participants had to switch between two semantic classification tasks. In Experiment 1 the stimuli were univalent, in Experiment 2 the stimuli were bivalent (relevant for both tasks). In both experiments, recognition memory for switch and repeat stimuli was tested subsequently. During encoding, task switching produced switch costs. Critically, subsequent memory was lower for switch compared to repeat stimuli in both experiments, and this effect was increased in Experiment 2 with bivalent material. We suggest that the requirement to switch tasks hurts the encoding of stimulus-specific information. Thus, cognitive conflicts produced by task switching and stimulus bivalency impair subsequent memory performance.
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(3024)

Neural Correlates Of Cognitive Control Functioning In Individuals With Insomnia Disorder. OLIVIER MAIRESSE, *Brugmann University Hospital*, GETHIN HUGHES, *University of Essex*, DANIEL NEU, *Brugmann University Hospital*, EVA VAN DEN BUSSCHE, *Vrije Universiteit Brussel* (Sponsored by Eva

Van Den Bussche) — Individuals with insomnia disorder (ID) commonly report associated complaints of cognitive functioning. Conversely, both behavioral and neurological evidence supporting subjective cognitive impairments in ID remain remarkably scarce and inconclusive. To investigate this, we used EEG to temporally dissociate the dynamic interplay of proactive (i.e., maintenance and updating of task-relevant information) and reactive control (i.e., interference monitoring and resolution). Results of an AX-Continuous Performance Task indicate that, compared with good sleeper controls (GSC), ID show an impaired proactive recruitment of cognitive control (reflected by the P3b and the contingent negative variation components of the cue-locked ERP). Moreover, in contrast to ID, GSC were able to engage reactive control (as indexed by the probe-locked N2) in order to overcome invalid response tendencies and to maintain an adequate level of performance. Our results suggest that compared to GSC, performance may be impaired in ID as a consequence of an impaired proactive control and an absence of reactive control as compensatory mechanism. As such, these findings advocate for both behavioral and neurological impairments in cognitive control functioning in ID.
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(3025)

Individual Differences In Grit And Cognitive Control. NURIA AGUERRE and TERESA BAJO, *University of Granada*, CARLOS GÓMEZ-ARIZA, *University of Jaen* (Sponsored by Teresa Bajo) — While some people spend much effort to face long term challenges throughout their lives, others prefer to deal with short-term goals. Related to this, grit is a personality trait that refers to the tenacious pursuit of a dominant superordinate goal despite setbacks. Individual differences in grit have recently drawn the attention of cognitive neuroscientist with the idea of understanding the neurocognitive mechanisms that underpin this trait. In the present work, we propose that cognitive control may play a key role in persistent effort to pursuit goals (grit). Thus, based on the Dual Mechanisms Theory of Cognitive Control (Braver, 2012), we explored whether grit is associated with different modes (proactive/reactive) of cognitive control. In our study, 100 participants differing in grit were assessed with two experimental tasks (AX-CPT and a switching task) to establish their preferred mode of control, as well as their efficiency when using it.
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(3026)

Conflict Adaptation Under Load: Proportion Congruent Effects Persist When Contingency Learning Is Impaired. GIACOMO SPINELLI, KESHENI KRISHNA, JASON PERRY, and STEPHEN LUPKER, *University of Western Ontario* (Sponsored by Stephen Lupker) — A robust finding in the Stroop literature is that congruency effects are larger for color words presented mainly in their congruent color than for color words presented mainly in incongruent colors. However, the cause of this item-specific proportion congruent effect (ISPCE) is unclear. It might reflect use of a conflict adaptation strategy (e.g., prepare for conflict whenever the word RED appears) and/or the process of learning stimulus-response contingencies (e.g., prepare to say blue whenever the word RED appears). By combining a Stroop task with a concurrent working-memory load task, we show that, although working-memory load slows responding overall, it does not alter the ISPCE. In contrast, some evidence emerged suggesting that working-memory load does reduce people's ability to learn contingencies in a non-conflict color identification task. These results suggest



that conflict adaptation drives the ISPCE, with working memory demands having virtually no impact on humans' ability to utilize that strategy.

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(3027)

Challenging The View Of Separate Resources For Effector Systems In Multitasking. ALEKS PIECZYKOLAN and LYNN HUESTEGGE, *University of Würzburg* — Executing two responses simultaneously is known to cause performance costs in form of longer response times compared to single responses. While several theoretical frameworks explain such costs based on the assumption of limited cognitive resources, the so-called multiple-resources theory particularly focuses on the role of sensory and effector system characteristics for resource allocation among responses. According to this theory, each effector system draws on a separate pool of resources, which should lead to greater costs when performing two responses within the same effector system compared to responses in different effector systems. In the present study, we tested this prediction by contrasting performance of the same manual response in the context of another manual response (intra-modal condition) against performance in the context of an oculomotor or vocal response (cross-modal conditions). Surprisingly, manual performance costs were larger in cross-modal conditions than in the intra-modal condition – a finding that contradicts the assumption of separate resource pools for effector systems. Instead, the findings suggest that additional cognitive demands resulting from response modality selection or activation play a role.

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(3028)

Spatio-Temporal Dynamics Of Action-Effect Associations In Oculomotor Control. EVA RIECHELMANN and ALEKSANDRA PIECZYKOLAN, *Würzburg University*, GERNOT HORSTMANN and ARVID HERWIG, *Bielefeld University*, LYNN HUESTEGGE, *Würzburg University* (Sponsored by Lynn Huestegge) — While there is ample evidence that actions (A) are guided by anticipating their effects (E) (ideomotor control) in the manual domain, much less is known about the underlying characteristics of effect-based oculomotor control. We address three open issues. Is A-E anticipation in oculomotor control reflected in corresponding spatial saccade characteristics in inanimate environments? Does the previously reported dependency of action latency on the temporal effect delay also occur in the oculomotor domain? Which temporal effect delay is optimally suited to develop strong A-E associations in the oculomotor domain? Participants executed saccades to peripheral traffic lights, causing an (immediate or delayed) action-contingent light switch in the upper vs. lower part of the traffic light. Results indicated that saccades were spatially shifted towards the location of the upcoming change, indicating anticipation of the effect. Saccade latency was affected by effect delay, suggesting that corresponding time information is integrated into event representations. Delayed (vs. immediate) effects were more effective in strengthening A-E associations. Basic principles underlying ideomotor control appear to generalize to the oculomotor domain.

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(3029)

Task Order And Effector System Prioritization In Dual-Task Control: Evidence From The PRP Paradigm. LYNN HUESTEGGE, MAREIKE HOFFMANN, and ALEKS

PIECZYKOLAN, *Würzburg University* — Performing two tasks at once usually yields longer reaction times than single-task situations. When the two tasks are triggered with a temporal delay (stimulus onset asynchrony, SOA), participants usually respond with a corresponding response order, and short SOAs usually prolong the second response while the first response remains largely unaffected (PRP effect). This finding is often interpreted in terms of a cognitive bottleneck which works according to a “first come first served” principle, irrespective of specific input modalities and effector systems. However, in recent studies we demonstrated that if two responses are triggered simultaneously, differences in observed dual-task costs represent an ordinal prioritization structure among effector systems which cannot be explained with serial “first come first served” accounts. In the present experiments, we show that effector systems also substantially impact on performance in the PRP paradigm. Implications for dual-task control theories are discussed.

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(3030)

Music Generates Diverse Shifts In Mood States Between High And Low Anxiety. CELENE GONZALEZ, HIDEYA KOSHINO, and JOHN CLAPPER, *California State University, San Bernardino* (Sponsored by Hideya Koshino) — Undeniably, emotions elicit different behavioral responses in anxious individuals. In this study, we investigated how happy and sad music affect mood in high and low anxiety groups. According to the threshold bias model, high anxiety is characterized by a “vigilant” processing mode for higher sensitivity to environmental stimuli, whereas low anxiety displays an “avoidant” processing mode. Participants listened to happy and sad music for 10 minutes each and were assessed with the Positive & Negative Affect Schedule (PANAS) and State & Trait Anxiety Inventory (STAI). Results showed that, sad music decreased positive mood for high and low state and trait anxiety group, whereas, happy music decreased negative mood for high state and trait anxiety. The threshold bias model describes why mood patterns were evident between high and low anxiety. High anxious individuals displayed a higher sensitivity to the musical stimuli, demonstrating greater mood fluctuations in comparison to low anxious individuals.

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(3031)

On The Dissociation Between Covert And Overt Orienting To Social And Non-Social Cues: The Role Of Task Difficulty. CLAUDIA BONMASSAR, FRANCESCO PAVANI, and WIESKE VAN ZOEST, *University of Trento* (Sponsored by Wieske van Zoest) — Gaze and arrow cues cause covert shifts of attention even when they are uninformative. Nonetheless, it is unclear to what extent oculomotor behavior helps to explain manual response biases to social and non-social stimuli. We tracked the gaze of participants performing an easy and a difficult discrimination task with uninformative central cues (gaze vs. arrow), SOA (250 vs. 750 ms) and cue validity (valid vs. invalid) as within-subject factors. When the discrimination task was easy (Experiment 1) a cueing effect was found on reaction time (RT) that was similar for the gaze- and arrow-cue. When the discrimination task was difficult (Experiment 2), the cue effect was larger in the arrow-cue compared to the gaze-cue. However, overt saccadic performance did not differ in dependency of cue, suggesting a dissociation

between overt and covert selection and providing insight in the relation between attention and eye movements in response to different cues.

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(3032)

Capacity Limitations Of Dishonesty. ANNA FOERSTER, ROBERT WIRTH, WILFRIED KUNDE, and ROLAND PFISTER, *University of Würzburg* (Sponsored by Roland Pfister) — Unrehearsed dishonest responding entails an effortful two-step process of the inhibition of the automatically activated honest response and the generation of the dishonest response, even in the case of yes/no responses to simple questions. Two

experiments examine the role of this two-step process in the stages of information processing. Together, the effect propagation logic and the locus-of-slack logic localized dishonest processes mostly in the central capacity-limited response selection stage but also in the late capacity-limited response monitoring stage. Surprisingly, dishonest responding also drew more strongly on perceptual processes than honest responding. The results demonstrate a pervasive impact of the two-step process in dishonest responding that mostly recruits capacity-limited resources. Moreover, the experiments point out a limitation of the underlying paradigm as the involved monitoring processes could overshadow potential motoric effects of dishonest responding.

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False Memory

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

FALSE MEMORY

(3033)

When More Is Not Merrier: Do Shared Stressful Experiences Amplify? SASHA NAHLEEN, GEORGIA DORNIN, and MELANIE K.T. TAKARANGI, *Flinders University* (Sponsored by Elizabeth Loftus) — Eyewitness memory literature has often focused on the effects of discussion among co-witnesses, discovering that such discussion can distort memory. Recent research suggests, however, that simply sharing experiences with others, even without communication, can amplify those experiences in terms of emotion (e.g., liking a pleasant chocolate more when shared with another vs not shared) and memory (e.g., better recall of words that a co-actor had responded to vs not responded to). It is plausible, therefore, that people devote more cognitive resources to co-attended experiences. We investigated whether sharing a *stressful* experience (Cold Pressor Task) amplifies the experience. Consistent with previous research, pain intensity was higher when the experience was shared vs unshared, with participants reporting more sensory pain qualities. Interestingly, they still remembered the pain as more intense after a delay period. This finding challenges the assumption that direct communication is necessary for memory distortion.

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(3034)

Initial Confidence As A Metacognitive Indicator Of Susceptibility To Misinformation. LIANA TKATCH and AINAT PANSKY, *University of Haifa*, JASON C.K. CHAN, *Iowa State University* (Sponsored by Jason Chan) — Exposing eyewitnesses to misleading information can alter their memory of event details. Several studies have successfully used initial testing as a means to inoculate eyewitnesses against such misleading suggestion. However, other studies have obtained the opposite finding, whereby testing witnesses after an event made them more suggestible, a phenomenon known as *retrieval-enhanced suggestibility*. In the present study, we examined to what extent susceptibility to misleading suggestion is influenced by one's initial confidence in the correctness of the retrieved information. Assuming that eyewitnesses tend to rely on their own memories when they are confidently held, less suggestibility would be expected for such items than for lower-confidence items. As predicted, we found that event details initially recollected with

high confidence were more immune to later suggestion than those recollected with low-to-medium confidence. Participants were also more likely to recollect discrepancies between the target event and the post-event information for high-confidence items. Although retrieval-enhanced suggestibility was obtained overall, it applied mostly to low-to-medium confidence items.

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(3035)

Examining The Impact Of Sleep On Integrating True And False Memories. DAVID P. MORGAN, LAURA MICKES, TRAVIS SEALE-CARLISLE, and JAKKE TAMMINEN, *Royal Holloway, University of London* (Sponsored by Laura Mickes) — Sleep has been shown to strengthen newly formed memories, and to integrate them with existing knowledge. Sleep therefore generally has an adaptive role in memory formation. However this integrative function might also promote the integration of false information with true events that were witnessed earlier. To investigate this, we manipulated the presence or absence of sleep in a forensically relevant experiment. Participants witnessed mock crimes, and were subsequently given a verbal account of the crimes that contained misinformation about some aspects of the crimes. Following a period of sleep or wake, participants' memory for the original crime was tested. We hypothesised that participants in the sleep group would integrate more of the misinformation into their memory of the crimes compared to participants who remained awake for an equivalent period of time, and would therefore find it harder to discriminate between true and false information.

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(3036)

Is Average Working Memory Capacity Necessary For The Relationship Between Need For Cognition And False Memories? EDA BAĞCI, PINAR BÜRHAN ÇAVUŞOĞLU, and HASAN GÜRKAN TEKMAN, *Uludağ University* (Sponsored by Hasan Gürkan Tekman) — Previous research using DRM paradigm has demonstrated that higher need for cognition (NFC) levels are associated with falsely recognizing critical items. However, in our lab we did not find a relationship between NFC and false recognition. This lack of a relationship between NFC and false recognition may be a result of not controlling working memory capacity (WMC). For example, average working memory capacity was shown to be necessary for the relation between NFC and fluid intelligence (Hill, Foster, Sofko, Elliott & Shelton, 2016).



The purpose of this study is to examine the moderator role of WMC between NFC and false recognition. One hundred and sixty participants are being tested with a DRM task, the Turkish version of the NFC Scale and an operation span task to measure WMC. If a moderator role of WMC is observed, this may indicate that motivation is not sufficient to affect memory processes and ability is necessary for influencing these processes.

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(3037)

Monitoring Problems Underlie False Memories In Temporal Lobe Epilepsy. MARIANA CAIRÓS, SERGIO HERNÁNDEZ, and MARÍA A. ALONSO, *University of La Laguna* — In a previous work we found that right Temporal Lobe Epilepsy (TLE) had a marked tendency to produce associative false memories in a DRM recognition task. In order to verify if this increase was due to difficulties in the monitoring of information, an experiment was conducted involving patients with right and left TLE and control participants. Lists of 10 words related to a non-studied critical word were presented, followed by an externalized recall task requiring them to write down all the words they remember and also words that came to their minds at the time of the test. They were also asked to mark the words they thought they had actually studied. Source monitoring analyses showed that patients

with right TLE had more difficulties distinguishing real from false memories. The results highlight the role of the right dorsolateral prefrontal cortex as a mediator in the recovery of false memories. Email: Mariana Cairós, mcairos@ull.edu.es

(3039)

An Experimental Approach To The Role Of Theme Identifiability Or Gist Extraction On False Recognition. SARA CADAVID, *Universidad del Rosario*, MAR SUAREZ and M. SOLEDAD BEATO, *Universidad de Salamanca* — We studied the role of theme identifiability (ID) on false recognition (FR) using the DRM paradigm. In this paradigm, words associated to a non-presented critical lure (i.e., theme) are studied and, subsequently, critical lures are often falsely remembered/recognized. Sixty-six participants studied 8 low-ID and 8 high-ID lists. These lists did not differ in terms of forward or backward associative strength. Results showed that the FR effect was found. Interestingly, low-ID lists produced significantly more percentage of FR ($M_{Low-ID} = 33.84$) than high-ID lists ($M_{High-ID} = 15.66$). Therefore, findings suggest that theme identifiability plays a key role on the rejections of critical lures in the DRM paradigm. In other words, when participants are able to identify the critical lure, they seem to use an identify-to-reject strategy to edit out, and reduce false memories. Results are discussed in terms of the most prominent theories in the field: The Activation-Monitoring Framework and the Fuzzy-Trace Theory. Email: Sara Cadavid Espinha, sara.cadavid.espinha@gmail.com

Human Learning and Instruction

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

HUMAN LEARNING AND INSTRUCTION

(3040)

The Effects Of Learning Modality On The Learning Of A New Alphabet. ROBERT W. WILEY and BRENDA RAPP, *Johns Hopkins University* (Sponsored by Brenda Rapp) — Recent research has provided evidence that our knowledge about how letters are written may play a role in aspects of letter and word processing that go beyond handwriting. However, these findings are not uncontroversial and the mechanism by which such effects might arise is not well understood. To investigate these issues, we conducted a longitudinal training study of adult second-language learners of Arabic orthography. All participants were trained to recognize the shapes, names, and sounds of Arabic letters, under one of three conditions: visual, typing, or handwriting. They were repeatedly tested on a multiple-choice letter name-shape matching task and a letter naming task. On both measures, those trained with handwriting improved the most rapidly, while those in the visual condition improved slowest on the letter name-shape matching, and those in the typing condition fared the poorest in letter naming. The pattern of results overall suggests that handwriting supports learning more precise letter-shape representations and in turn faster access to these representations for mapping onto other letter representations such as name or identity. Email: Robert W. Wiley, wiley@cogsci.jhu.edu

(3041)

Illusory Causation Of A Continuous Outcome: Interaction Between Causal Framing And Outcome Salience. JULIE YL. CHOW, BEN COLAGIURI, and EVAN J. LIVESEY, *University of Sydney* (Sponsored by Ben Colagiuri) — Illusory causation is

the erroneous belief that the presence of one event (a cue) causes or prevents another (an outcome). This effect amplifies when the outcome occurs more frequently, i.e. the outcome density bias. Covariation-based models of causal learning account for this bias by assuming that instances where both cue and outcome occur are over-emphasised. However, real-world problems to which illusory causation applies (e.g. beliefs about ineffective therapies) often involve variable consequences that are continuous and always present to some degree. This study investigated whether outcome density effects emerged when using continuous and variable outcomes in a learning task framed as a trial for a medical treatment. We also manipulated the causal framing by suggesting that the cue may generate a desirable outcome or prevent an undesirable one. We found outcome density effects in judgements of treatment efficacy only when causal framing of the outcome did not conflict with inherent differences in the salience of high and low outcome values. These results have important implications for theories of causal learning and the development of false beliefs.

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(3042)

Note-Taking Devices In The Classroom. KAYLA MOREHEAD, JOHN DUNLOSKY, and KATHERINE RAWSON, *Kent State University* (Sponsored by John Dunlosky) — Few studies have investigated the impact of different note-taking devices (e.g., notebooks, laptops, or eWriters) on learning outcomes and even less have investigated their impact on learning outcomes in the classroom. We investigated the impact of these devices on classroom learning in two sections of an Introductory Psychology course. Some participants were randomly assigned to use eWriters to take notes, and the others used their preferred method. Students'

notes were collected so as estimate whether the note-taking method impacted the amount or quality of notes taken. Performance on high-stakes exams were not related to the note-taking device used, which may have occurred because the various note-taking methods supported the same amount and quality of notes.

