



'Strong Kids': Effects of drama therapy on child resilience after the 2021 German flood disaster

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ABSTRACT

This study examines the effects of drama therapy workshops in schools and kindergartens on strengthening the resilience of the children after the centennial flood disaster in the German Ahrtal in July 2021. The drama therapy intervention reached about 600 children in kindergartens and schools, with $N = 238$ being part of the main evaluation of the workshop (ages 3–11). The children's educators completed the 10-item child resilience scale for each participating child ($N = 238$) at five points in time: before and immediately after the flood (in hindsight at baseline), before and after the intervention, and at a six-week follow-up; control participants were observed at two additional times ($n = 127$; within-group), with a questionnaire before and after a regular school week preceding the workshop week. Within the given limitations of a within-subject design, results suggest that the drama therapy intervention can strengthen child resilience, independent of sex, number of siblings or migration background of the children. Educators' ratings indicated that child resilience increased significantly from before to after the intervention compared to a regular school week and further increased significantly from after the workshop to the follow-up. Acceptance of the intervention was high. Vulnerable children with the highest social-behavioral problems showed the steepest increase in resilience after the workshops but fell back at follow-up. Children aged 3–4 and severely affected children benefited less and may need an adapted version or longer duration of the intervention. Moderating factors and implications of the findings for child emergency aid and prevention are discussed.

Introduction

The flood disaster in July 2021 in the Ahrtal was one of the most devastating events in Germany since World War II: The water masses destroyed entire villages, more than 200 people died, and more were physically injured; severe psychological consequences have been described (Kahle et al., 2022; Zenker et al., 2024). As the numbers and intensity of environmental disasters increase, so does the risk of severe

adverse effects on children. Therefore, children need to be supported in developing protective factors and strategies to cope with adverse situations. Resilience- and resource-promoting interventions lend themselves as coping tools after disasters, and for preventive health promotion. *Creative interventions* need to be tested and based on a solid empirical foundation, before being systematically applied. This study contributes to the *evidence base of drama therapy* and its potential to strengthen child resilience after disaster. Our study evaluates the drama

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therapy project ‘Starke Kinder’ [‘Strong Kids’²], aiming to support affected children to cope with the flood and its consequences by promoting their mental and social resilience. It provides an understanding of the impact of the flood disaster and the drama therapy intervention, asking the research question: *Can drama therapy workshops strengthen child resilience after a flood disaster?*

Natural disaster and its effects on children

Due to climate change, the number of natural disasters has increased noticeably in recent decades (AghaKouchak et al., 2020). Hurricanes, wildfires, droughts and floods are increasing in frequency and severity (Alfieri et al., 2018; Berlemann & Steinhardt, 2017; Grillakis, 2019; Kousky, 2016), with adverse effects on individuals, families and children (Benevolenza & DeRigne, 2019; Osofsky & Osofsky, 2018). In Germany, data of children after natural disasters are commonly not explicitly specified. The review of Ries et al. (2019) suggests that from 2006 to 2016, there were 41 disasters in Germany claiming 259 lives. The majority of events were storms (37 %), extreme temperatures (17 %), floods (17 %), and transport accidents (17 %; Ries et al., 2019). In the Ahrtal flood disaster, this 10-year rate of deaths was almost reached in one single night.

Natural catastrophes do not only threaten people’s living space and environment but also their health and integrity (Esterwood & Saeed, 2020; United Nations, 2024; WHO, 1948). About 50 % of those affected globally by natural disasters are children (Kousky, 2016), with their health being threatened in particular ways (Peek, 2008; Scully et al., 2020). Exposure to natural disasters during childhood can lead to interruptions in education, physical health problems, and severe and long-lasting damage of socio-emotional development and mental health (Kingston et al., 2019; Kousky, 2016; McDermott & Cobham, 2014). Children can develop adverse reactions such as clinical depression or anxiety, post-traumatic stress symptoms or disorder, social and attentional problems, disruptive behavior disorders (Dyregrov et al., 2018; La Greca et al., 2013; Olteanu et al., 2011; Roussos et al., 2005; Shaw et al., 1996; Tang et al., 2014; Thienkrua, 2006; Yelland et al., 2010). Effective methods for coping with traumatic events and preventive health promotion for children need to be investigated and applied to mitigate natural disasters’ stressful and potentially long-lasting effects on children.