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(3043)

Successfully Addressing Learner Diversity Through Student Selected Assessments. MARK ROBERT LUDORF, *Stephen F. Austin State University* — Instructors employ various methods in adapting courses to address learner diversity. The current study addressed learner diversity by allowing a subset of learners in a senior level online course to customize their educational experience. Although instructed together, learners in one section selected their assessments, while learners in the other section were assigned their assessments. Averages and variances on common assessments were compared. Results showed less variability (with higher averages) in performance for learners who selected their assessments versus those learners who were assigned their assessments. That is, the selection process's homogenizing effect on performance supports its efficacy as a method to reduce the effects of learner diversity. These results are consistent with previous research demonstrating the beneficial effects of adapting courses to address learner diversity.

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(3044)

The Effects Of Retrieval Practice On Color Memory And Response Confidence. BRENDAN A. SCHUETZE, LUKE G. EGLINGTON, and SEAN H.K. KANG, *Dartmouth College* — Although previous research on retrieval practice (RP) has predominantly featured stimuli with discrete right-or-wrong answers, a more continuous measure potentially offers greater sensitivity in assessing the effects of RP. A subset of the Lab color

space (125 points ranging from yellow to red) functioned as our continuous variable. Participants reported their memory using a continuous color bar. The colors of different images were learned through either RP or restudy and either 1 or 3 cycles of practice (after initial study). On a delayed final test, each participant's color memory and confidence were assessed for each item. We found RP enhanced color memory (responses were closer to the correct color). Gamma correlations between response accuracy and confidence were also marginally higher in the RP than restudy condition ($p = .055$). These findings suggest that RP promotes more precise memory (less error) and potentially greater ability to differentiate correct from incorrect responses.

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(3045)

Self-Explanatory Feedback Enhances Long-Term Learning. NOLA DALEY and KATHERINE A. RAWSON, *Kent State University* (Sponsored by Katherine Rawson) — *Self-explanatory feedback* (i.e., feedback requiring students to explain why correct answers are right) following multiple-choice practice tests leads to greater gains in learning compared to other feedback formats. Across two experiments, we investigated the extent to which the benefits of self-explanatory feedback extend to short-answer practice tests. In Experiment 1, 228 students studied two textbook passages. Each participant took a multiple-choice practice test over one passage and a short-answer practice test over the other. Following each practice test, students received either self-explanatory feedback, correct-answer feedback, or no feedback. Two days later, all participants completed a final multiple-choice test. The benefit of self-explanatory feedback on final test performance was larger following a short-answer practice test versus a multiple-choice practice test. Experiment 2 replicated these key patterns and extended to show similar patterns on a short-answer final test. Our results demonstrate self-explanatory feedback is a promising new way to structure feedback.

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Judgment and Decision Making

Friday

Grote Zaal

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JUDGMENT AND DECISION MAKING

(3046)

Base-Rate Neglect Or Base-Rate Distortion? Effects Of Ambiguity. KELLI L. JOHNSON and CHRISTIAN C. LUHMANN, *Stony Brook University* (Sponsored by Christian Luhmann) — When estimating the probability of an event, normative reasoning considers the base rate (general prevalence) of the event. Base-rate neglect refers to the tendency for people's predictions to disproportionately reflect the case-specific information compared to the base rate. We propose that people do not ignore base rates and argue that base rates undergo probability distortion, the tendency for people to behave as if probabilities are closer to 50% than stated. If base rates are distorted, probability estimates would appear to overly reflect case-specific information. Because previous work suggests ambiguity (uncertainty regarding probability estimates) modulates distortion, we tested whether ambiguity also modulates base-rate use. We presented subjects with probability estimation problems that varied in base rates and ambiguity, and results revealed a significant interaction in the

predicted direction; base rates had a larger effect on probability estimates when base rates were unambiguous. These results are consistent with previous simulations regarding optimal probability distortion. We conclude that the use of base rates in prediction is dependent on modulating factors.

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(3047)

The Relationship Between Thinking Style, Political Belief, Anomalistic Belief, And The Interpretation Of News Articles. TOBY PRIKE, MICHELLE M. ARNOLD, and PAUL WILLIAMSON, *Flinders University* (Sponsored by Michelle Arnold) — News articles are a major information source, and thus it is important that people draw accurate inferences from them. We predicted that misleading (vs. congruent) headlines, an intuitive (vs. analytical) thinking style, conservative political ideology, support for President Trump, and greater anomalistic (e.g., paranormal) beliefs would be associated with less accurate inferences made from news articles. Participants read twelve (8 critical, 4 filler) news articles and answered three inferential questions per article. Each critical article presented initial



misinformation that was then corrected by scientific evidence/opinion. As predicted, a more intuitive thinking style, greater political conservatism, and support for President Trump were associated with less accurate inferences. However, no relationship was found between inference accuracy and both anomalistic belief and headline type (misleading vs. congruent). The results highlight several issues that make it difficult to inform the public and encourage evidence-based decision making.
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(3048)

Rank-Order Of Body Shapes Reveals Internal Hierarchy Of Body Image. REVITAL NAOR-ZIV, ROSE KING, and JOSEPH GLICKSOHN, *Bar-Ilan University* — How do individuals rank body shapes? Does this relate to the body part one is most dissatisfied with? Our study investigates whether one can generalize regarding how women represent the body. Three BMI-calibrated images from the *Photographic Figure Rating Scale*, representative of thin (BMI = 14.72), medium (BMI = 20.33), and large (BMI = 29.26) shapes, were divided into torso, legs and arms, and saved as individual images on a black background. Of 27 possible composite images, 8 were chosen based on a Torso (thin vs. large) $\times$ Leg (thin/large vs. medium) $\times$ Arm (thin vs. large) design. Our 44 female participants ordered these from thinnest to largest. Our data show that this was first according to torso, then leg, and finally arm: 41 individuals agreed on the thinnest image (thin torso, thin legs, thin arms), followed by a second image (thin torso, thin legs, large arms, $n = 26$; or thin torso, medium legs, thin arms, $n = 10$), and so forth. One participant markedly differed in her choice of the first image (large torso, medium legs, thin arms). Interestingly, she scored 10 on the EDI-2 scale of Bulimic Tendencies, revealing high risk for bulimia, suggesting that our task might be useful for studying eating disorders.
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(3049)

Traffic Users' Modal Bias Effect On Hazard Predictions And Risk Estimations. CANDIDA CASTRO, PEDRO GARCIA-FERNANDEZ, ANDRES GUGLIOTTA, and PABLO DONCEL, *UNIVERSIDAD DE GRANADA*, EDUARDO ESIMAN, *University of Granada*, JOSE LUIS PADILLA, *UNIVERSIDAD DE GRANADA*, DAVID CRUNDALL, *NOTTINGHAM TRENT UNIVERSITY* — A new traffic test with sub-modules of clips recorded naturalistically was created and analysed to ascertain the effect of different perspectives (Walking, Cycling, Driving) and different groups of traffic users who carried out the test (Pedestrians, Cyclists, Vehicle Drivers). Holistic Training in HP from different road users' perspectives improves HP Performance. The higher HP scores were found for vehicle drivers and cyclists and for the hazards recorded from the cyclist's and the car driver's perspective. No significant interactions were found. In fact, the Modal bias is only found in the Risk Estimations of experienced vehicle drivers. They believe that the hazards recorded from the pedestrian's perspective are the least hazardous. In addition, estimations by males show the lowest hazardousness ratings. The effect of practice and training could not be isolated in this experimental design. Therefore, a new manipulation to distinguish the two effects is required.
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(3050)

How Contextual Similarity And Presence Influence The Detection Rates In A Choice Blindness Task. EKATERINA TCYPYSHEVA, *University of Warsaw*, PETKO KUSEV, *University*

of Huddersfield (Sponsored by James Hampton) — Choice Blindness (CB) is a decision-making phenomenon, revealing that human respondents fail to notice the mismatch between what they choose and what that they actually get (Johansson et al., 2005). Traditional attempts to explain the CB phenomenon are derived from the classical theories of decision-making, assuming reasoning errors on the part of the decision agents. In this study, we investigated the CB paradigm highlighting the importance of contextual and behavioural factors for preference formation and elicitation. Apart from making a theoretical contribution to the study of CB, we offer a methodological extension by introducing response times. Our results show that psychological factors such as level of similarity between the stimuli and physical presence of another individual during the decision-making process influence detection rates and decision-making time. These findings are discussed in light of the recently proposed simplicity framework and cognitive effort/engagement in decision-making (Kusev & van Schaik, 2013).
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(3051)

The Role Of Contradictory First Impression On The Social Evaluation. NATALIA ANDRIYANOVA, KARINA BAKULEVA, MAX PETROV, and IRINA GOLOVANOVA, *Saint-Petersburg State University* — The aim of the study is to investigate the influence of first impression on the social evaluation. On the first part of the experiment the nicknames of different people were presented for participants from experimental group. The task was to evaluate the pleasantness of these people on the scale from 1 to 4. On the second part of the experiment (immediately after the first part) the nicknames were presented with photos of these people. Participants should evaluate these people on the same scale. One half of positive nicknames were combined with attractive photos and one half of negative nicknames were combined with unattractive photos. Remaining combinations were incongruent. Participants from control group took part only in the second part of the experiment. Results showed that attractive people with negative nicknames were evaluated slower. Only in the experimental group the evaluations of attractive people with negative nicknames were lower than with positive nicknames. Thus, attractive person with negative nickname produces a conflict. However it results in low evaluation only if the nickname was known before the appearance. Supported by President RF grant MK-3732.2018.6
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(3052)

The Relationship Among Cultural Orientation, Self-Esteem, And Mortality Salience Effect In Chinese Participants. TAORAN ZENG and CHI-SHING TSE, *The Chinese University of Hong Kong* (Sponsored by Chi-Shing Tse) — According to Terror Management Theory, people tend to favor their worldview and in-group members after the reminder of death. In three studies, we tested whether this mortality salience (MS) effect would be moderated by cultural orientation (individualism-collectivism) among Chinese samples. In Study 1, participants were primed with thoughts of death (MS group) or dental pain (DP group) by writing down relevant thoughts. However, the two groups did not show any difference in the evaluation of pro- vs. against-China worldview essays and in resource allocation for in- vs. out-group members. In Study 2, images related to death or dental pain were presented in attempt to strengthen the priming effect. However, MS effect was again not found. In Study 3, participants' horizontal and vertical individualism-collectivism orientation were measured. Under MS (vs. DP) priming, participants with

high vertical-collectivism preferred to allocate more resources to in-group members, while participants with high horizontal-individualism demonstrated less support for pro-China worldview essays. The MS effects were found among participants with high (vs. low) self-esteem. The implications of these findings on Terror Management Theory are discussed.

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(3053)

The Inner Peculiarity And Difficulties In Changing The First Choice At Two-Stage Decision Making (4). MASAYO YAMAMOTO, *Jin-ai University*, ICHIRO FUKUDA, *Setsunan University* — We previously conducted experiments dealing with Two-stage decision-making (a.k.a. The Monty Hall Dilemma) in PC games. In the original protocol, one Ace was hidden among three cards and the two other cards were Jokers. Participants made their initial choice to see one card, and the location of one of the Jokers was revealed from the two remaining cards. They were then prompted as to whether they wished to switch their choice, or stay with their original choice (EXPA). The experiments were conducted under the following conditions; (1) EXPA×EXPC (the first card choice was made by a PC, not the participant), (2) EXPA×EXPB (instead of just one Ace there were two). Method: In this study, a new condition was added; (3) EXPA×EXPD (The first card choice was made by a PC, and two of the three cards were Aces). We carried out three-way factorial-mixed ANOVA; 2 (EXPB / EXPD) × 2 (anxiety: high (HG) / low (LG)) × 5 (blocks). Conclusion: In all conditions main effects were significant. The rates of switching choices were higher in EXPD than EXPB, in the high anxiety group. Especially, participant confusion appeared to occur when two Aces were selected. The results suggest that learning to make correct choices is difficult to establish.

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(3054)

Modeling Behavioral Competencies In Crisis Management Scenarios. PARIS MAVROMOUSTAKOS-BLOM, *Tilburg University*, SANDER BAKKES and PIETER SPRONCK, *University of Tilburg* (Sponsored by Sander Bakkes) — In the Data2Game project we are developing methods that can assess basic behavioral competencies in crisis management scenarios (i.e., leadership, decisiveness, stress resilience, political and administrative insight and advice giving). To this end, we are closely cooperating with actual crisis managers of the Twente Crisis Management Administration (TCMA) in the Netherlands. The methods that we are developing will be utilized by the TCMA for training crisis management staff in such a way that the efficacy of decision making during actual crisis situations can be optimized. Specifically, building upon the foundations of an existing computerized training game (the Mayors Game, developed by TNO, Thales T-Xchange, and HKU), in our research we confront crisis managers with predetermined dilemmas, and subsequently assess their behavioral and affective responses so that statistical models of human behavior can be created. In the presentation accompanying the paper, we will show that these models can provide us with accurate estimates of competency levels of crisis managers, and can be used to provide the crisis managers with tailored and constructive feedback on their behavior.

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(3055)

Debt Management Strategy Among US College Students. JUNSU PARK, *Barnard College, Columbia University*, DO-YEONG KIM, *Ajou University*, LISA SON, *Barnard College, Columbia University* (Sponsored by Lisa Son) — We aimed to identify an individual's debt management competency, by asking whether US college students can make financially optimal decisions on debt repayment. We recruited forty-five undergraduates and asked them to play a debt management game where participants were given a fixed-income and occasional bonuses that could be used to pay off six debts differing in interest rates and amounts across 25 rounds. Results showed that participants tended to close small debts more quickly than those with higher interest rates (i.e., debt account aversion; DAA). This strategy led to a mean total debt (\$43,578) that was significantly greater than the mean total debt of a normatively defined financial optimal player (\$29,428) who would instead prioritize the repayment of debt with the highest interest first. The observed differences may be attributed to a lack of financial knowledge and numerical skills that were found to be negatively correlated with total debt. We predict that improved financial literacy may help prevent individuals from making non-optimal decisions related to cognitive biases such as DAA on financial matters.

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(3056)

(Withdrawn) Visual Statistical Learning And Pattern-Matching Ability: Is Statistical Learning Associated With Increased Accuracy On Pattern-Matching Tasks? BETHANY GROWNS, *University of New South Wales Sydney*, KRISTY A. MARTIRE, *University of New South Wales* (Sponsored by David White) — The ability to learn visual statistical information from the environment is an innate and unconscious ability. It may also improve the pattern-matching performance of forensic science examiners who evaluate complex visual evidence (e.g. fingerprints). Knowledge of statistical information may be key to the accuracy of examiners on pattern-matching tasks. The statistical frequency of visual features provides information about how likely it is that two samples of evidence 'match'. For example, if two samples share a rare feature they are more likely to 'match' than two samples that share a common feature. However, no research has examined whether pattern-matching performance is associated with statistical learning. Across two experiments, participants were exposed to 120 exemplars of complex patterns. We then measured their statistical learning and pattern-matching accuracy. In Experiment 1 participants made 'match' decisions and in Experiment 2 they estimated 'match' likelihood. The results of the experiments will be discussed. This is the first research to examine whether statistical learning is associated with pattern-matching performance and has important practical applications for the training and selection of forensic examiners.

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(3057)

Assessing The Effectiveness Of Expert Testimony By Jurors' (In)sensitivity To Irrelevant Cues. GIANNI RIBEIRO, JASON M. TANGEN, and BLAKE M. MCKIMMIE, *University of Queensland* (Sponsored by Jason Tangen) — The way in which forensic experts testify about the results of forensic comparisons is a contentious issue. Current proposals involve presenting evidence in ways that are scientifically or mathematically complex for the average juror to understand. Edmond, Thompson, and Tangen (2014) propose that presenting information about examiners' performance is



both easier to understand and is useful to appropriately weigh the evidence. To evaluate testimony effectiveness, prior research has compared novice participants' judgments against theoretically "normative" standards of decision-making. However, this is problematic when comparing judgments about a methodology and judgements about experts' performance. Instead, we examine

people's (in)sensitivity to irrelevant cues such as an examiner's attractiveness, confidence, or likeability, as an ideal model of testimony would be one in which jurors do not rely on irrelevant cues to weigh the evidence.

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Learning and Memory II

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

LEARNING AND MEMORY II

(3058)

The Role Of Procedural And Declarative Metamemory In Children's Prospective Memory. MILVIA COTTINI, *University of Pavia*, DEMIS BASSO, *Free University of Bolzano-Bozen*, PAOLA PALLADINO, *University of Pavia* (Sponsored by Michelle Ellefson) — Prospective memory (PM) develops considerably during the early school years. This development seems to be mainly linked to executive functions (EF), although recently, PM has been suggested to benefit potentially from metamemory (MM). To date, few studies (mainly focused on adults) have investigated the relation between MM and PM. These have shown that making predictions improved adults' PM performance on a resource-demanding, but not a more automatic, PM task. The aim of the current study was to examine whether performance predictions benefit 7-year-olds' PM performance. Thus, half the children predicted their performance and half received standard instructions for two PM tasks, differing by resource demand. Declarative MM and EF were assessed. Our results replicated adults' findings, showing that predictions increased children's PM performance in the resource-demanding task. This prediction-advantage also occurred in slower ongoing task RTs, suggesting strategic monitoring processes were enhanced. In addition, declarative MM significantly predicted PM performance. These findings are the first showing the important role of procedural and declarative MM in children's PM.

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(3059)

Comparing Costs In Time-Based And Event-Based Prospective Memory. DAWN M. MCBRIDE and MEGAN FLAHERTY, *Illinois State University* — Event-based prospective memory (PM) tasks require a response upon presentation of a PM cue, but time-based tasks require a response at a set time or after a set amount of time has passed. Cognitive costs are well-documented for some types of event-based tasks (e.g., non-focal tasks), but results from past studies have not yet clearly determined the level or cause of cognitive cost from time-based tasks. The majority of research in PM has focused on event-based tasks, but some recent studies have begun to compare event-based task with time-based tasks to examine their relative cognitive costs. The current study provided a further examination of cognitive costs for focal event-based, non-focal event-based, and time-based PM tasks. Although PM accuracy was similar for the non-focal and time-based tasks, the non-focal task resulted in lower ongoing task reaction times than the time-based task overall, suggesting more overall cognitive cost during ongoing task trials for the non-focal task. These results suggest that time-based tasks may not require as much attention as non-focal event-based PM tasks for a similar level of performance. Email: Dawn M. McBride, dmcbride@ilstu.edu

(3060)

Remember That You've Already Paid The Bill: Finding Prospective Memory Commission Errors. PATRÍCIA MATOS, PEDRO B. ALBUQUERQUE, and FLÁVIA H. SANTOS, *University of Minho* (Sponsored by Pedro B. Albuquerque) — Prospective Memory (PM) is essential to daily life and its failures may cause devastating consequences in some real-world environments, such as on air traffic control navigation. PM research has recently focused on the execution of intentions that are no longer relevant, termed *PM commission errors* (e.g., make the same payment twice). Studies have demonstrated that completed PM intentions are not so neatly deactivated and could continue to be spontaneously retrieved. In the present study, we applied the paradigm proposed by Bugg and Scullin (2013) and adapted it to Portuguese sample. We had younger adults performing a PM task and then told them that the intention was completed (Phase 1). Participants later performed a lexical-decision task (Phase 2) in which the PM cues reappeared. Our results showed that 40% of participants erroneously performed the intended action, contrasting with 56% of commission errors in the original study. In conclusion, we achieved a successful replication of commission errors effect.