Resilience

The word resilience originates in the Latin ‘*resilire*’, which means ‘to bounce back’ or ‘to rebound’. Resilience is a complex construct (Masten & Barnes, 2018; Opsomer et al., 2020; Vella & Pai, 2019) with the common denominator of being a dynamic process or outcome of positive adaption when the normal level of functioning of a person or system is disrupted by adversity (Diamond & Shrira, 2018; Masten, 2021; Southwick et al., 2014). The American Psychological Association (APA) adds that the described adaptation occurs “[...] especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands” (American Psychological Association, 2023). Hence, being resilient describes the process of returning to balance after a disruption.

² The project for children after the flood disaster in the Ahrtal was initiated and funded by the Dr. Hans Riegel-Stiftung, Bonn, the evaluation was conducted by the Research Institute for Creative Arts Therapies (RIaT) at Alanus University, Bonn. Three drama therapists (B. Merschmeyer, U. Schwab de Ribeaupierre and M. Schlüter) developed the intervention and recruited a total of eleven drama therapists to facilitate the workshops. The concept was written by Prof. Dr. J. Junker from the Drama Therapy Program at Hochschule für Wirtschaft und Umwelt (HWFU) Nürtingen-Geislingen, and Prof. Dr. S. Klees from Medical School Hamburg (MSH), and was based on Lahad’s theory of resilience (Lahad, 2017).

There is disagreement in the literature on whether resilience describes the process of adaptation, the outcome of adaptation, or the ability to adapt itself. Most often, the process is meant (Opsomer et al., 2020), such as in the theories of salutogenesis (Antonovsky, 1980) or positive psychology (Seligman & Csikszentmihalyi, 2000).

In this study, we used the BASIC Ph-model of Mooli Lahad and Ofra Ayalon (Lahad & Ayalon, 1993), two Israeli psychologists and drama therapists, as an integrative model of resilience (Ayalon & Lahad, 2000; Lahad, 1993). The model provides an empirically based categorization of people’s modes to cope with stress that form the six modalities that constitute resilience (Berger & Lahad, 2010; Lahad, 2017; Lahad et al., 2013) (s. Table 1).

People are able to use all of these modes, but often prefer to use one or two of them. For example, to reduce stress, some people primarily interact with family and friends (“Social”), others escape into daydreams and future visions (“Imagination”), or do express themselves emotionally, e.g. with laughing or crying (“Affect”). The model also provides the basis for diagnosis and intervention planning. The model and its interventions have been used in the aftercare of disaster victims, such as after the 2004 Tsunami in Sri Lanka and the September 11th, 2001 attacks in the United States (Junker, 2021), and on this basis are used in our context of the evaluation of the drama therapy workshops after the flood disaster in the Ahrtal.

Drama therapy after disaster

Traumatic experiences often cannot be accessed or sufficiently verbally described (Auxéméry, 2021; Johnson, 1987; 2009). Creative Arts Therapies (CATs) are executed nonverbally and can help to successfully cope with trauma (Eberhard-Kaechele, 2020; Fancourt & Finn, 2019; Field, 2016; Hylton et al., 2019; Sesar, 2022). In the process, parts of the clients’ inner worlds are externalized and can then be related to in a different way (e.g., Glass, 2006; Kushnir & Orkibi, 2021).

Drama therapy (DT), as one form of CATs, is the intentional use of drama and/or theater processes to achieve therapeutic goals (Jones, 2007). Drama therapy is an embodied practice that is active and experiential. It can provide the context for participants to tell their stories, set goals and solve problems, express feelings, or achieve catharsis. Through drama, the depth and breadth of inner experience can be actively explored, and interpersonal relationship skills can be enhanced (NADTA, 2023). Evidence on DT is increasing, yet DT research still has major gaps (Armstrong et al., 2019a, 2019b; Keiller et al., 2023). The effectiveness of DT has been studied and demonstrated in various populations, diagnoses, settings, and age groups (Feniger-Schaal & Orkibi, 2020; Orkibi et al., 2023). Findings suggest that DT therapy can enhance mental health (Orkibi et al., 2023), for example, by facilitating client change (Cassidy et al., 2014; Orkibi et al., 2014), emotional reflection, regulation (Cassidy et al., 2017), (self-)awareness (Armstrong et al., 2016), and empathy (Bucuță et al., 2018). Especially for underserved clinical populations, DT can be an excellent alternative to talk therapy (Armstrong et al., 2016; Foloștină et al., 2015). Children intuitively use DT tools to playfully and creatively address and process what they have experienced (Malchiodi, 2015). Research to date shows that children can be sustainably stabilized in crises and supported in coping with traumatic experiences through drama therapy (Frydman & Mayor, 2023; Van Westrhenen & Fritz, 2014). Drama therapy can decrease their fear and anxiety (Ilievová et al., 2015) and increase their emotional expression and awareness (Lewis & Banerjee, 2013; Moneta & Rousseau, 2008). Studies in schools show that DT workshops can strengthen the resilience, interpersonal relationships, and self- and social awareness of adolescents (Burch et al., 2019; Fanian et al., 2015; Pearson, 2019). In sum, studies demonstrate the effectiveness of DT, but still more research is needed to improve its validity and generalizability (Feniger-Schaal & Orkibi, 2020).