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(3061)

Desperate For Attention: When Cell Phones Disrupt Memory And Learning. IAN M. MCDONOUGH, JESSICA S. MENDOZA, and BENJAMIN C. PODY, *The University of Alabama*, SEUNGYEON LEE, *University of Arkansas at Monticello*, MINSUNG KIM, *University of Nebraska-Lincoln*, MYEONG W. KIM, *University of Arkansas at Monticello* — While it is widely known that cell phones disrupt learning in classroom settings, little is known as to *when* individuals are most susceptible to these distractions. Across two experiments, researchers collected data from 393 participants who were presented with a lecture while researchers manipulated phone accessibility. Following a test on the lecture content, students completed a measure on *nomophobia* to assess their fear and discomfort from not having access to their phones. Test questions from the lecture were divided into four segments depending on when the material was presented (1st, 2nd, 3rd, and 4th quarter of the lecture). Findings revealed that students who had access to their phone performed worse on the material that was presented in the 3rd quarter of the lecture. Participants with greater nomophobia performed worse on the memory test and also for material that occurred in the 3rd quarter of the lecture.

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(3062)

Impact Of Social Media On Stereotype Threat. RACHEL SKINNER, *Bournemouth University* (Sponsored by Tim Slattery) — Stereotype threat as described by Steele and Aronson (1995) is the risk of conforming to negative stereotypes when the stereotype is applicable (i.e. poorer performance in certain races). A stereotype exists that females perform worse in Science, Technology, Engineering and Math (STEM) subjects. This research aims to determine if viewing sexist (i.e. stereotypical) content via social media (Twitter) can trigger stereotype threat in undergraduate students and negatively impact cognitive (math) performance. Participants were shown either stereotypical/counter-stereotypical or neutral tweets regarding female performance in STEM subjects, then asked to complete a 15 item math test. As a covariate the Gender Based Rejection Sensitivity Questionnaire (RSQ- Gender; London et al., 2008) was also administered. It is expected that participants who viewed the stereotypical tweets (and also scored highly on the RSQ-Gender) would perform worse on the math test. No directional effect was predicted for the other stereotype conditions.

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(3063)

I'd Feel Lost With You – Mobile Phone Dependence And Wayfinding. JESSICA MENDOZA, MARY ELIZABETH NEWMAN, NICK REHBERG, DALTON BURCHARDT, and BEVERLY ROSKOS, *University of Alabama, Tuscaloosa* (Sponsored by Beverly Roskos) — Wayfinding takes place daily. It involves memory retrieval of routes and landmarks that are used to get to our destinations. Wayfinding is strengthened through practice; however, with mobile devices being ubiquitous, the need for practice appears to be diminished. Therefore, it is important to consider how reliance on technology is shaping spatial knowledge. This study recruited fifty-one undergraduates for an outdoor wayfinding task. Students completed a questionnaire

on *nomophobia*, the fear of not having one's phone. They were asked to leave their phones behind in the laboratory before completing a walking trip to and from a little-known destination. Upon return to the laboratory, they verbally recalled as many landmarks as possible and then mapped their routes to and from the destination. Findings demonstrated a negative relationship between self-reported dependence on mobile devices and memory for landmarks and routes. This suggests that frequent mobile device use and dependency impair spatial knowledge.

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(3064)

Kids Teaching Kids: Peer Tutoring Of Programming Languages. DIEGO DE LA HERA, *Universidad Torcuato Di Tella* — Teaching is key to maintenance and development of human culture. Surprisingly, it has been much less studied by neuroscience and cognitive science than learning, its counterpart. Here, we propose that teaching among companions of equal status, or peer tutoring, may help children understand and learn programming languages and their fundamentals. In this study we compared i) learning in a regular class set-up, with one adult teacher and a group of children, vs ii) peer tutoring, with one child teaching another of the same age. In addition, we hypothesized that revision and reorganization of knowledge, supposedly involved in teaching, will have an impact on tutor performance as well. To our knowledge, this is the first systematic and quantifiable study pertaining peer tutoring and learning of programming skills in children. Our results have shown that children perform equally well, irrespective of whether they learned from an adult or from a peer. In addition, ongoing further analysis may inform about subtler differences between both conditions, and also about possible tutor benefits not present in children who did not go through the hypothetically enriching experience of teaching.

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Letter/Word Processing

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

LETTER/WORD PROCESSING

(3065)

The Effect Of Word Frequency On Lexical Access With Selective Attention. ZANE ZHENG and OLIVIA SROKA, *Lasell College* — Models of lexical processing postulate that high-frequency words have a lower activation threshold and are easier to access than low-frequency words in the mental lexicon. However, the extent to which this process of retrieval is affected by selective attention remains poorly understood. Here we developed a paradigm where participants had to make either an orientation or a lexicality judgment on each trial regarding either Gabor stripes or a string of letters that were superimposed on each other. Across two experiments, we showed that for both accuracy and reaction time, there was an effect of stimulus difficulty only when the task-relevant feature was attended to. Furthermore, faster reaction time and more judgment errors were observed for high-frequency words than for low-frequency words or nonwords, during only

lexicality but not orientation judgment. Overall our results suggest distinct levels of access for high-frequency words and inform the models of lexical processing.

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(3066)

How Non-Native Speakers Inform Models Of Language Processing: Evidence From A Masked Priming Study With Prefixed And Suffixes Words. LAURA ANNA CIACCIO, *Potsdam Research Institute for Multilingualism, University of Potsdam* (Sponsored by Petroula Mousikou) — In a masked priming experiment involving native (L1) and non-native (L2) speakers of German, we tested morphological priming effects with prefixed and suffixed words and compared these to orthographic and semantic priming. We found reliable morphological priming with prefixed and suffixed words that were distinguishable from orthographic and semantic priming in the L2 group, but less so in the L1 group. The L2 results in particular challenge non-morphological accounts of complex word recognition that try to reduce morphological priming effects to surface form and semantic overlap (Feldman, 2000). We also argue that our finding of parallel priming effects for suffixed and prefixed words is more



consistent with the notion of affix stripping (Rastle et al., 2004) than with stem-search accounts of morphological processing (Grainger & Beyersmann, 2017).

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(3067)

The Impact Of Dialect Exposure On Artificial Literacy Learning In Transparent And Opaque Orthographies. GLENN PATRICK WILLIAMS, *Abertay University*, VERA KEMPE, *Abertay University, Dundee*, NIKOLAY PANAYOTOV, *Abertay University* (Sponsored by Vera Kempe) — In two miniature artificial literacy learning experiments we explored whether exposure to a dialect helps or hinders literacy acquisition. Participants trained to read and write 30 artificial words rendered by 13 invented graphemes. During testing, we assessed performance without feedback on the trained words and 12 novel words. Critically, in the dialect condition, half of the trained words were dialect variants while in the standard condition words remained unchanged. In Experiment 1 (transparent orthography), we found an overall benefit from dialect exposure during reading, presumably because a larger amount of lexical variants facilitates focus on grapheme-phoneme conversion. We also found impaired reading for words with a dialect variant, suggesting lexical competition effects. Overall, performance was worse in Experiment 2 (opaque orthography) where these trends did not reach significance due to task difficulty, suggesting that more training is required. Still, results suggest facilitation of literacy learning with dialect exposure.

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(3068)

Learning New Printed Words: Does Bigram Frequency Help? KARINNE SAUVAL and FABIENNE CHETAIL, *Université Libre de Bruxelles* (Sponsored by Fabienne Chetail) — It is well known that repeatedly exposing readers to print makes them sensitive to frequency of letters or letter groups (such as bigrams). However, how and to what extent this sensitivity to orthographic regularities influences reading and visual word processes is far from being understood. Here, we examined whether bigram frequency impacts the processes of learning new orthographic word forms. Participants were asked to learn new written words, with half entailing bigrams of high frequency and half having bigrams of low frequency. The participants used a self-spaced exposure task, which was followed by a spelling and word recognition tasks. Learning times were similar for both conditions of words, but there was an effect of bigram frequency in the spelling task. Words with high-frequency bigrams were better spelled than words with low-frequency bigrams. These results suggest that bigram frequency impacts the development of orthographic lexical representations.

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(3069)

The Visual Word Recognition Of Singular- And Plural-Dominant Words In Spanish Children And Adults. ANTHEA SANTOS and ALBERTO DOMÍNGUEZ, *University of La Laguna* (Sponsored by M^a Ángeles Alonso) — Previous studies of visual word recognition, in adults, support a dependency for the access to plural from the singular forms representations (Dominguez, Cuetos y Seguí, 1999). Our goal was the study of access and representation of word number in primary school children and the later comparison with adults performance. Plural dominant pairs of words (plural form–dientes-teeth-being more frequent than singular-diente-tooth) and singular dominant pairs (cometa-kite/cometas-kites) were presented to two groups of children, of

8 and 11 years old, and a group of adults for a lexical decision task. The results showed that no differences between children and adults. Plurals of singular dominant pairs were recognized slower than singular forms. On the contrary, plurals of plural dominant pairs were not recognized faster than singular forms. Thus, the age does not seem to be a determinant factor to change the procedure used to access and recognize grammatical number.

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(3070)

Exploring The Time Course Of The Dissociation Between The Repetition Effects Of Words And Pseudowords In Lexical Decision. STÉPHANIE MASSOL, *Université de Lyon, Université Lyon 2*, MARTA VERGARA-MARTINEZ and ANA MARCET, *Universitat de València*, PABLO GOMEZ, *DePaul University*, MANUEL PEREA, *Universitat de València* — We used event-related potentials (ERPs) to examine the time course of the repetition effect of words and pseudowords in lexical decision. Using a two-block design, the critical stimuli could be presented either once in each block (i.e., repeated stimuli) or presented only once in the second block (i.e., non-repeated stimuli). Half of the stimuli were words and the other half were pseudowords. The behavioral data revealed a facilitative effect for repeated words, and an inhibitory effect for pseudowords. The ERP results showed a repetition effect for words starting at around 300 ms and continuing up to 700 ms, with less negative-going waveforms for repeated words than for non-repeated words. In contrast, repeated pseudowords produced more negative-going waveforms in the subsequent time-window (i.e., 500-700 ms). This dissociation will be discussed in terms of familiarity/wordness accounts of the lexical decision task.

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(3071)

Reading without spaces: Letter Order Is Crucial. JONATHAN MIRAULT and JONATHAN GRAINGER, *Aix-Marseille Université* (Sponsored by Jonathan Grainger) — Skilled readers can read text that is printed without extra spacing between words, albeit more slowly and less accurately than normally spaced text. Here we examined the role of precise letter order in reading unspaced text. We compared reading aloud of normal sentences with sentences containing words with transposed letters, in both spaced and unspaced conditions. We predicted that unlike normally spaced text, precise letter order should be crucial for reading unspaced text. We replicated prior findings of relatively fluent reading of unspaced regular sentences as well as normally spaced text with letter transpositions. Crucially, we found that unspaced text with letter transpositions was disproportionately difficult to read aloud, with significantly more errors and longer reading times. We conclude that unspaced text is not read one word at a time (i.e., mimicking spoken language processing), and that a certain amount of parallel word processing is still possible even when there are no spaces between words. It is parallel processing and excessive spatial integration of orthographic information that creates the extra difficulty in reading unspaced text with letter transpositions.

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(3072)

The Effect Of Personal Pronouns On Perspective And Language Comprehension In Autism: An Eye-Tracking Study. MAHSA BARZY, JO BLACK, DAVID WILLIAMS, and HEATHER FERGUSON, *University of Kent* (Sponsored by Heather J Ferguson) — Research shows that personal pronouns (“I/you”)

activate an internal perspective while 3rd person pronouns (“he/she”) activate an external perspective, with the former showing enhanced memory of described events. Using eye-tracking and the visual world paradigm, we tested this personalization effect in adults with and without Autism Spectrum Disorder (ASD vs. TD). Participants listened to sentences containing pronouns, e.g. “I am/You are/He is slicing the fresh tomato”, while viewing four images of hands performing actions from internal or external perspectives, and selected the picture that best matched the description. Their behavioural responses, eye-movements and memory for the actions were recorded. TD participants distinguished internal and external perspectives, but only showed clear prediction for the pronoun “he/she”. ASD participants were impaired in adopting the appropriate perspective following “he/she” and “you”, but were sensitive to personalization following the pronoun “I”. Recall accuracy was higher among ASD than TD participants, irrespective of pronoun.

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(3073)

A Slight Increase In Inter-Letter Spacing Helps Drivers Find A Target Word In Traffic Signs. PILAR TEJERO and BEATRIZ INSA, *Universitat de València*, JAVIER ROCA, *Universitat de*

València — Slight increases of inter-letter spacing relative to the default settings can have a positive impact on adult readers’ recognition of visually presented words. The present work examined whether or not a slight increase in the standard inter-letter spacing of the words displayed on traffic signs can have positive consequences on the search of a target word (e.g., our destination). Twenty-two drivers participated in a driving simulation experiment. They completed a route in which 3-D models of direction traffic signs similar to those currently present in many Spanish motorways were embedded. Each model showed eight toponyms, using either the standard spacing or a 2.5 expanded spacing. Participants were instructed to use a right or a left lever behind the wheel to indicate whether or not the target was present, without neglecting the driving task. With the expanded inter-letter spacing, correct responses were given at a farther distance than with the standard spacing, i.e., they were able to find the word earlier. Vehicle control was not affected by the increase in inter-letter spacing. Therefore, drivers can benefit from a slight increase in inter-letter spacing relative to the standard setting.

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Multisensory Integration

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

MULTISENSORY INTEGRATION

(3074)

Effect Of Audio-Visual Semantic Congruency On Spatial Orienting. DARIA KVASOVA and SALVADOR SOTO FARACO, *Departament de Tecnologies de la Informació i les Comunicacions, Universitat Pompeu Fabra, Barcelona, Spain* (Sponsored by Salvador Soto Faraco) — Combined information from different senses can affect the deployment of attention in space. For example, attention can be captured automatically by synchronized audio-visual onsets, using simple stimuli. Further, in real-world environments, semantic relations between sounds and visual objects might have an influence on attention capture. In the present study, we investigated how task constraints may modulate the effect of cross-modal semantic congruency on attracting spatial attention. We found that the effect of audio-visual semantic congruency on attention is present only when it carries some relevance to the current goal or when it is irrelevant but presented under low perceptual load. Additionally, we demonstrated the effect semantic relationships between sounds and visual events on attention not only in simple and stereotyped stimuli but in real-world scenarios.

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(3075)

Emotional Music Influences Visual Perception Of Facial Expressions During Binocular Rivalry. ROBERT JERTBERG, *Vrije Universiteit Amsterdam*, CARMEL LEVITAN and ALEKSANDRA SHERMAN, *Occidental College* — Binocular rivalry occurs when two percepts, each presented to a single eye, compete for perceptual dominance. We investigated whether emotional music influenced perceptual dominance of an emotionally-congruent face. Participants heard music (happy,

fearful, none) while viewing an emotional face pitted against a neutral face or emotional faces pitted against each other. As expected, emotional faces significantly dominated over neutral faces, irrespective of music. For emotional face pairings, negative faces were predominantly reported as initial percepts, and this bias was attenuated by positive music. Interestingly, the negativity bias did not persist for the duration of the trial, for which positive faces dominated perception, overall. Further, music drove attention to congruent expressions, particularly for positive faces. Finally, when participants explicitly attended either positive or negative expressions, a negativity bias still emerged for initial percepts, and was again attenuated by positive music. Together, these findings demonstrate how emotional sounds automatically drive attention to congruent faces.

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(3076)

The Effect Of Room Atmosphere On The Perception Of Time. SONJA EHRET, JOANA POST, MIRIAM RUESS, and ROLAND THOMASCHKE, *University of Freiburg* (Sponsored by Roland Thomaschke) — The study aims to specify which dimensions of room atmosphere predict the perception of waiting time in a room. 24 participants spent 90 minutes in a room of distinctly contemplative character (a church), and – on a different day, another 90 minutes in a doctor’s waiting room. Awareness of time, felt passage of time judgments, and estimated duration of waiting time were assessed. After waiting, participants also reported how they experienced the individual room’s atmospheres along different dimensional scales. The results suggest that atmospheric qualities of a room – specifically the perceived valence, detachment and liveliness of a room – predict the awareness of time as well as the estimated duration during waiting in that room. Interestingly participants’ mood and emotion did not affect temporal experience.

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(3077)

Cross Modal Priming Effects During Auditory Identification Of Environmental Sounds. KELLY DICKERSON and MARGARET DUFF, *US Army Research Laboratory Human Research and Engineering Directorate*, ALECIA MOSER, SARAH OLSEN, and PETER GERHARDSTEIN, *Binghamton University* — Sound plays a critical role in human situational awareness, alerting an observer to people, animals, and objects in their surroundings. Recent studies suggest that acoustic and semantic information guide perception, however, the extent that one type of cue contributes is often not clear. The present study used an auditory and visual item identification tasks where 21 listeners were presented with 88 sounds and 44 pictures and asked to provide a text labels for each. The results demonstrate that when an image was presented first, participants were faster to identify the corresponding sound, whether or not the identification was correct. Further, the benefit of seeing the image prior to identifying a sound had no decay effect, relative to experiment duration. This finding suggests that cross-modal priming mainly affects identification response time and is present even when participants are not explicitly told to use prior experiences to inform their responses.
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(3078)

Seeing, Hearing, And Feeling The Road: Multisensory Integration And Virtual Driving. MARYAM PANDI, BEN TOWNSEND, MARTIN VON MOHRENSCHILDT, and JUDITH M. SHEDDEN, *McMaster University* — Studies that explore integration of audio, visual, or vestibular cues, are derived from stimulus detection and discrimination tasks in which stimuli are selective and controlled. The role of multisensory integration is not well understood in more dynamic and realistic tasks. We attempted to fill this knowledge gap by measuring the contribution of different combinations of sensory cues to driving performance. Participants were exposed to a series of combinations of vestibular, visual, and auditory cues in a driving simulator. In each condition, participants had to maintain a constant speed and drive in the middle of a straight road. Results indicated that participants' overall performance was the poorest when they had only the visual of the road. Also, our results show that driving performance is significantly enhanced in multi-sensory conditions that include audio cues. We see a boost in relative driving performance when participants are able to take advantage of more than one source of sensory information.
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Numerical Cognition

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

NUMERICAL COGNITION

(3079)

(Withdrawn) Perceiving Symbolic And Nonsymbolic Representations Of Null Numerosity. RUT ZAKS-OHAYON, *Ben Gurion University of the Negev*, MICHAL PINHAS, *Ariel university*, JOSEPH TZELGOV, *Ben Gurion University of the Negev*, *Achva Academic College* (Sponsored by Joseph Tzelgov) — Numbers are symbolic representations of the total amount of members in a set. All members in a set are associated with a specific quantity, as such, all of them are ordinally mapped onto the mental number line. Conversely, an empty set is not associated with a specific amount. In a series of experiments, the present study tested under which conditions zero was represented on the mental number line as a numerical entity, as indicated by the distance effect. We conducted three experiments, manipulating: (a) the notation of the stimuli set (i.e., symbolic and nonsymbolic numerosities), (b) task requirements, and (c) the stimuli range. Our findings demonstrated that the emergence of the representation of an empty set as a numerical entity is context-dependent; thus, an empty set is not necessarily the nonsymbolic representation of "0". The implications of these findings are discussed with regard to models of number representation.
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(3080)

Statistical Inferences In A Non-Symbolic Context By Adults And Preschool Children. WEN-CHI CHIANG and HE-RUI CHEN, *National Chung Cheng University* — Some studies have suggested that infants can represent probabilities of physical events, and reason about a likely sample given the population, and vice versa. These competences in adults were often studied in symbolic numerical contexts. An often unaddressed issue is whether infants' statistical inferences were influenced, or mediated, by absolute quantities. We therefore tested adults and preschool children on a

non-symbolic task that required inferences from a random sample and binary probability judgments on the population of which the sample was obtained. A key finding is that performances on the critical trials, which pit the quantity against the proportion of a target type, were negatively affected by preceding trials in which a reliance on proportions versus on quantities resulted in the same judgments. This effect was detrimental to preschoolers, leading to below-chance performance on the critical judgments, and also evident in adults, whose performance remained above-chance but was significantly reduced.
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(3081)

Convex Hull As A Heuristic For Enumeration. NAAMA KATZIN, MOTI SALT, and AVISHAI HENIK, *Ben-Gurion University of the Negev* (Sponsored by Avishai Henik) — Enumeration up to four, subitizing, is accurate and fast with only 50-80ms increase per item. Enumeration above four, estimation, is less accurate and more time consuming with an additional cost of 200ms per item. Subitizing and estimation are considered two distinct processes. We suggest that the shape of the convex hull, the polygon created by the smallest set (of dots) that contains all stimuli, may account for both processes. In two experiments we show that enumeration of dot arrays is modulated by the number of vertices on the convex hull. Namely, a low number of vertices on the convex hull yields an underestimation of numerosity; a high number of vertices on the convex hull yields an overestimation of numerosity. We suggest that the perceptual system utilizes convex hull as a heuristic to estimate numerosity.
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(3082)

Two-Digit Number Processing: Serial, Parallel, Or Coactive? DANIEL FITOUSHI, *Ariel University* — Holistic models of two-digit number perception assume that decades and units are

converted automatically into a single magnitude code. In contrast, decomposed models assume that decades and units are represented separately as two independent attributes. In the present study, two-digit number processing was examined from the composite end, by asking participants to respond to the individual components. Two powerful paradigms of multidimensional perceptual integration were used: (a) Garner's speeded classification task (1974) and (b) system factorial technology (SFT, Townsend & Nozawa, 1995). The results from the Garner paradigm indicated that participants processed the two-digit components as partially integral dimensions. The SFT results indicated that decades and units were processed in a parallel-coactive architecture with supercapacity in rates. These results support a hybrid model, according to which units and decades are processed in parallel but then coalesce into a single holistic magnitude representation.

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(3083)

A Right Hemisphere Bias For Arithmetic. SELIM JANG and DANIEL C. HYDE, *University of Illinois at Urbana-Champaign* — Right hemisphere biases for mathematical thinking are clearly seen early in development, but may be masked by interactions between mathematics and language in adults. To determine whether hemispheric differences for mathematical thinking persist into adulthood, we asked participants to add two sequentially presented arrays of objects and judge the whether a third array, the proposed answer, was the correct sum or not while measuring event-related potentials (ERPs). We manipulated the visual field of presentation and the relatedness of incorrect answers to the actual answer by two distances (numerical ratio). We observed an effect of relatedness of incorrect answers only under left visual field presentation, providing evidence for a right hemispheric bias in arithmetic processing in adults. This bias contrasts with classic left hemisphere biases for processing of language, providing new support for the idea that mathematics is at least partially distinct from language in the mind.

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(3084)

Numerical And The Intraparietal Sulcus. RICHARD THOMAS and ALICE PETERKIN, *St. Mary's University* — The intraparietal sulcus (IPS) is an important area of the brain for numerical

cognition (Norton & Deater-Deckard, 2014); with the left side found to be important for mathematical processing of visually presented digits (Cohen Kadosh & Walsh, 2009). This study investigated the role of the left IPS in mathematical processing by applying single-pulse TMS to this area while participants carried out calculations that differed in complexity (simple addition, and more complex multiplication). Results showed that when TMS was applied to the left IPS response times for simple addition calculations were increased compared to sham and no TMS conditions. However, for complex multiplication calculations TMS had no effect. The findings suggested that the left IPS is involved in simple calculations but when complex calculations occur different areas of the brain are involved, possibly because multiplication is taught using a rule-based method that recruits different cognitive and neural processes. Email: Richard Thomas, thomasr@smuc.ac.uk

(3085)

(Withdrawn) The Temporal Dynamics Of Numerosity Comparison: Insights From Response Trajectories. MICHAËL VANDE VELDE and ALAIN CONTENT, *Université Libre de Bruxelles* (Sponsored by Alain Content) — Our ability to estimate the number of items in a set is often ascribed to the Approximate Number System (ANS). In a comparison task, however, performance is not only driven by the numerosities of the arrays but also by their visual properties (e.g., convex hull). To account for these effects, authors have recently modeled the numerosity comparison as a weighting process, teasing apart the effects of ANS acuity from those of the non-numeric stimulus features. The major drawback of this model is that it is static: It predicts well the final choice (i.e. the set selected) but does not allow to make inferences about how processing evolves over time. This is particularly annoying considering that recent data suggest that numerical representation precision and influence of visual properties are time-dependent. To overcome this limitation and provide insights on the dynamics of the process, we tracked continuous hand movements during a comparison task, in which we orthogonally manipulated numerosity, size, and convex hull ratios. Analyzing the evolution of the trajectory over time allowed us to map out a timeline of the relative weights of numerosity and visual properties during the comparison process.

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Statistics and Methodology

Friday

Grote Zaal

Viewing 17:20-19:00, Author Present 17:20-19:00

STATISTICS AND METHODOLOGY

(3086)

Validity And Feasibility Of Obimon, An Open-Source Device For Measuring Electrodermal Activity In Psychological Experiments. KRISZTIAN KASOS, SZABOLCS ZIMONYI, and ANNA SZEKELY, *Eötvös Loránd University* (Sponsored by David Balota) — The objective behind designing a new open-source device was to be able to measure electrodermal activity (EDA) simultaneously on many subjects, monitoring their activity in real-time, and collecting high precision data suitable for analyses. To assure feasibility of simultaneous measurements, the devices must be compact and wearable, without compromising data quality and sensitive to small changes in arousal in the full measurement

range. Experiments using synchronized devices were carried out to assess validity, system characteristics and scope of utility. Validity of Obimon was demonstrated using Bland Altman analysis. We assessed EDA from multiple body-parts, and found, the palmar surfaces to be the best places to measure the type of low-level stimuli we used. The third experiment was carried out in small groups (2-5 participants) while measuring simultaneously and bilaterally from palms and plantar surfaces. Our results suggest that the electrodermal mapping of emotions elicited by music show lateral differences both on the hands and the feet. Based on analyses of the high precision data, we conclude that the Obimon device presented here is a valid and feasible tool for collecting EDA in single or multi-subject environment.

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(3087)

Psychometrics And The Continuous Mind: Exploiting Action Dynamics With Time Continuous Multiple Regression.

STEFAN SCHERBAUM, *Technische Universität Dresden* (Sponsored by Marcus Janczyk) — Psychometrics usually relies on discrete measures, e.g. answers in questionnaires or responses in tasks. Thereby however one neglects the information that is present in the process leading to an answer or a response. Mouse tracking promises to open a continuous window on such processes, but mouse tracking studies do not exploit the full potential of the method, that is, the extraction of dynamic, psychometrically valid markers for the different sub-processes which are intertwined on the way to the final response. I will present a method, time continuous multiple regression (TCMR), that extracts dynamic markers for the different sub-processes leading to a response. These dynamic markers are specified by the timing, the duration, and the strength of the influence of the different sub-processes. I will present results on the psychometric properties of these dynamic markers, i.e. reliability and validity. Furthermore, I will illustrate how these dynamic markers can further be applied in group-level studies, e.g. on differences between the Flanker and the Simon task. All analyses presented can be performed with the TCMR Matlab toolbox that is provided for download (osf.io/5e3vn).

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(3088)

The Effect Of Pregistration On Trust In Empirical Research Findings. SARAHANNE M. FIELD and DON VAN RAVENZWAAIJ, *University of Groningen*, E.-J. WAGENMAKERS, *University of Amsterdam*, ANJA ERNST, RINK HOEKSTRA, and HENK A.L. KIERS, *University of Groningen* (Sponsored by Eric-Jan Wagenmakers) — The crisis of confidence in research findings has played a primary role in undermining the trust researchers place in the findings of their peers. Thus, the importance of increasing trust in reported research is paramount.

Incentives such as preregistration are aimed at establishing a more trustworthy scientific literature. As it stands, however, no empirical evidence exists demonstrating that preregistration does increase trust. Additionally, the picture may be complicated by a researcher's familiarity with the author of the study. This report describes a combined quantitative and qualitative study. In the former, we test the extent to which preregistration increases the trust of participants in the reported outcomes, alongside how their familiarity with other researchers influences this effect on trust. Our results show that preregistration increases researchers' trust in findings. The current sample of academic psychologists utilizes a broad range of information when determining how much to trust the results of their peers. We also discuss, on the basis of the qualitative results, how the current methodology can be improved for a planned replication of our quantitative results.

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(3089)

Assessing The Benefits Of Preregistration. BENCE E. BAKOS, MARK ZRUBKA, PETER SZECSI, MARTON KOVACS, and BALAZS ACZEL, *Eotvos Lorand University* (Sponsored by Balazs Aczel) — It has been suggested that preregistration should improve the methodological quality of psychological research. To test this assumption, we compare preregistered studies to non-preregistered studies by objective measures. By this, we aim to examine the thoroughness of statistical reporting (e.g., whether effect sizes, confidence intervals, a priori power analyses etc. are provided) and the availability of materials, data, and analysis plan necessary for replication efforts. To investigate, whether any occurring improvements can be accounted for preregistration only, we compare each article to a non-preregistered article from 1) the same main author and 2) from the same journal. In order to contribute to the development of psychological research, we aim to identify strengths of preregistration and find room for its improvement.

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POSTER SESSION 4

Cognitive Control III

Saturday
Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

COGNITIVE CONTROL III

(4002)

Implicitly Conditioned Stimulus-Effect Associations Can Affect Metacontrol States. ROEL VAN DOOREN, ROBERTA SELLARO, and BERNHARD HOMMEL, *Leiden University* (Sponsored by Manila Vannucci) — According to the Metacontrol State Model, human behavior can be described in terms of two counteracting systems: one promoting persistence, the other promoting flexibility. The ability to adjust the balance between these two systems is referred to as metacontrol. Interestingly, metacontrol states have been observed to be quite flexible and can change as a function of long-term (e.g., cultural background) and short-term factors (e.g., mood). The present study extends previous observations by providing evidence that implicit conditioning procedures can be another effective way to bias metacontrol states. Specifically, we show that, whenever such unconscious learning is successful, the mere presentation of the conditioned stimulus can reactivate the metacontrol state that was previously associated with that stimulus. Extending previous research, we thereby show that metacontrol states are in fact flexible and that short-term factors are effective in establishing temporary and specific metacontrol states that can affect (i.e., transfer to) performance in subsequent unrelated tasks.

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(4003)

Clustering And Switching Behavior In Fluency Tasks: Gaining Additional Insight In Cognitive Metacontrol. VERA MEKERN, ZSUZSIKA SJOERDS, and BERNHARD HOMMEL, *Leiden University* — The balance between persistent and flexible cognitive control is crucial for adaptive behavior (Hommel, 2015). We hypothesized that persistence and flexibility contribute to fluency, or the ability to produce many different responses in a short amount of time, in a range of fluency tasks. We propose that the balance between persistence and flexibility in these tasks is reflected by the use of clustering and switching strategies, respectively (Troyer, Moscovitch, & Winocur, 1997). In our sample ($N=126$), clustering and switching behavior both uniquely contributed to composite fluency in three types of fluency tasks. However, where switching was to some extent generalizable over different tasks, clustering was not. We related fluency-related clustering and switching to similar measures in other tasks of cognitive control as well as mood and brain dopamine levels, and propose that these measures might offer additional insight in adaptive cognitive control over fluency composite measures alone.

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(4004)

The Effect Of Flexibility-Promoting Vs. Persistence-Promoting Dual-Task Training On Creativity. SASKIA HEIJNEN, *University of Leiden*, ROBERTA SELLARO and BERNHARD HOMMEL, *Leiden University* — There is growing evidence that cognitive control states can vary both between and within people and that they can be systematically controlled to promote either a more persistent or a more flexible cognitive control state. The

current study sought for converging evidence supporting the possibility that current metacontrol states can be systematically biased by means of tasks that call either for persistence or flexibility. In a within-subject design, participants performed short dual-task training to promote, in two different sessions, a serial (i.e., persistent) vs. a parallel (i.e., flexible) processing style, both interleaved with a convergent and a divergent creativity task (remote association task and alternate uses task, respectively). Preliminary results support the hypothesis that engaging in a short dual-task training is effective in biasing metacontrol states towards either persistence or flexibility, and that training-induced metacontrol states can affect performance in subsequent unrelated tasks.

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(4005)

Ready, Steady, Stop! The Effect Of Response Inhibition Training On Drivers' Behaviour At Amber Traffic Lights. WILLIAM G. NICHOLSON, *University of Exeter*, FREDERICK VERBRUGGEN, *Ghent University*, IAN P.L. MCLAREN, NATALIA S. LAWRENCE, and CRIS N.W. BURGESS, *University of Exeter* (Sponsored by Frederick Verbruggen) — In the UK, drivers should stop when a green traffic light turns to amber, but many fail to do so, resulting in accidents. Research has found that response inhibition training can change behaviour regarding junk food and alcohol consumption, therefore we investigated whether such training could increase drivers' stops at amber traffic lights. Within a laboratory we gave stop-change training to 92 drivers using computer generated images of UK traffic lights. Participants undertook a driving scenario pre- and post-training on a driving simulator in which they encountered a number of traffic light signals including twenty amber lights. Participants' stops at the amber lights pre- and post-training were recorded. In the training task, the experimental group received stop-change trials where a traffic light changed from green to amber requiring a change in response from 'go' to 'stop'. The control group also received these trials but with a change of lights from green to blue. An effect was found, with bayesian analysis providing anecdotal evidence for the theory that inhibition training helps to increase the number of stops at amber traffic lights. Given this result we will discuss how training can be improved in future research.

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(4006)

A Study Of The Relationship Between Mindfulness And Attentional Control Using Self-Report Measures. FABRICE B.R. PARMENTIER, AINA YAÑEZ, and PILAR ANDRÉS, *University of the Balearic Islands* — Mindfulness is often described as an ability to be in the moment, aware of what we are doing and not overly reactive to what is going on around us. Hence mindfulness is often assumed to improve attentional functioning. Evidence supporting this contention remains scarce, however. Using self-report measures, we examined whether mindfulness and meditation improve attentional control, evaluated the potential mediating role of depression, anxiety, worry, mind wandering, and controlled for age and education level. Our sample consisted of 1150 participants aged between 18 and 76



years, with no history of psychological disorders, and included both meditators (496) and non-meditators (564). Using structural equation modelling, we found a significant direct link between mindfulness and attentional control. Depression and worry (but not anxiety or mind wandering) acted as significant mediating factors: Mindfulness reduced depression and worry, both of which reduced attention control. Interestingly, meditation did not impact attentional control directly, though it did increase mindfulness. We suggest that mindfulness may benefit attentional functioning, directly and indirectly, while meditation may only do so by increasing mindfulness.

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(4007)

The Role Of Emotional Expression In Inhibition-Induced Forgetting. HYEJIN JADE LEE and YANG SEOK CHO, *Korea University* (Sponsored by Sowon Hahn) — Chiu and Egner (2015) reported inferior memory performance for no-go cued materials compared to go cued materials, a phenomenon referred to as the “inhibition-induced forgetting”. According to them, response inhibition shares a common attentional resource with memory encoding so that action control diverts resource available for perceptual encoding. The present study aimed to examine whether emotion modulates this phenomenon. Participants were asked to categorize face stimuli by gender in a go/no-go task in Experiments 1 and 2 where facial expressions were manipulated. A surprise memory test, followed after a delay, showed that participants were better at recognizing angry faces than neutral faces, but the impaired memory for the inhibitory cued faces was not observed in Experiment 1. In Experiment 2, in which angry and neutral faces were presented in separate blocks, inhibition-induced forgetting occurred with angry faces having higher memory than neutral faces. The results suggest that emotion may serve important functions in modulating inhibition-induced forgetting.

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(4008)

Increased Goal Shielding Under Stress: The Influence Of Current Action Goals On Affect-Induced Facial Muscle Contractions Increases After Stress. JULIA KOZLIK, *University of Greifswald*, ROLAND NEUMANN, *University of Trier*, FRANZISKA PLESSOW, *Harvard Medical School*, RICO FISCHER, *University of Greifswald* — Acute stress seems to foster goal shielding resulting in enhanced perseveration. Here we investigated whether this also applies to affective processing contexts which produce natural response tendencies (e.g., enhanced zygomaticus/corrugator activity after positive/negative stimuli). Do stressed individuals even stick to current action goals when these counteract their natural responses? To test this volunteers were exposed to a stress- vs. no-stress-induction phase. Afterwards, we applied an affective Simon task that required to categorize a non-valent aspect of affective stimuli by voluntary contractions of the zygomaticus or corrugator. To manipulate goals, a second task (i.e., valence categorization) was randomly intermixed for which a congruent (i.e., positive > zygomaticus; negative > corrugator) or incongruent S-R rule (i.e., negative > zygomaticus; positive > corrugator) had to be applied. We observed a reduced affective Simon effect when incongruent (compared to congruent) action goals were pursued. This effect was stronger in the stressed group.

Thus, stress fosters goal pursuit even when goals oppose natural response tendencies. This finding challenges the widely believed idea that stress promotes habitual behavior.

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(4009)

Investigating The Affective Modulation Of Cognitive Control With A Complexity-Minimized Conflict Task. BENCE PALFI, *University of Sussex*, MATE GYURKOVICS, *University of Sheffield*, MARTON KOVACS and BALAZS ACZEL, *Eotvos Lorand University* (Sponsored by Claudia von Bastian) — Dynamic adjustments of cognitive control are often measured by the congruency sequence effect (CSE), the interaction between congruency on Trial N-1 and congruency on Trial N in a conflict task. Learning and memory confounds, however, often make it difficult to interpret findings purely in terms of control adjustments. We developed a task that enables the measurement of the CSE while not only minimizing contingency and feature repetition confounds but also potential carry-over effects. In this modified Stroop task, participants respond to pairs of trials (with no overlapping features) separated by a filler task that requires no cognitive control. We used the task to investigate the effect of transient affective states on conflict resolution by presenting emotional stimuli before each trial pair. This test allows the investigation of affective modulation of cognitive control in a simplified design.

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(4010)

Musical Expertise Modulates Dual Mechanisms Of Cognitive Control. LUIS MORALES, *Universidad Loyola Andalucía*, SUSANA PLAZA, *University of Jaén*, JULIA MORALES, *Universidad Loyola Andalucía*, CARLOS J. GÓMEZ-ARIZA, *University of Jaén* — Previous studies demonstrate that musicians show better cognitive performance in specific spheres engaging executive control compared to non-musicians. However, the existing literature has mainly focused on isolated mechanisms involved in cognitive control, ignoring current approaches proposing that executive advantages derived from certain experiences not only depend on the unique contribution of isolated cognitive processes but also on the critical interactions between them (e.g., proactive and reactive control). The current study compared professional musical students and university students with no musical experience in different cognitive skills, such as working memory and inhibitory control. Critically, they also performed a task that required continuous adaptation of proactive and reactive control strategies (AX-CPT task). In this manner, we could observe both main processes of executive functioning and the interaction between them. The results showed that the musicians become more efficient than controls at coordinating proactive and reactive control, which speaks in favor of their higher cognitive flexibility. We discuss how musical expertise modulates cognitive control as reported in previous studies.

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(4011)

The Influence Of Response Mode On The Scope Of Control In The Simon Tasks. CHAE-EUN LIM and YANG SEOK CHO, *Korea University* — The present study examined the prominent task features influencing the specificity of control mechanisms underlying the congruency sequence effect (CSE). In two experiments, participants were to perform horizontal and vertical Simon tasks alternatively in a trial-by-trial manner with aimed

movement responses to make the degree of the spatial compatibility between the irrelevant stimulus location and response in the vertical Simon task more equivalent to that in the horizontal Simon task. In Experiment 1, in which two color Simon tasks were responded either by a common or distinct response modes, a cross-task CSE was obtained only when the common response mode was used. Furthermore, in Experiment 2, a cross-task CSE was consistently engendered regardless of whether the two tasks had the same or different task-relevant stimulus dimensions, when both tasks were performed by a common response mode. These results suggest that, at least in the Simon tasks, response mode plays a critical role in determining the scope of control, rather than the task-relevant stimulus dimension.

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(4012)

Individual Differences In Intelligence, Working Memory Capacity, And Habitual Use Of Inner Speech As Predictors For Performance In Conflict Tasks. MIRIAM GADE, *Catholic University of Eichstätt-Ingolstadt*, MARKO PAELECKE, *University of Wuerzburg* — Inner speech has been proposed to play an important role in everyday goal achievement but has only been intensively researched in children. In our study we set out to establish individual differences in the reliance on inner speech such as self-instruction as a trait that is predictive for individual differences in cognitive control performance, e.g., resistance to interference. 160 participants performed six laboratory tasks assessing cognitive control abilities (e.g., Stroop task, Flanker task). Performance was assumed to vary depending on the engagement of inner speech used for task completion. To control for individual difference in intelligence and working memory capacity, those two constructs were assessed next to inner speech habits and task performance. To provide evidence for our claim of individual differences in performance due of differential reliance on inner speech, data were analyzed with multilevel analysis simultaneously taking into account personality as well as performance measures. Email: Miriam Gade, miriam.gade@ku.de

(4013)

(Withdrawn) Costs And Benefits Of Voluntary Selection For Learning And Retrieval Of Attentional Sets. DAVID DIGNATH and ANDREA KIESEL, *University of Freiburg* (Sponsored by

Andrea Kiesel) — Actions are controlled in two fundamental different ways, either by an exogenous, stimulus driven control mode or by an endogenous, voluntary control mode. Here, we investigated whether endogenous control facilitates learning of attentional sets as indexed by the context specific proportion congruency effect. Participants choose on each trial between two different contexts in which they had to perform a flanker task. Critically, each context was associated with different proportions of congruent to incongruent flanker trials. We assessed how participants learned these biased regularities and adapted their attentional processing accordingly. Three experiments are presented that contrast endogenous and exogenous learning of attentional sets. Results showed superior learning and retrieval of attentional sets for endogenous control. Additional control experiments showed that this benefit was rather due to the order of contexts than due to the act of choosing. This suggests that under voluntary control people can optimize the scheduling of stimulus presentation.

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(4014)

Investigating The Relation Between Smartphone Addiction And Executive Functions. ANDREE HARTANTO, WEI XING TOH, QIN YING JOANNE TAN, and HWAJIN YANG, *Singapore Management University* — With the rapidly growing functional adaptability of smartphones in recent years, smartphone devices have become a ubiquitous part of our lives. Despite its high prevalence, little is known about the cognitive consequences of smartphone overuse. To elucidate this issue, two high-powered studies were conducted to examine the relation between smartphone addiction and executive functions, measured by the Attention Network Test for Interaction and Vigilance (ANTI-V; Roca et al., 2011) in Study 1, and task-switching paradigm and saccade task in Study 2. In two studies, we found that higher smartphone addiction was significantly associated with lower sustained attention (Study 1) and higher switch costs (Study 2), even after controlling for demographics, socioeconomic status, and intelligence. However, smartphone addiction was not associated with executive control network scores (Study 1), the antisaccade effect, and mixing costs (Study 2). Empirical and theoretical implications were discussed.

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Emotion and Cognition

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

EMOTION AND COGNITION

(4015)

Attentional Bias For Taboo Words. TATIANA PRYAKHINA, *The Russian Presidential Academy of National Economy and Public Administration*, VICTORIA OVSYANNIKOVA, *Higher School of Economics National Research University* — The present study compares attentional bias for positive and threatening stimuli. However, the small number of studies used taboo words for Russian speaking people, although this material clearly reflects the emotional processing of information. Taboo words were included in dot-probe task. In our study, we tested the idea that taboo words, compared with neutral distracters, will impair emotional attention. Participants (n=43) performed dot-probe

task (MacLeod, Mathews, Tata, 1986), then they were asked about words, which they remember. There was not statistically significant differences between the neutral and taboo words. We found a correlation between the number of correctly named words and attentional bias for presenting words on 100 ms ($r = 0.431$ $p < 0.05$). Subsequent research will focus on procedure of dot-probe task. This research showed a need to control the emotionality of words for participants. Larger effects of attentional bias for taboo words can be obtained with the use of a large number of probes.

1. MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, 95(October), 15–20. doi:10.1037/0021-843X.95.15

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(4016)

Does Reading Literary Fiction Really Improve Theory Of Mind? Results Of Two Replication Studies (Kidd & Castano, 2013). KATINKA DIJKSTRA, *Erasmus University Rotterdam*, PETER VERKOEIJEN, *Erasmus University Rotterdam, Avans University of Applied Sciences*, MATTHIJS BAL, *Responsible Management Research Group, University of Lincoln* — In 2013, Kidd and Castano demonstrated in *Science* that reading literary fiction enhances measures of Theory of Mind (entails the ability to attribute mental states of others to themselves) relative to reading popular fiction. Since then, several studies have failed to replicate these findings (Dijkstra, Verkoeijen, van Kuijk, Chow, Bakker, & Zwaan, 2015; Panero, Weisberg, Black, Goldstein, Barnes, Brownell, & Winner, 2016; Samur, Tops, & Koole, 2017). To assess whether the findings of Kidd & Castano could be replicated under more favorable conditions, a conceptual replication study was conducted (Dijkstra, Verkoeijen, & Bal, submitted). Participants were exposed repeatedly to the literary and popular fiction texts and read longer excerpts in these sessions relative to the original study. The results still showed no benefit of reading literary fiction on measures of Theory of Mind over reading popular fiction, questioning the robustness of the findings of the original paper with regard to measures of Theory of Mind. Readers' emotional transportation ratings did increase in the literary fiction over time, however, suggesting growing immersion in the literary fiction condition relative to the popular fiction condition.
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(4017)

Speaking Out Loud "Pleasure" Makes People More Pleased: Influence Of Overt Speech Of An Emotion Word On Emotion Perception. HYEONBO YANG, SOYOUNG KWON, and DONGHOON LEE, *Pusan National University* (Sponsored by Donghoon Lee) — According to the psychological construction theory of emotion, labeling an affect promotes the construction of the conceptual representation of facial expressions (Nook, Lindquist & Zaki, 2015). In the present study, we investigated the effect of reading aloud an emotion word on the perception of emotional face using a psychophysical method. During the experiment, one of three words ('Pleasure', 'Anger', and 'Mass') was presented and participants read aloud the word if it was underlined. Then, the target face, chosen from 6 gradually morphed faces from Happy to Angry, was presented for a two-alternative forced choice task ('Happy' or 'Angry'). Using a psychometric function, points of subjective equality (PSEs) of participants were estimated and statistically analyzed. Compared with the non-emotional word, reading an emotional word, 'Pleasure' or 'Anger', significantly changed the PSE. Moreover, when the word 'Pleasure' was read aloud, the PSE was further biased to Happy. The current results suggest that speaking out loud an emotional word effectively enhances the perception of emotional faces.
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(4018)

Understanding Emotional Language Could Be Associated With Inhibition Processes: Evidence From An ERP Study. SANDRA PAOLA AGUDELO-ORJUELA, DAVID BELTRÁN, and MANUEL DE VEGA, *Universidad de la Laguna* (Sponsored by Manuel de Vega) — Prior research has shown that the processing of affective visual scenes modulates behavioural and neurophysiological indexes of response inhibition. Here we present two ERPs experiments that, first, extend the reach of this emotional effect to language, and second, reveal that response

inhibition also modulates emotional processing. For both studies we made use of a modified version of the Go/NoGo paradigm in which participants read sentences (positive, negative or neutral) while monitoring cues signalling to either execute or withhold a manual response. In the first experiment, the emotional content of the sentences appeared just before the onset of the Go/NoGo signal, and modulated the amplitude of the inhibition-related N2 component. In the second experiment, this signal was shown at the very start of the sentences having an impact on the activity of emotion-related components (EPN and LPC) elicited by the emotional words embedded in the sentences.
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(4019)

Altered Crying Face Processing As A Common Neural Link Between Childhood Maltreatment And Neglectful Mothering. SILVIA HERRERO, JOSEFA RODRÍGUEZ, INMACULADA LEÓN, and JUAN ANDRÉS HERNÁNDEZ, *Universidad de La Laguna*, ILEANA QUIÑONES, *Basque Center for Brain, Cognition, and Language* (Sponsored by Inmaculada León) — Several studies are trying to prove that childhood maltreatment is associated with the risk of transmission to the next generation. This study revealed by using fMRI while presented different facial expressions (infant neutral, infant crying or adult crying and neutral faces) that there was an overlap of affected areas in neglectful mothers with a history of childhood maltreatment suggesting a common neural link. Using the BOLD response, we were able to conclude that the largest clusters showing commonalities correspond to reduced activity in the left lingual, bilateral fusiform, hippocampus, parahippocampal gyrus and right amygdala, with other clusters in the insula and inferior frontal gyrus. This neural insensitivity of crying faces may provide a neurological substrate for the intergenerational transmission of maltreatment. These results are consistent with those advocated studies which proposed that early experiences of stress (i.e., early deprivation, severe stress, sexual abuse) may influence over the next generations.
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(4020)

Contextual Modulation of Emotion Perception Depends on the Social Relationship Between Target and Context Faces. JEONGSOO LEE and DONGHOON LEE, *Pusan National University*, MYEONG-HO SOHN, *The George Washington University* (Sponsored by Myeong-Ho Sohn) — We investigated the effects of the social relationship and the affective context of the contextual faces (e.g., surrounding faces) on the emotion perception of the centrally presented target face. Four happy or sad faces as affective context were presented before the target, and the social relationship between the target and the surrounding faces was manipulated as the same/different sport team. Participants first made an affective judgment of the game result (Win/Lose) for the surrounding faces, and then made a happy-sad decision for the target face, which was one of 6 faces gradually morphed from happy to sad. Using a psychometric function, points of subjective equality (PSEs) of participants were estimated and analyzed by repeated measures ANOVA. Results showed a significant interaction of *affective context* and *social relationship*, suggesting that the influence of the emotion of surrounding people on the emotion perception of the target person depends on the social relationships.
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(4021)

Neural And Cognitive/Motivational Mechanisms Underlying The Processing Of Stereotypic Roles. BERRY VAN DEN BERG, *University of Groningen*, JOLIEN VAN BREEN, *University of Exeter*, RUSSELL SPEARS and MONICQUE LORIST, *University of Groningen* (Sponsored by NVP membership NVP membership) — Stereotypes can help us rapidly identify the role of a person, notably when an actor is congruent with the role stereotype. However, encountering stereotypes can be threatening to some (e.g., women exposed to women in traditionally devalued roles). To gain insights into the underlying cognitive and motivational processes, we measured brain activity (EEG) while presenting female participants images of actors in neutral, stereotypical and, counter-stereotypical roles. Presentation of a female stereotypical image vs. female counter stereotypes, elicited in female participants a larger fronto-central P3, concurrent with increased fronto-midline theta power (4- 7Hz), followed by decreased posterior Alpha (8-14Hz) power. These effects were smaller/absent when the actors were males. These results suggest that when confronted with images of actors with a stereotypical role that could be threatening, the brain actively recruits fronto-central regions important for regulating attention and working memory followed by enhanced image evaluation - even when viewing images passively.

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(4022)

Biofeedback Is Less Effective In Meditation Than Comparable Feedback Uncoupled From Physiology. ANGELICA M. TINGA and IVAN NYKLICEK, *Tilburg University*, MICHEL-PIERRE JANSEN, *Max Planck Institute for Psycholinguistics*, TYCHO T. DE BACK, *Tilburg University*, TIMOTHY L. GALLATI, *Harvard University*, SHYLO S. SHEPHERD, *Altelier LLC*, SOURABH JAIN, *Relax VR*, SHEA C. REMBOLD, *Super Soul LLC*, MAX M. LOUWERSE, *Tilburg University* (Sponsored by Max Louwerse) — Live (audio)visual feedback paired to a person's physiology is thought to enhance the effectiveness of interventions aimed at arousal reduction, such as meditation. Yet, the literature provides no comparison between biofeedback and other forms of feedback, such as comparable automatic feedback not coupled to physiology. The current study aimed to examine arousal during a virtual reality guided meditation while participants were presented with 1) visualization paired or 2) not paired to their breathing, or 3) no visualization at all. Subjective calmness and tension, heart rate, heart rate variability, respiration, and cortical activity (EEG) were measured during a baseline, followed by a period of stress, followed by meditation under one of the three conditions. The subjective and objective neurophysiological outcomes indicated that visualization not paired to breathing is more effective for lowering arousal during meditation than biofeedback. These findings have important implications for arousal reduction interventions currently applied.

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(4023)

Is Forewarned Always Forearmed? Effects Of Trigger Warnings On Reactions To Negative And Neutrally Valenced Stimuli. VICTORIA MARY EVEREST BRIDGLAND, *Flinders University*, DEANNE M. GREEN and JACINTA M. OULTON, *Flinders University*, MELANIE K.T. TAKARANGI, *Flinders University* (Sponsored by Melanie Takarangi) — Trigger warnings are messages that alert a person that upcoming content may contain themes that could 'trigger' extreme emotional reactions.

However, we currently don't know whether trigger warnings reduce aversive reactions or increase distress. Here, we were interested in whether a warning message about the graphic nature of upcoming visual material (photographs) would influence how viewers react towards that material. We conducted a series of experiments assessing participants' emotional reactions to the same ambiguous photo stimuli presented with or without a trigger warning. We also manipulated the emotional valence of the photos, by pairing each photo with either a negative, neutral or no headline (between subjects). Our hypotheses were only partially supported. We found that warning messages led to small but significant increases in anxiety and negative affect. However, the warnings had negligible effects on emotional reactions to stimuli. Thus, trigger warnings may provide minimal benefit in real-world applications.

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(4024)

The Role Of Emotion And Working Memory Capacity On False Memories. ELIF YUVRUK, AYCAN KAPUCU, and HAKI TURAN, *Ege University* (Sponsored by Aysecan Boduroglu) — The aim of this study is to investigate the effects of emotion and working memory capacity on false-memory using DRM paradigm, originally developed by Deese (1959) / Roediger and McDermott (1995), including positive, negative and neutral words. According to Affect-as-information hypothesis (Clore, Gasper, & Garvin, 2001), positive emotions increase this illusion because they lead to heuristic processing. Also as the working memory capacity (WMC) increases, this illusion decreases due to participants' use of different monitoring strategies. In this study, participant will firstly study emotional DRM lists and then complete recognition task for these lists. Also Operation span task (Turner & Engle, 1989) will be used for measuring participants' WMC. It is hypothesized that DRM illusion will be higher for positive words than for negative words, especially for participants with lower WMC. Participants with high WMC are expected to use diagnostic strategies more than participants with low WMC.

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(4025)

Emotion Both Enhances And Impairs Memory-Guided Attention. NILGUN TURKILERI, DAVID T. FIELD, JUDI A. ELLIS, and MICHIKO SAKAKI, *University of Reading* (Sponsored by Michiko Sakaki) — Long-term memory guides spatial attention (Hutchinson & Turk-Browne, 2012), but the role of emotional arousal on it has remained unclear. Across two experiments, we addressed this question. First, participants were asked to learn the locations of a target embedded within scenes. In half of the trials, scenes included the target (valid-memory), whereas there was no target in the other half. In a consecutive day, they were asked to indicate whether each scene included the target under emotional arousal by fear-conditioning. In the first experiment, arousal worsened detection of the target when individuals did not have a valid memory of the location of the target. In the second experiment with a slightly different design, we found that arousal facilitates detection of the target when individuals have a valid location memory. Both results support recent theories, suggesting emotion has different effects on cognition depending on information's priority (Mather & Sutherland, 2011).

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(4026)

Inflammation Decreases Emotion Recognition—Evidence From The Vaccination Model Of Inflammation. LEONIE JT BALTER, *University of Amsterdam, University of Birmingham*, SARAH ALDRED, MARK DRAYSON, SUZANNE HIGGS, JANE E. RAYMOND, and JET JCS VELDHUIJZEN VAN ZANTEN, *University of Birmingham*, JOS A. BOSCH, *University of Amsterdam*, SASHA HULSKEN, *University of Amsterdam, University of Birmingham* (Sponsored by Laura van Steenberg) — The ability to interpret someone's mental state, such as affects and intentions, is key to complex human social interaction, and impaired in several psychopathologies including major depression. Activation of the immune system (inflammation) has been proposed as a candidate mechanism. The supporting human evidence is, however, based on experiments that besides inflammation also induce high levels of discomfort. Hence, experimental replication using a manipulation that lacks such confounding side-effects is warranted. Forty healthy male participants participated in this double-blind placebo-controlled crossover trial. Inflammation was induced using Salmonella Typhi vaccination (0.025 mg; Typhim Vi, Sanofi Pasteur, UK). Participants completed the Reading the Mind in the Eyes Test in both conditions. Vaccination did not induce sickness symptoms or mood changes, $p > .10$. Typhoid vaccination ($M = 71\%$, $SD = 13\%$) reduced emotion recognition compared to placebo ($M = 65\%$, $SD = 13\%$), $p < .05$. Unconfounded by mood or sickness symptoms, the present findings support the idea that emotion recognition is impaired by immune activation. Inflammation may drive social-cognitive deficits in pathologies that exhibit enhanced inflammation.

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(4027)

Music-Evoked Nostalgia Increase Face Trustworthiness. MASANORI KOBAYASHI, *Kwasensei Gakuin University*, KEIKO OTAKE, *Kwanasei Gakuin University* — Nostalgia is defined as a sentimental longing to the past and it has described as bittersweet emotion. Previous researches indicated that induced nostalgia enhance positive emotion and prosocial behavior. Contrarily, it remains unclear that induced nostalgia affect human cognition. Accordingly, we examined whether music-evoked nostalgia increase perceived face trustworthiness. As nostalgia has a sociality function (Sedikides et al., 2015), we hypnotized that music-evoked nostalgia increase perceived face trustworthiness. The participants rated trustworthiness of human faces by visual analogue scale after listening to nostalgic or control music. The results indicated that nostalgia were successfully induced, and that perceived face trustworthiness score after listening to nostalgic music was significantly higher than that after listening to control music in support of our hypothesis. Thus, music-evoked nostalgia can increase perceived face trustworthiness, suggesting that the sociality function of nostalgia is generalized to face perception.

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(4028)

Mood Influence On The Perception Of Ambiguous Facial Expressions. YULIA KOZHUKHOVA, *Russian Presidential Academy of National Economy and Public Administration*, EKATETINA SUCHKOVA, *Higher School of Economics* — Perception of ambiguous facial expressions can be influenced by a perceiver's mood. Emotional congruency (EC) consists in the better perception of emotions that are congruent with a perceiver's mood. We hypothesized that EC would be stronger

when the duration of stimulus presentation is very short and a perceiver does not have enough time for stimulus processing. In two experiments ($N=69$ and $N=58$), after elicitation happiness and sadness ambiguous expressions that could be perceived as being either happy or sad were presented for 50, 100, 200, and 1000 ms followed by a pair of emotion terms. Participants were asked to choose a word that described the emotional expression in the best way. RM ANOVA showed the significant main effect of mood but no influence of presentation duration on EC. The results suggest that EC effect is robust across earlier and later stages of perception of ambiguous expressions.

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(4029)

Effects Of Positive Affective States With Different Motivational Intensity On Memory Narrowing. YILDIZ ÖZKILIÇ KARTAL, AYCAN KAPUCU, and SONIA AMADO, *Ege University* — Studies on affective state's effect on memory narrowing were mostly conducted to understand the effects of valence and arousal. On the other hand, Motivational Intensity Model of Affect suggests that affects do not only vary in approach-withdrawal motivation but also in their motivational intensity and this model proposes that high motivational intensity leads to memory narrowing. The present study examined the effects of low-intensity (i.e. amusement) vs. high-intensity (i.e. desire) approach motivation on memory narrowing. Participants read three script-based stories which contained central and peripheral story actions and were then given a surprise recall test after 2 days. Primary results showed that desire and amusement did not have different effects on remembering central and peripheral story actions.

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(4030)

The Effect Of Similarity To The Self On Impression Memory. ALLISON M. SKLENAR, MATTHEW P. MCCURDY, ANDREA N. FRANKENSTEIN, and ERIC D. LESHKAR, *University of Illinois at Chicago* (Sponsored by Andrew Mienaltowski) — In the self-similarity effect, there is a memory advantage for social targets similar to the self. However, much of the work in this area has focused on self-similarity of traits (i.e., similarity of the self to a social target on a trait like extroversion). In this experiment, we examined whether the self-similarity effect would extend to political ideology. Participants formed impressions of social targets based on their political ideology and a trait-implicating behavior. We then measured participants' memory for information about each social target. Impression memory was not affected by self-similarity of traits or ideology, but was only affected by valence of the initial impression. There was a reversal of the self-similarity effect for behavior memory. These data suggest self-similarity affects some aspects of person memory, and that the addition of political ideology may have hampered other effects typically seen with similarity of traits.

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Language Processing

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

LANGUAGE PROCESSING

(4031)

Does Reading Ability Predict Individual Differences In The Syntactic Processing Of Spoken Language? SAORADH FAVIER, ANTJE MEYER, and FALK HUETTIG, *Max Planck Institute for Psycholinguistics* (Sponsored by Falk Huettig) — The influence of reading on syntactic processing in spoken language constitutes a gap in our understanding of the cognitive impact of literacy – a recent cultural invention in the timeline of human evolution. As a first step, we conducted a large-scale correlational study to investigate the relationship between online and offline measures of syntactic processing and literacy skills in native Dutch speakers (aged 18-35) from diverse educational backgrounds. Using a comprehension-to-production priming paradigm with auditory presentation, we asked whether reading ability predicts individual differences in syntactic priming behaviour when working memory, processing speed and non-verbal IQ are controlled. In the same sample, we also examined literacy as a predictor of explicit syntactic awareness, indexed as accuracy in an auditory grammaticality judgment task. Our results will help to shed light on the nature of the relationship between literacy and syntactic processing, as well as the mechanisms that underlie syntactic priming effects.

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(4032)

Infant-Directed Speech Effects In Adult Artificial Grammar Learning. KRISZTINA SÁRA LUKICS and ÁGNES LUKÁCS, *Budapest University of Technology and Economics* (Sponsored by Mihály Racsmány) — First language acquisition is facilitated by several characteristics of infant-directed speech (IDS), but we know little about what the relative contribution of these factors is to learning different aspects of language. We investigated IDS effects on grammar acquisition in two experiments. In Study 1, we examined the effects of two features of IDS, incremental presentation of strings (*starting small*) and prosody (comparing *monotonous*, *arbitrary* and *prosody marking phrases*), together with their interaction on the acquisition of an artificial grammar. Presenting shorter strings before longer ones led to higher learning rates compared to random presentation of sequences, and the presence of prosody marking phrase boundaries had a similar effect. In Study 2, we compared the effects of *arbitrary* and *monotonous* prosody types with more controlled stimuli. We found it was not the mere presence of prosody that facilitated learning, but its role in indicating boundaries of structural units in sequences. Our results suggest that *starting small* and prosody support artificial grammar acquisition by facilitating the extraction of regularities from stimuli, indicating they may play an important role in natural language acquisition, as well.

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(4033)

Learning To Read Makes You Faster: Literacy Impacts In Rapid Automatized Naming. SUSANA ARAÚJO and TÂNIA FERNANDES, *Universidade de Lisboa*, FALK HUETTIG, *Max Planck Institute for Psycholinguistics* (Sponsored by Falk Huettig)

— The profound changes in cognitive and brain function induced by literacy acquisition makes this cultural experience a remarkable model for neuroplasticity. Exactly *which* aspects of the cognitive system are affected by (il)literacy, and *how*, have raised revitalized interest. Here we investigated whether literacy acquisition bolsters *rapid, automatic naming* of visual items (RAN), a reading-related ability at the interface of visual recognition and speech production. We tested three groups of adults who differed only in literacy/schooling (illiterate, ex-illiterate, and schooled literate) on a serial object RAN task in which word frequency and phonological neighborhood density were orthogonally manipulated. Literate people performed better than illiterates on speeded naming. Importantly, this literacy-driven advantage was larger for items of low-frequency and sparse neighborhoods. Learning to read has, thus, a substantial impact on the automaticity with which familiar stimuli (e.g., objects) can be retrieved and named, possibly because phonological representations of words become more fine-grained. Email: Susana Araújo, smaraujo@psicologia.ulisboa.pt

(4034)

The Contribution Of Left Dorsolateral Prefrontal Cortex To Language Processing: Evidence From Cathodal tDCS. JANA KLAUS and DENNIS J.L.G. SCHUTER, *Radboud University* — While it has been shown that language comprehension is highly correlated with verbal working memory capacity, its role in language production has been investigated much less. In the current study, we systematically compared the influence of working memory on language comprehension and production performance. In two sessions, 32 healthy native Dutch speakers received online 2-mA cathodal or sham tDCS across the left dorsolateral prefrontal cortex (DLPFC) while performing a sentence comprehension and a picture naming task. Cathodal tDCS reliably increased reaction times in the comprehension task compared to sham tDCS, while the opposite pattern (i.e., shorter naming latencies during cathodal tDCS) was found in the production task. Reliability of the stimulation protocol was verified by a letter flanker task. Cathodal tDCS resulted in longer reaction times compared to sham tDCS, confirming that the current montage effectively targeted the desired region. Moreover, individual effects of stimulation across the three tasks were highly correlated, implying individual differences in tDCS susceptibility. Overall, the results provide causal evidence for the involvement of left DLPFC in both language comprehension and production.

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(4035)

How Appropriate Is Sarcasm In The Workplace? The Influence Of Individual Differences And Social Dynamics. DAWN BLASKO, *Pennsylvania State University, Erie*, VICTORIA KAZMERSKI and SHARIFFAH DAWOOD, *Pennsylvania State University-Erie*, REBECCA MISTEROVICH and CHRISTIE LESLIE, *Pennsylvania State University, Erie*, MARNA J. OWENS-BAILEY, *The Pennsylvania State University* — Sarcasm is ubiquitous in natural language, yet the interpretation of any sarcastic utterance can be very different depending on the social context (e.g. with friends, family, or coworkers) and individual differences of the listener. For example, sarcasm by a work



superior may be intimidating, whereas a similar statement with friends after work can be funny and with an attractive partner flirting. In the current study, we systematically examined, with a diverse sample, the interaction of these variables in context. We examined in more detail the work place dynamics where sarcasm is most likely to appear. Participants' rated how likely and how appropriate it would be to use sarcasm with different types of people (e.g. gender and age) in different situations (e.g., at work, with friends, or with family). The results shown that although some people are more comfortable using sarcasm and tend to see it in a more positive light overall, situational differences and power dynamic are powerful especially in the workplace.
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(4036)

Mental Imagery And Narrative Links Between Events. CAROL MADDEN-LOMBARDI, CNRS/INSERM U1208, *University of Lyon 1*, SOPHIE DEJARDIN, INSERM U1208, *University of Lyon 1*, PETER FORD DOMINEY, CNRS/INSERM U1208, *University of Lyon 1* — The present study investigates the ability to understand mini-narratives (pairs of sentence or pictures) that vary in their predictability or coherence. The second event could be a logical follow up to the preceding event (The woman waits in line at the bakery. She buys a baguette.), or it could reflect an abrupt change in topic (The man drops the envelope into the mailbox. The woman buys a baguette). Two intermediate conditions maintained coherence of the agent, while shifting the action topic (same-agent: The woman drops the envelope into the mailbox. She buys a baguette), or vice versa (same-action: The man waits in line at the bakery. The woman buys a baguette). Results suggest that the capacity to mentally simulate events (and not necessarily general language skill) is crucial in creating meaningful links between events, as high imagers find the sentence and image pairs easier to connect than low imagers. Especially when the agent is the same across events, high imagers make the cognitive effort to generate a narrative link between events. This is in line with research showing better comprehension with increased imagery, as well as perceptually situated theories of language comprehension.
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(4037)

ERP Indicators Of Local And Global Text Influences On Word-To-Text Integration. ANNE HELDER and CHARLES PERFETTI, *University of Pittsburgh* — Reading comprehension requires the integration of word meaning with the meaning of the text. We examined word-to-text integration processes with a focus on sentence-initial words, where building a new sentence structure is obligatory and integrating the word with the preceding text is not (Calloway & Perfetti, 2017). This structure-initiating default process can be accompanied by integration when the sentence-initial word triggers the retrieval of a co-referential binding site from text memory. Three ERP experiments provided results on the time course of word-to-text integration to binding sites that were local (preceding clause), remote (preceding sentence), or global (central theme). When a local binding site was present, lexical-semantic integration (reduced N400) was dominant, with no additional global influence (Exp 1 and 2). When there was no local binding site, global binding to a central theme influenced the integration of sentence-initial words by boosting the retrieval of a remote-binding site (Exp 3).
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(4038)

Validation: Text- And Knowledge-Based Monitoring During Reading. MARLOES VAN MOORT, ARNOUT KOORNNEEF, and PAUL VAN DEN BROEK, *Leiden University* (Sponsored by Johanna Kaainen) — To create a coherent mental representation of a text, readers must monitor incoming information for consistency with the preceding text and their background knowledge (i.e., validation). The current study investigates the cognitive mechanisms and neural correlates of validation processes during text comprehension. In a behavioral experiment we contrasted text- and knowledge-based monitoring to investigate their distinct influences on processing. To do so, we collected reading times for texts that contain information that conflicts with either the preceding text (text-based monitoring) or readers' background knowledge (knowledge-based monitoring). Comparison with control versions of the texts shows that text- and knowledge-based monitoring have different time courses and that working memory only affects the latter, which suggests different underlying cognitive mechanisms. Preliminary neuroimaging results complement these findings by suggesting partly distinct networks. These results show that validation occurs against both prior text and background knowledge, but likely via distinct cognitive and neurological routes.
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Meaning/Semantics

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

MEANING/SEMANTICS

(4039)

Accessing Indeterminate Event Information In Context: Evidence From An Eye-Tracking Memory Paradigm. CAITLYN ANTAL and ROBERTO G. DE ALMEIDA, *Concordia University* — A sentence such as *Mary began the book* is indeterminate with regards to what Mary began doing. Indeterminate sentences constitute a test case for two key issues regarding the nature of language comprehension: (1) whether semantic composition is simple (classical) or enriched with intended constituents; (2) the

nature of the linguistic and cognitive resources that eventually help us interpret the event the sentence conveys. We conducted an eye-tracking study to investigate whether indeterminate sentences embedded within biasing contexts would trigger event interpretations, using a long-term memory paradigm. In each trial, participants were presented with one of three recognition probe types for reading while having their eyes monitored: an identical/indeterminate (*began the book*), contextually supported (*began reading the book*), or contextually unsupported (*began writing the book*) sentence. Recognition probes were presented 0 seconds (s) after having read the indeterminate sentence, or following an

additional 25s of neutral discourse. Preliminary results suggest that indeterminate sentence interpretation is driven by abductive processes, relying on the propositional content of supporting context.

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(4040)

Negation Markers Inhibit Motor Routines During Typing Of Manual Action Verbs. YURENA MORERA, ENRIQUE GARCÍA-MARCO, and DAVID BELTRÁN, *Universidad de La Laguna*, KATIA ROLÁN, *Universidad de Vigo*, MANUEL DE VEGA, *Universidad de La Laguna*, AGUSTÍN IBÁÑEZ and ADOLFO GARCÍA, *Laboratory of Experimental Psychology and Neuroscience* — The present study examined whether the presence of negation markers during action-sentence processing inhibits motor routines involved in written production. Using a computer, participants read two-sentence Spanish texts and typed the text-final target verb, which could denote manual actions (*sign*), non-manual actions (*kick*) or non-action processes (*think*). The first sentence set the context of the action (*There is a contract*); the second one described the action with either affirmative (*Now you do sign it*) or negative (*Now you don't sign it*) polarity. Motor planning and execution processes were assessed considering the lapse between target onset and first keystroke, and between first and last keystroke, respectively. Whereas negation yielded no effect on motor planning, it selectively interfered with the typing (motor execution) of manual action verbs, irrespective of the subjects' typing skills. This result indicates that processing negations during comprehension of manual-action sentences recruits inhibitory mechanisms acting on same-effector movements.

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(4041)

Concreteness Effects During Learning And Processing Of Novel L2 Words In Beginning Adult Bilinguals. GABRIELA MEADE, *San Diego State University & University of California, San Diego*, PHILLIP J. HOLCOMB, *San Diego State University* (Sponsored by Phillip Holcomb) — To investigate the role of semantics during processing of second language (L2) words at the earliest stages of learning, we taught participants 160 novel words from an artificial language. Half of the words had concrete meanings and half had abstract meanings. During learning, participants saw the L2 word and had to type the native language (L1) translation. Accuracy on this task was higher for L2 words with concrete meanings than for those with abstract meanings. After learning, ERPs were recorded during a language decision task that included the L2 words and a separate set of L1 concrete and abstract words. Consistent with previous findings, concrete L1 words elicited larger amplitude N400s than abstract L1 words. However, the effect of concreteness for L2 words was not significant, suggesting that they were not being processed as deeply. Implications for theories of L2 learning and processing in beginning adult learners will be discussed.

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(4042)

Combining Syntagmatic And Paradigmatic Semantic Relations. JOSEPH P. LEVY, *University of Roehampton*, JOHN A. BULLINARIA, *University of Birmingham*, SAMANTHA MCCORMICK, *University of Roehampton* — It is well known that word co-occurrences in language corpora can be used to measure how often two words co-occur with each other (syntagmatic association) and the similarity of their pattern of co-occurrence with other words (paradigmatic relatedness). Both kinds of

relationship are relevant to psychological theorising. Many distributional techniques for representing word meanings directly measure only the latter. However, the matrices that are the raw material of distributional semantic vector approaches do capture both types of word-word relation. We show how well such matrices can account for two sources of human performance data that have usually been modelled using either association or semantic relatedness - the tendency of some word lists to cause more DRM false memories than others and vocabulary multiple-choice questions that test knowledge of synonymy. We also compare the success of this joint associative-relatedness method with the use of a combination of an association measure with other recent semantic relatedness vector techniques.

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(4043)

Modelling Priming Effect With Distributional Semantics. ANDREA NADALINI, *International School for Advanced Studies*, ROBERTO BOTTINI, *Center for Brain/Mind Sciences, University of Trento*, MARCO MARELLI, *University of Milano Bicocca*, DAVIDE CREPALDI, *International School for Advanced Studies* (Sponsored by Daniel Casasanto) — Despite access to word meaning has been attested with subliminal stimuli, it is unclear what type of semantic information is grasped unconsciously. We exploit computational semantics and masked priming to address this issue in a quantitatively rigorous way. We selected 300 prime-target pairs referring to animals or tools (giraffe-DOG, fork-HAT) whose similarity was assessed through:

- i. pointwise mutual information (PMI), which tracks surface association based on words' cooccurrence.
- ii. cosine proximity (COS), which tracks non-local relationships based on words' distribution.

Stimuli were chosen so that PMI and COS were widely distributed, and loosely correlated ($r=.38$).

102 volunteers participated to a priming experiment, where prime visibility (masked vs. unmasked) was manipulated. Subliminally, we found no semantic priming, although participants with better prime detection (assesses separately) showed larger effects both for PMI and COS. Supraliminally, PMI yielded solid priming, while cosine proximity was attested only with long and low-frequency targets.

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(4044)

Two Processes In Trivalent Categorization. STEVEN VERHEYEN and PAUL EGRÉ, *École Normale Supérieure* — Most categories are vague. They admit of borderline items that are neither determinately category members nor determinately not category members. We modeled the processes involved in trivalent categorization tasks where participants can answer with "partial member" in addition to "nonmember" and "full member". The categorization data from 363 undergraduate students for eight nominal categories were analyzed with IRTree models. We compared a one-dimensional model that assumes the choice for a particular response results from a single consideration (the extent of category membership) with a multidimensional one that assumes a response results from two considerations (one about category membership and one about typicality). We found that the multidimensional model accounted better for the categorization data than the one-dimensional model did, suggesting that membership and typicality are two qualitatively distinct processes



involved in categorization. The trivalent categorization process is a sequential one whereby participants decide whether the item belongs to the category ("nonmember" vs. "partial member or full member") before establishing how representative the item is for the category ("partial member" vs. "full member").
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(4045)

Can Prediction-Based Semantic Models Predict Typicality?

TOM HEYMAN and GEERT HEYMAN, *University of Leuven* (Sponsored by Gert Storms) — Recent advances in the field of computational linguistics have led to the development of various prediction-based models of semantics (e.g., Mikolov et al., 2013). These models seek to infer word representations from large text collections by predicting target words from neighboring words (or vice versa). The resulting representations are vectors in a continuous space, collectively called word embeddings. Although psychological plausibility was/is not a primary concern for the developers of predictive models, it has been the topic of several studies in the last few years. That is, word embeddings have been linked to similarity ratings, word associations, semantic priming, word recognition latencies,... Here, we build on this work by investigating category structure. More specifically, we calculated a prototype for a number of common categories (e.g., fruit, fish, furniture,...) by averaging across exemplar vectors. Then, we examined whether the similarity between an exemplar and its prototype correlated with human typicality judgments.
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(4046)

A Comparison Between A Distributional Semantics Model And An Association Based Semantic Model In The Deese-Roediger-McDermott Paradigm.

HENDRIK VANKRUNKELSVEN, ANKE BRUNINX, and TOM HEYMAN, *University of Leuven*, SIMON DE DEYNE, *University of Adelaide*, GERT STORMS and WOUTER VOORSPOELS, *University of Leuven* (Sponsored by Gert Storms) — The Deese-Roediger-McDermott paradigm is commonly used in research on false memories. In a learning phase, lists of related words are presented to participants and in the test phase, participants have to identify previously seen words. Crucial items (critical lures) involve words that are not presented but related to a previously seen list. In the present study, we rely on the paradigm to compare two models of semantics. The first model relies on text corpora and assumes that external language representations are sufficient to capture mental representations. The second model relies on human word associations and assumes that other types of information make a crucial contribution. We constructed two 15-words lists for each of 24 targets, selecting the 15 most similar words on the basis of either model. In total, 80 participants completed the task. Critical lure recognition will be compared between list types and implications will be discussed.
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(4047)

The Cost Of Learning New Meanings For Familiar Words.

GREG MACIEJEWSKI, *University of Leeds*, JENNIFER M. RODD, *University College London*, MARK MON-WILLIAMS and EKATERINI KLEPOUSNIOTOU, *University of Leeds* (Sponsored by Jennifer Rodd) — Adults are highly skilled at learning new words and meanings. Here, we examined whether learning new meanings for familiar words affects processing of their existing meanings. Thirty adults learnt new, fictitious meanings for previously unambiguous words through daily 30-minute training sessions on Days 1-4. We tested comprehension of the existing meanings before and after the training using a semantic relatedness decision task in which the probe was related to the existing but not the new meaning of the trained word. On Day 5, following the word-meaning training, RTs increased for the trained but not the untrained words, indicating semantic competition between the newly-acquired and the well-established meanings. The training effect was larger for new meanings unrelated to the existing meanings, demonstrating that meaning relatedness modulates the degree of competition. Overall, the findings delineate how new word meanings are learnt, represented, and processed, and support the postulate of semantic competition in existing models of ambiguity processing.
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(4048)

The Challenge Of Abstract Meaning: Semantic Processing Of Abstract Verbs.

EMIKO MURAKI, ALISON HEARD, and PENNY M. PEXMAN, *University of Calgary* — The representation of abstract verbs remains problematic for theories of embodied or grounded cognition. Previous neurolinguistic studies have demonstrated that concrete verbs simulate perceptual, motor and sensory experiences when processed. Concrete verbs have also been shown to differ from abstract verbs in processing, eliciting faster reaction times on lexical tasks and differing patterns of neural activation. Thus far, abstract verbs have been treated as a homogenous group, despite the fact that they differ on semantic dimensions such as valence and cognition (i.e. verbs that represent mental states). The present study separates abstract verbs into discrete categories and compares them to concrete verbs using a go/no-go syntactic classification task while recording associated event-related potentials. We interpret and discuss our results by analyzing the differences between groups on reaction times and the N400, a common ERP component which is usually sensitive to differences between concrete versus abstract words.
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Recall

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

RECALL

(4049)

The Automatic Encoding Of The Location Of Others. DERYA TURHAN, EMILY B. MOON, and STEVEN P. MEWALDT, *Marshall University* — Two experiments were conducted to test for automatic encoding of location information in an explicit and an incidental learning task. In the explicit test, college students (tested in 4 groups of 16) were seated in a square, given fictitious background information they were to use to introduce themselves, and were asked to remember all the introductory information. In addition, two of the groups were asked to remember where each person sat. Subjects then moved to another room where they sat in a different order and attempted to recall the introductory information, match it to the person, and indicate the location where each person had been seated. Recall was followed by a recognition test. Experiment 2 followed a similar procedure except that subjects were told to use the information to select people they would want with them in a lifeboat. Results from both experiments suggest encoding of location information was automatic.

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(4050)

(Withdrawn) Selective Retrieval Can Induce Detrimental, Neutral, Or Beneficial Effects: The Critical Roles Of Retention Interval And Type Of Practice: The Critical Roles Of Retention Interval And Type Of Practice. LISA ANNE WALLNER and KARL-HEINZ THEODOR BÄUML, *University of Regensburg* (Sponsored by Karl-Heinz Baeuml) — Using categorized lists (e.g., FRUIT-Orange, INSTRUMENT-Piano, FRUIT-Mango, INSTRUMENT-Violin), we examined the effects of selective retrieval of some list items on the recall of the remaining items. Selective retrieval took place 3 min or 24 hours after study. It occurred (i) within categories, i.e., some of the items of each category were retrieved (e.g., FRUIT-Orange, INSTRUMENT-Piano) or (ii) between categories, i.e., all items of some of the list's categories were retrieved (e.g., FRUIT-Orange, FRUIT-Mango). Relative to a control condition, selective retrieval impaired recall when it occurred within categories, regardless of delay. When selective retrieval occurred between categories, however, it left recall unaffected after the short delay and enhanced recall after the long delay. Results are consistent with Bäuml and Samenieh's (2012) two-factor account, which assumes that selective retrieval triggers both inhibition and context reactivation, and the relative contribution of the two processes determines whether retrieval is detrimental, neutral, or beneficial.

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(4051)

Colour Perception And Colour Memory In Colour Synaesthetes And Colour Experts: A Comparison. NICOLAS ROTHEN and REBECCA OVALLE FRESA, *University of Bern* — Synaesthesia is associated with extraordinary experiences elicited in the presence of an appropriate inducing stimulus. For instance, in grapheme colour synaesthesia (GCS) an achromatic letter may elicit a highly specific colour experience. Previous studies reported enhanced colour perception in GCS

and other studies provided empirical evidence for enhanced colour memory in GCS. This led to the suggestion that enhanced perceptual processing in synaesthesia may be responsible for enhanced memory performance. However, perceptual processing and memory performance has never been directly compared in a single study. Thus, it was our primary goal to compare perceptual processing and memory performance in a group of GCS, non-synaesthetic colour experts (NCE) and non-synaesthetic controls (NSC). GCS and NCE outperformed NSC in both, perceptual processing and memory tasks, while GCS and NCE showed similar performance in both tasks. We conclude that enhanced memory performance in GCS and NCE is associated with enhanced perceptual processing.

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(4052)

Effects Of Repeated Word Retrieval On The Use Of Keyword Mediators During Recall. GESA VAN DEN BROEK, *Utrecht University*, MIRTE DIKMANS and JETSKIE KLATTER-FOLMER, *Radboud University* — We investigated how the use of keyword mediators changes over the course of repeated successful retrieval practice, using think-aloud protocols. Keyword mediators can link novel words to meaning (e.g., barua=letter), through a keyword that resembles the word form (e.g., bar: *She writes a letter in a bar*). Prior research suggests that initially mediated word form-meaning associations might become more direct and less dependent on keywords after repeated retrieval (Kole & Healy, 2013, JEP:LMC). In this experiment, we investigated if such changes in keyword mediation predict later recall of words. College students encoded novel words using experimenter-provided keywords and then repeatedly retrieved the word meaning while thinking aloud. Think-aloud protocols were analysed to determine if and how the students' use of keyword mediators changed over the course of practice, and if mediator use at word and participant level predicted recall on a test 7 days after practice.

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(4053)

Remembering World War II: What Were The 10 Most Important Events? MAGDALENA ABEL, *University of Regensburg*, SHARDA UMANATH, *Claremont McKenna College*, RUTH A. SHAFFER, JAMES V. WERTSCH, and HENRY L. ROEDIGER, III, *Washington University in St. Louis* — World War II as a global war affected almost all nations. The events that took place during the war and the consequences of these events are still being debated today, decades after the war ended in 1945. In this study, we examined how people from different countries remembered the war. We asked over 100 people from each of 11 countries (Australia, Canada, China, France, Germany, Italy, Japan, New Zealand, Russia, the UK, and the US) to recall the 10 most important events of World War II. The results demonstrate great overlap in which events are considered to be the most important, but also some striking differences. In particular, Russia's narrative is quite different from that of its former allies and enemies.

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(4054)

Different Effects Of Selective Retrieval With Unrelated And Categorized Item Lists. MICHAEL WIRTH and KARL-HEINZ T. BÄUML, *University of Regensburg* (Sponsored by Karl-Heinz Bäuml) — Using unrelated items as study material and prolonged delay between study and selective retrieval, selective retrieval of some studied items has repeatedly been shown to improve recall of the other items. Here we examined whether this effect generalizes to categorized material. Experiment 1 replicated the basic beneficial effect of selective retrieval using unrelated items for study. Experiment 2 used the same material as Experiment 1, but added adequate category labels to the single items and used the very same labels as retrieval cues at test. Experiment 3 followed Experiment 2 but employed several exemplars per category for study, with subjects selectively retrieving some of a category's items. Two main results emerged: Categorization (i) largely reduced time-dependent forgetting and (ii) induced detrimental effects of selective retrieval. Findings are consistent with an extension of Bäuml and Samenieh's (2012) two-factor account of selective retrieval, which assumes that category labels induce study context reinstatement.

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(4055)

The Effect Of Test Modality On Perceived Mental Effort. LEONORA C. COPPENS, MARIO O. DE JONGE, LIESBETH KESTER, and TAMARA A.J.M. VAN GOG, *Utrecht University* — Taking a test on studied materials results in better delayed recall performance than restudying (a.k.a. the testing effect). A common finding in research on the testing effect is that the memorial benefits associated with testing can be dependent on test format. In particular, free recall testing has often been found to be more effective than cued recall testing. This finding can be explained using the retrieval effort hypothesis: A successful retrieval attempt requiring more mental effort will result in enhanced memory for a retrieved item. It is assumed that successful retrieval on a free recall test requires more effort on the learner's behalf, compared to successful retrieval on a cued recall test. In the present study, we test this assumption. We investigate perceived mental effort per item on free recall vs. cued recall tests, compared to a baseline control condition (restudying).

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(4056)

Retrieval-Induced Forgetting And Eating Behaviour. MARCELLE FERNANDES and JASLEEN GURAM, *St. Mary's University, Twickenham*, KATY TAPPER, *City University, London*, JO SAUNDERS, *University of Strathclyde* — Previous research demonstrated that retrieval-induced forgetting extends to behavioural tasks and affects the likely execution of a behaviour; where participants who suppressed positive traits about a target chose to sit further away from and those who suppressed negative traits chose a seat closer to the target's belongings (Fernandes & Saunders, 2013). The current study examines whether this effect may also be found in health behaviours. Participants first studied neutral words (knife, fork, etc.) and positive health-related words (energy, antioxidants, etc.) and then practised the neutral words via retrieval practice. Participants were then asked to perform taste perception tests on healthy and unhealthy foods before recalling all the words studied. Results demonstrated that forgetting of healthy

eating words affected eating behaviour in terms of the amount and type of food consumed during the taste test. Findings are discussed in terms of the theories of retrieval-induced forgetting.
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(4057)

Exploring The Link Between The Vividness And Clarity Of Mental Simulation And The Survival Processing Effect. JEREMY K. MILLER, DANIELLA KIM, QI YING WANG, and LYDIA SAVELLI, *Willamette University* — Processing a stimulus in terms of its survival value has been demonstrated to lead to robust and reliable increases in long term memory performance (Nairne & Pandeirada, 2008). One reason that survival processing may lead to high levels of memory performance is because the survival scenario may encourage participants to engage in a highly immersive mental simulation (Buckner & Carroll, 2007; Schacter & Addis, 2007). The current experiments sought to explore the role of immersive visual imagery in the survival processing effect. We hypothesized that participants who were especially good at forming clear and detailed mental images would be more likely to show larger survival processing effects. We administered several common scales designed to measure the clarity and immersiveness of a visual simulation (VVIQ- Marks, 1973; SUI- Reisberg, Pearson & Kosslyn, 2003). Surprisingly, no relationship emerged between these measures of facility of visual imagery and the size of the survival processing effect.

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(4058)

Aging Stereotype Threat Increases Anxiety And Reduces Locus Of Control Involvement In Episodic Memory Performance. BADIÂA BOUAZZAOUI, SÉVERINE FAY, LINA GUERRERO-SASTOQUE, MICHEL ISINGRINI, and LAURENCE TACONNAT, *UMR CNRS 7295 CeRCA, University of Tours* — The aim of this study was to test the hypothesis that age-related stereotype threat disrupts the mechanisms normally devoted to memory performance. Two groups of older adults, one with stereotype threat and one without, performed an episodic memory task. To activate the stereotype threat, the memory component of the task was emphasized in the instruction given to the threatened group. Both groups also completed four scales of the MIA questionnaire (anxiety, capacity, internal strategy use and locus of control) to identify predictors of memory performance. Results indicated that the non-threatened group performed better than threatened group. They also indicated that factors predicting episodic memory performance in the threatened group were memory anxiety and memory capacity, whereas in the control group they were locus of control and internal strategy use. This study shows that stereotype artificially increases memory anxiety and abolishes the sense of control over memory.

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(4059)

Retention Rates From Seconds To Fifty Years In 88 Experiments. ABIGAIL M. CSIK, JERRY S. FISHER, and GABRIEL A. RADVANSKY, *University of Notre Dame* (Sponsored by Nathan Rose) — Although theories of consolidation suggest that rates of forgetting should slow down as memories age, recent work in our lab suggests that the rate of forgetting may actually speed up, particularly after one week. The present analysis aimed to further explore changes in the rate of forgetting over time. We fit power functions to memory data from 88 experiments from 31 publications with a minimum of three retention intervals (ranging



from seconds to over fifty years) to assess any changes in the rate of forgetting both overall and for retention intervals prior to or beyond one week. This study informs our understanding of factors that contribute to changes in the rate of retention and forgetting over time.

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(4060)

Effects Of Embodiment On Declarative Memory Reconsolidation. TATIANA ROMERO ARIAS, *University of La Laguna*, CECILIA FORCATO, *University Arturo Jauretche*, MARÍA ÁNGELES ALONSO RODRÍGUEZ, *University of La Laguna* (Sponsored by María Ángeles Alonso Rodríguez) — Consolidated

memories can return to a labile state after the presentation of a memory-cue (reminder) of the original information involving a re-stabilization process known as reconsolidation (Nader 2000). The mechanisms involved in this process can lead to the modification of the stored information: strengthening it, weakening it, or incorporating new information into the reactivated memory. It has been suggested that reconsolidation can be modulated in several ways, including motor action (Van Dam et al. 2013). The present study aimed to investigate whether motor action reinforces episodic memory through consolidation, increasing its accuracy and persistence. The results will be discussed in relation to current accounts of reconsolidation and embodiment theories.

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Spatial Cognition

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

SPATIAL COGNITION

(4061)

Impact Of Environmental Landmarks On Route Learning In A Simulated Driving Study. YASAMAN JABBARI and MARTIN VON MOHRENSCHILDT, *McMaster University*, JUDITH M. SHEDDEN, *McMaster University* (Sponsored by Judith Shedden) — We investigated the spatial performance of young adults in using different environmental landmarks for wayfinding in a virtual town in a driving simulator. Previous research showed that different types of landmarks (e.g. proximal and distal) produce behavioural differences, suggesting that navigators use these landmarks differently. We designed a new paradigm in which participants find a target location in a virtual town under four learning conditions: learning in the presence of proximal, distal, both proximal and distal, or no landmarks. The results showed that the presence of landmarks reduced the duration of driving needed to find the target. Specially the presence of proximal landmarks bolster route learning ability of participants by increasing the success rate of finding the target location, in addition to increasing the ability of retracing the trained path leading to the target. The presence/absence and types of landmarks significantly affected spatial navigation and driving behaviors.

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(4062)

Eyetracking Metrics Reveal Impaired Spatial Anticipation In Behavioural Variant Frontotemporal Dementia. SILVIA PRIMATIVO, *LUMSA University*, CAMILLA CLARK, *University College London*, KEIR YONG, *UCL Institute of Neurology, University College London*, NICHOLAS FIRTH, JENNIFER NICHOLAS, and DANIEL ALEXANDER, *University College London*, JASON WARREN, JONATHAN ROHRER, and SEBASTIAN CRUTCH, *UCL Institute of Neurology, University College London* — Eyetracking technology has had limited application in the dementia field, particularly in assessing higher-order cognitive abilities. The present study adapted the Brixton spatial anticipation test to a computerized instruction-less version using oculomotor metrics as indicators of high level cognitive functions. Twelve Behavioural Variant Frontotemporal Dementia (bvFTD), six patients with Semantic Dementia (SD) and 38 healthy controls were presented with a 10x7 matrix of white circles. During each trial a black dot moved across seven positions

on the screen, following 12 different patterns. Frequentist statistical analysis of standard eye movement metrics were complemented by a Bayesian machine learning (ML) approach. The bvFTD group showed a diminished ability to make correct anticipatory saccades. The fine grained datasets obtained from eyetracking metrics can inform us about higher-level cognitive functions in dementia. The ML approach can help identify conditions where subtle deficits are present, contributing to test optimisation and reduction of testing times.

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(4063)

Spatial Ability Incrementally Explains Multi- But Not Dual-Tasking: Further Evidence For The Spatiotemporal Hypothesis.

VEIT KUBIK and MARIUS ZIMMERMANN, *Stockholm University*, FABIO DEL MISSIER, *University of Trieste*, ANDREA FRICK, *University of Fribourg*, TIMO MÄNTYLÄ, *Stockholm University* — Previous research showed that spatial ability uniquely contributes to performance in multitasking scenarios, suggesting that spatial ability can alleviate the high executive-control demands. In this study, we tested potential boundary conditions of this spatiotemporal hypothesis: First, we devised a multitask that eliminated any spatial cues of the subtasks, rendering a nonspatial multitask-layout. Second and third, we manipulated the characteristics (number, letters, vs. gauges) and number (2 vs. 4) of the subtasks. Participants completed various dual- and multitask scenarios, along with measures of spatial ability, spatial updating, and, for the first time, of working memory. Preliminary results showed that spatial ability incrementally explained multitasking performance independent of the nature, but not number, of subtasks, and importantly above and beyond the contributions of working memory and spatial updating. The present findings provide further evidence for the spatiotemporal hypothesis.

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(4064)

Emotional Word Processing And Configural Representations.

AHU GOKCE, ELIF MEMİŞ and ÇİÇEK GÜNEY, *Kadir Has University* — The present study investigates the processing of emotional words presented within configurations. On each trial, four words in different colors were positioned to form a square configuration. The task was to localize target word indicated by fixation cross color that randomly changed on each trial. Across trials, size of the configuration (big/small square) and target's



location (same/different) changed randomly leading to different inter-trial transitions. In three experiments neutral, positive and negative words were used. Localization task performance was modulated by the changes in the target location, size of the configuration as well as by the word valence (emotional, neutral). Neutral and negative words led to target location repetition cost as different location targets were processed faster. Additionally, bigger, compared to smaller configurations, led to better performance only when emotional words were used. Results suggest that configural representations are formed automatically and influence the processing of emotional and neutral words differently.

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(4065)

Role Of Temporal Sequencing Of Landmarks In Route Learning. DENISE HEAD and MARTA STOJANOVIC, *Washington University in St. Louis* — Research suggests travel direction is encoded during route acquisition (route direction effect). The evolution of this effect and implications for reversing a route are unclear. 75 young adults travelled a virtual route in one direction either 2, 5 or 8 times. The route direction effect was examined using spatial priming and explicit landmark order recognition tasks. Participants then traversed the route in the reverse direction. A route direction effect was observed only in the 8 exposures group for spatial priming. There was evidence that individuals with a greater route direction effect were better at route reversal across groups. Route representations may increasingly incorporate travel direction, rather than more complex sequential associations evolving across repetitions. The route direction effect may reflect a general learning phenomenon, such as occurs with verbal recall, so that effective learners tend to show stronger travel direction-based sequential associations and better route reversal. Email: Denise Head, dhead@wustl.edu

(4066)

Anticipatory Memory For Regular And Random Patterns. IREM YILDIRIM and HELENE INTRAUB, *University of Delaware* (Sponsored by Helene Intraub) — It has been known that memory representations for natural scenes include the anticipated space surrounding a given view, a phenomenon referred as boundary extension. The present study investigated whether patterns with

minimal contextual associations and lack of typical scene layout elicit the extension as natural scenes do. We further examined if regularity in pattern layout matter for the anticipation of the surrounding space. We probed boundary memory with different task demands across two experiments. In Experiment 1, patterns were extended in memory when studied for 10s sequentially followed by a boundary memory test. Also, random patterns showed the extension more consistently than regular patterns. However, patterns were restricted when studied for 250ms or 1s with a test after each trial in Experiment 2. Moreover, random patterns were less restricted than regular patterns. These results indicated that patterns with minimal context and lack of scene layout elicit extension when given enough time and delayed test. In addition, randomness benefited the anticipation, perhaps through discontinuities in the layout allowing for individuation of the items.

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(4067)

Inconsistent Impairments To Spatial Cognition In Systemic Lupus Erythematosus. ELISABETH J. PLORAN, *Hofstra University*, ERIK ANDERSON, BETTY DIAMOND, BRUCE VOLPE, CYNTHIA ARANOW, and MEGGAN MACKAY, *Feinstein Institute for Medical Research* — Cognitive impairment is well-documented in systemic lupus erythematosus (SLE), with considerable impact on quality of life. However, isolating the exact nature of this impairment and its biological causes has proven difficult. Cross-reactive anti-dsDNA/NMDA receptor antibodies (DNRAb) have been shown to bind neurons in the mouse hippocampus, specifically place cells, with resulting synaptic signaling changes promoting neuron dysfunction or death and difficulties in spatial tasks as tested with mice (Chang et al., 2015). The purpose of this study was to evaluate serum DNRAb associations with spatial memory in SLE using several spatial cognition tasks with humans, including figure drawing, spatial working memory, and navigation. The results indicate that high autoantibody levels are associated with poor task performance in navigation, though not necessarily in other spatial tasks. This conflicts with prior research and suggests that the complexity of cognitive impairment in SLE may involve more intricate functions than previously considered.

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Working Memory

Saturday

Grote Zaal

Viewing 12:00-13:40, Author Present 12:00-13:40

WORKING MEMORY

(4068)

Importance Of Bindings In Working Memory To Age Differences In Episodic Long-Term Memory. LEA M. BARTSCH, *University of Zurich*, VANESSA M. LOAIZA, *University of Essex*, KLAUS OBERAUER, *University of Zurich* (Sponsored by Klaus Oberauer) — Past research has consistently shown episodic memory (EM) decline with age. According to the associative-deficit hypothesis, the locus of this decline is in binding difficulties. We directly investigated the importance of setting up bindings in working memory (WM) to age differences in EM binding. We adapted the presentation rate of word pairs individually to achieve 67% correct responses in a WM test of bindings in young and older adults. Subsequently, EM for the pairs was tested in the same way, using

a reconstruction paradigm. In this way, we successfully equated WM for bindings for young and older adults. This resulted in full compensation of the EM deficit in the old. In a second experiment we varied the set size of word pairs while retaining the mean presentation rates for each age group from the first experiment. If the EM deficit in old age is caused by a WM deficit at encoding, both WM and EM performance should decrease with higher memory load. Against this prediction, EM was not affected by increasing memory load. We conclude, that the WM capacity deficit does not cause the EM deficit of old adults, but rather both WM and EM deficits are reflections of a common cause, which is fully compensated by longer encoding time.

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(4069)

Age-Related Difference In Using Global Relationships: A Map-Learning Study. RUIZHI DAI, SHOSHANA OPPENHEIM, HOLLY A. TAYLOR, and AYANNA K. THOMAS, *Tufts University* (Sponsored by holly taylor) — Global relationships of to-be-learned objects could differentially affect younger and older adults' visuo-spatial working memory (VSWM). Whereas younger adults more likely use spatial organization, older adults rely more on categorical association. The present study examines whether this age-related difference exists when learning more real-world stimuli, such as concrete maps. Younger and older adults studied maps with a grid structure, similar to New York City, each containing five designated landmarks. We systematically manipulated spatial and categorical relationships of the landmarks, and tested participants' memory for locations, landmark identities, and the location-identity combination. Results showed that spatial organization played a stronger role than categorical association in map learning. Further, although older adults used spatial organization to facilitate learning of individual map elements, they were less efficient than younger adults in using spatial relationship in location-identity binding. Our findings suggested an age-related difference in the use of global relationships in concrete map processing.

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(4070)

Learning To Use Evidence From Working Memory: Modeling Age Differences In Capacities And Strategies Before And After Extensive Practice. HANNA BETTINE FECHNER, KLAUS OBERAUER, HENRIK SINGMANN, and PETER SHEPHERDSON, *University of Zürich*, JOACHIM VANDEKERCKHOVE, *University of California, Irvine*, FLORIAN SCHMIEDEK, *German Institute for International Educational Research* — Two sources of evidence contribute to recognition judgments: evidence due to recent presentation (familiarity) and evidence from binding memories to the current context (recollection). Whereas recollection tends to decline with age, familiarity is largely preserved. We investigated age differences (101 younger and 103 older adults) and the effects of extensive practice (approx. 100 daily sessions) in the use of these sources of evidence in working memory (a spatial 3-back task). Older adults performed worse, especially for intrusion items. However, both age groups improved with practice. With a cognitive measurement model, embedded in a Bayesian-hierarchical framework, we estimated the contribution of familiarity, recollection, and context discrimination to individual and age differences in retrieval probability. This information determined the rate of evidence accumulation within a Wiener diffusion model. Our modeling approach separates age-related and practice-induced changes in memory capacities from strategic aspects of behavior (response bias and caution).

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(4071)

Monitoring Information During Reading: Investigating The Role Of Working Memory In A Dual-Task Paradigm. AMY DE BRUÏNE, DIETSJE JOLLES, and PAUL VAN DEN BROEK, *Leiden University* (Sponsored by Panayiota Kendeou) — To understand the world around us, we construct a mental representation of incoming information. When reading a text, for example, we integrate sentences, monitor our understanding, and slow down when we encounter inconsistencies. Many of these processes seem to occur automatically but others seem to be more

reader-initiated. Working memory (WM) is assumed to play an important role in these processes, but its exact role during reading comprehension remains unclear. This study investigated the effects of a dual-task on reading comprehension and its interaction with WM. Participants (N=32, 18-30 years of age) read consistent and inconsistent stories one sentence at a time on a computer, followed by comprehension questions. In the dual-task condition, they also had to remember numbers that followed each sentence. Reading-time results showed a consistency x condition interaction: when WM was constrained, participants did not notice inconsistencies, supporting the importance of WM in the process of integration.

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(4072)

Phonology Vs. Semantics In Short-Term Memory: A Novel Experimental Manipulation Using Arabic In Serial Recall. HAIDER CATAN, STEVEN ROODENRYS, and LEONIE MILLER, *University of Wollongong* (Sponsored by Steven Roodenrys) — The linguistic features of Arabic were used to undertake a novel investigation of semantic and phonological contributions to short-term memory (STM). Arabic is a derived morphological-based language, in which phonological and semantic information can be banded together via two morphemes, the so-named, root and pattern principles. Both root and pattern elements can occur in a variety of word families that can be semantically related or unrelated. This context can be useful to investigate lexical effects such as semantic and phonological contributions to STM. In two experiments, Arabic morphemes were used, and arranged to manipulate the morphemic and semantic relatedness of words within the list of the verbal serial recall task. As both root and pattern are defined by a set of phonemes sharing either within a list increases the phonological similarity of the items. The results demonstrate that the root and pattern make reverse contributions to recall. Semantic information provided by the root was beneficial to recall while pattern-phonological similarity impaired recall. The implications, limitations and further research will be discussed.

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(4073)

Prioritising Information In Verbal Working Memory. AMY L. ATKINSON and AMANDA H. WATERMAN, *University of Leeds*, ALAN D. BADDELEY and GRAHAM J. HITCH, *University of York*, RICHARD J. ALLEN, *University of Leeds* (Sponsored by Alan Baddeley) — Previous research has demonstrated that individuals can direct attention to more valuable information in visual working memory. However, research to date has not investigated whether such abilities extend to the verbal domain. We present three experiments which explored this. Participants listened to series of digits and recalled them verbally following a brief delay. During the instructions, participants were either told that one serial position was more valuable than the rest (prioritisation conditions) or that all items were of equal value (control condition). Performance at the targeted serial positions was enhanced by prioritisation, demonstrating that individuals can orient attention in verbal working memory. Follow-up experiments explored whether prioritisation boosts are affected by articulatory suppression or cognitive load. These results are discussed in relation to whether prioritisation boosts rely on rehearsal mechanisms or executive resources.

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(4074)

Age-Related Improvements In Immediate Memory Result From A Genuine Increase In Storage Capacity Across Different Stimulus Classes. FABIEN MATHY, *Université Côte d'Azur*, ORI FRIEDMAN, *University of Waterloo* — We examined children's (7, 9, 11 year olds) and adults' immediate memory for six stimulus classes (Alvarez and Cavanagh, 2004), and observed three main findings. First, immediate memory improved with age. Second, participant's immediate memory performance varied across the different stimulus classes. Third, although memory performance varied across the stimulus classes, the age-related improvements in immediate memory were similar across the different stimulus classes, meaning that all stimulus classes yielded a similar percentage of increase in capacity with age. Our findings suggest that age-related improvements in immediate memory result from an increase in the number of chunks available to encode stimuli at each age, and not from changes in the ability to form chunks. We provide a bayesian analysis of the ratios between the different spans at each age. Changes in capacity show a gain of about 50% between children aged 7 and adults no matter stimulus class. This tends to indicate that a genuine increase in storage capacity takes place independently of the complexity of the stimuli and that opportunities to chunk are simply contingent on stimulus kind. Email: Fabien Mathy, fabien.mathy@unice.fr

(4075)

Do Older Adults Rely More On Verbal Labels In Visual Working Memory? ALICIA FORSBERG, WENDY JOHNSON, and ROBERT H. LOGIE, *University of Edinburgh* (Sponsored by Robert Logie) — Visual Working Memory (WM) tends to decline more rapidly with ageing than verbal WM. Therefore, we hypothesised that older adults may compensate by relying more on verbal labels, to remember visually presented stimuli. We compared the effects of experimentally permitting or hindering verbal strategy use for memory for colours in younger and older adults. Older adults had a significantly larger performance drop between conditions where labeling of colours was easy, compared to where it was made difficult, consistent with successful use of verbal memory strategies. Articulatory Suppression (repeating digits out loud) was associated with performance decline only for the older adults, for the easy-to-name colours. This further supports the hypothesis that older adults are more reliant on verbal strategies than younger adults. We also tested the effect of instructing participants to label colours out loud compared to silence and Articulatory Suppression in a colour wheel precision memory task. Email: Alicia Forsberg, aforsber@ed.ac.uk

(4076)

(Withdrawn) Between-Stream Similarity Of Irrelevant Speech Enhances Remote Migration Errors In Immediate Serial Recall. GERALD TEHAN, *University of Southern Queensland* — Background unattended speech has a deleterious effect upon short-term recall. Prior literature suggests that the phonological and/or semantic content of the irrelevant speech influences correct recall and intrusion errors in cued and free recall, but has little impact upon serial recall when correct recall in position is used as the dependent variable. We consider the possibility that between-stream similarity effects may have an impact of the frequency and type of errors made in immediate serial recall. Using a methodology developed by Poirier et al. (2015) to facilitate order errors, two experiments examine the effects of between-stream similarity in enhancing remote forward movement errors.

The results indicate that while between-stream similarity has little impact on correct recall of target items, it does have an impact on the forward migration of those targets when they are not recalled in position. The results are interpreted with reference to position to time bindings and primacy gradients. Email: Gerry Tehan, tehan@usq.edu.au

(4077)

Does Attentional Refreshing Allow A Long-Term Memory Implication In A Working Memory Span Task? FIONA LAURA ROSSELET-JORDAN, *University of Fribourg*, MARLÈNE ABADIE, *Aix-Marseille University*, VALÉRIE CAMOS, *University of Fribourg* (Sponsored by Valérie Camos) — Long-term memory (LTM) is known to affect recall during working memory (WM) tasks. However, the way LTM intervene in WM remains unknown. To address this issue, the implication of LTM representations in a WM span task was manipulated through variations of the associative relatedness of the memory items. Moreover, the concurrent cognitive load was varied to manipulate refreshing opportunities. Different WM models were compared (Barrouillet, Bernardin, & Camos, 2004; Cowan, 1999; Unsworth & Engle, 2007) on the variation of associative relatedness effect according to the cognitive load. Children and adults were also contrasted, children using refreshing and relatedness cues less efficiently. Despite the impact of both manipulated factors on recall, associative relatedness and cognitive load did not interact neither in children nor in adults. This suggests that refreshing might not rely on LTM representations' retrieval, supporting the latest view on refreshing in the Embedded-Processes model (Vergauwe & Cowan, 2015). Email: Fiona Laura Rosselet-Jordan, fionalaura.rosselet-jordan@unifr.ch

(4078)

Consolidation And Attentional Refreshing: Separable Or Substitutable Processes? DONNA M. BAYLISS and ANNA DOLIN, *University of Western Australia* — This experiment examined whether short-term consolidation and attentional refreshing, two processes important for the maintenance of information in working memory, are separable or can be substituted for one another. The opportunity for consolidation was varied by manipulating the pace at which the processing activity was presented following each memory item in a working memory span task (fast-to-slow, slow-to-fast, constant) whilst equating the opportunity for attentional refreshing. 50 participants completed all three pace conditions in either an immediate context, which presented the processing activity immediately after each memory item, or a delayed context, which presented a blank delay interval after each memory item to allow for consolidation. Results showed no difference in memory performance across the three processing pace conditions, suggesting that consolidation and attentional refreshing may be substitutable, but better performance in the delayed context, consistent with a process of consolidation. The findings have implications for models of short-term consolidation. Email: Donna M. Bayliss, donna.bayliss@uwa.edu.au

(4079)

Two Limits Of Visual Working Memory Capacity. ANKA SLANA OZIMICH and GREGA REPOVŠ, *University of Ljubljana* — The capacity of visual working memory (VWM) is highly limited and varies significantly both across individuals and age. We propose that VWM capacity is limited by two systems: a representational system enabling formation of independent visual representations, and an active maintenance system enabling



active maintenance of the established representations. To test this hypothesis, participants performed a VWM task in which they maintained orientation of items presented to the left, right or both visual hemifields. The results revealed that participants were able to maintain more items, when they were distributed across both vs. one visual hemifield, indicating that bilateral display enables employment of representational capacities of both hemispheres. Bilateral capacity, however, did not reach the combined representational potential, suggesting that the capacity is further limited by a second, unitary active maintenance system that can sustain only a limited number of representation of items in any or both of the hemispheres.

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(4080)

Independent Effects Of Eye And Hand Movements On Visual Working Memory. NINA MARIA HANNING and HEINER DEUBEL, *Ludwig-Maximilians-Universität München - Munich* (Sponsored by Artem Belopolsky) — Saccades and reaches have been shown to selectively interfere with visual working memory, presumably due to the deployment of spatial attention to their action goals. Given the assumption of independent attentional mechanisms for the selection of eye and hand targets, the question arises whether the two effector systems also separately interact with visual working memory. To approach this issue, we investigated memory performance in combined eye-hand movements. Participants memorized several items and performed eye, hand, or combined eye-hand movements during the maintenance interval. Subsequently, we tested working memory performance at motor goals and action-irrelevant locations. We found that for single eye and single hand movements, working memory performance was increased at the motor target compared to the action-irrelevant locations. Remarkably, the same amount of benefit was found at both the eye and the hand target for combined eye-hand movements – with no memory tradeoff between the two targets. We conclude that both effector systems independently enhance visual working memory at their goal location. This is in line with the assumption that eye and hand targets are selected by separate attentional mechanisms.

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(4081)

Decoding Working Memory Within And Across Sensory Modalities. GÜVEN KANDEMİR, *University of Groningen*, MICHAEL J. WOLFE, *University of Groningen, University of Oxford*, MARK G. STOKES, *University of Oxford*, ELKAN G. AKYÜREK, *University of Groningen* (Sponsored by Hedderik van Rijn) — Sensory modalities interact with each other, influencing perception and memory. To study the neural basis of such cross-modal interactions, we investigated the auditory and visual working memory (WM) networks. The state of the WM network for stored visual items can be estimated during the retention interval via multivariate analyses of the EEG activity generated by a nonexclusive, uninformative impulse stimulus. Here, this technique was generalized using an auditory and a visual impulse.

In each trial a memory set was presented, consisting of two same-modality stimuli, pure tones or Gabor gratings. A following cue indicated which stimulus would be probed later for report. During the subsequent delay phase, two impulse signals were presented; a flash and a sound, to (re-)activate the WM network. WM content could only be decoded following the presentation of the same-modality impulse. Our results indicate that at least for simple, non-integrated stimuli, the WM networks are uni-modal.

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(4082)

Working Memory Capacity Modulates The Relationship Between Trait Mindfulness And Goal Specificity. XIAOYI ZHOU, *University of Groningen*, LI-HAO YEH and XINGYE CHEN, *Chung Yuan Christian University* — Mindfulness practice has been shown to increase goal specificity. The aim of this study was to investigate whether there is any association between trait mindfulness and goal specificity as well as whether working memory capacity modulates their relationship. 84 participants completed the Chinese version of Freiburg Mindfulness Inventory (FMI), Automated Operational Span task (AOSPAN) and Measure to Elicit Positive Future Goals and Plans (MEPFGP). In the MEPFGP, participants were first required to generate as many goals as they could think of for the coming year. Six most important goals were selected to be judged for specificity from 0 (non-specific) to 3 (highly specific). For participants with low working memory capacity, high trait mindfulness was found to be associated with high goal specificity. However, this association was disappeared for participants with high working capacity. These results indicated that mindfulness can help individuals, especially those with low executive function, engage in focused processing.

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(4083)

On The Contribution Of Cognitive Load And Free Time To Working Memory And Long-Term Memory. JOHANN CHEVALÈRE and VALÉRIE CAMOS, *University of Fribourg* — Despite long-lasting evidence for the existence of separable memory systems, namely working memory (WM) and long-term memory (LTM) (e.g. Unsworth & Engle, 2007), underlying factors accounting for their respective maintenance mechanisms remain obscure. The Time-Based Resource Sharing model (Barrouillet & Camos, 2004, 2015) yields differential predictions on the contribution of specific factors impacting WM and LTM maintenance in complex span tasks (CST). While increasing the cognitive load (CL) of the concurrent task would hamper immediate recall performance (involving WM), the performance on delayed recall test (involving LTM) might be enhanced by increasing a distinct parameter, the free time (FT) during which attention is available. These predictions were tested in young adults by contrasting three conditions of a CST comprising both an immediate and a delayed recall test, in which the effects of CL and FT were disentangled. Findings shed light on the role of attention on WM and LTM.

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