A recent scoping review on school-based DT for socio-emotional skills in early childhood included 16 studies (Frydman & Mayor,

Table 1
The six stress coping modes of the BASIC Ph-model of Mooli Lahad.

Coping Mode	Belief (Self, Ideology)	Affect (Emotions)	Social (Role, Others, Organisation)	Imagination (Intuition, Humor)	Cognition (Reality, Knowledge)	Physical (Action, Practical)
Ex-amples	Attitudes, Beliefs, Life-span, Value, Clarification, Meaning	Listening, Skills, Emotions, Ventilation, Acceptance, Expression	Social Role, Structure, Skills, Assertiveness, Group, Role-play	Creativity, Play, Psychodrama, ‘As-if’, Symbols, Guided Imagery, Fantasy	Information, Order of preference, Problem solving, Self navigation, Self talk	Activities, Games, Exercise, Relaxation, Eating, Work

Note. Theory, Research and Cross-Cultural Application’ (Lahad et al., 2013, p.22); BASIC-Ph stands for Believe, Affect, Social, Imagination, Cognition and Physical. Adapted from ‘The ‘BASIC Ph’-Model of Coping and Resiliency.

2023). Results suggest the following practice recommendations: use of metaphor, dramatic distance, and life-drama connection to enhance socio-emotional skills; dramatic play to address adverse experiences and to support specific clinical populations. School-based DT should further be included within a public health trauma approach (Frydman & Mayor, 2023). In DT, the client can test and rehearse alternative reactions to the activated body sensations and feelings in a protected space. There, the client can pretend-act, act, think or feel differently than before (Emunah, 2020). This protected test acting, as in a laboratory, facilitates insight and the integration of new, more helpful behaviors into everyday life. Drama therapy uses distancing techniques such as symbols or metaphors, hand puppets, or symbolic objects. These allow severely affected persons to view their burdensome experiences from a distance, which gives them security while facilitating clarification or change (Casson, 2014; Yotis, 2006). Drama therapy allows the client to approach complex and difficult issues playfully and discover new possibilities of processing in a playful and joyful way (Dokter & Sajjani, 2022; Emunah, 2020; Feniger-Schaal et al., 2024; Pearson, 2019).

Recent empirical studies also shed light on the therapeutic factors of DT, i.e. on how DT works. Feniger Schaal and colleagues (2024) emphasize the role of playfulness. In a scoping review, De Witte and colleagues (2021) investigated the therapeutic factors across the Creative Arts Therapies (CATs). The *common factors* of psychotherapy, such as active engagement, or therapeutic alliance and bonding, are also active in CATs. In addition, the study identified the following so-called *joint factors* of all CATs: (a) *embodiment* (e.g., body awareness; interoception; sensory experience through the body), (b) *concretization* (e.g., expressing oneself in art, creating something visible, portraying feelings of the past, enacting inner processes and relational issues), and (c) *symbolic communication* (e.g., use of metaphors, interpreting symbols and images) (De Witte et al., 2021). Specific factors of DT include *active engagement in dramatic reality* (Cassidy et al., 2014; Orkibi et al., 2014), *dramatic distancing* (Cassidy et al., 2017), *role-reconstruction* (Bucută et al., 2018), *role-reversal* (Orkibi et al., 2014), *dramatic embodiment*, and *dramatic projection* (De Witte et al., 2021).

Our study

In the project "Strong Kids", DT was offered to children affected by the centennial flood in the German Ahrtal. Techniques used were improvisation, (role-)play, storytelling, projection, rituals, etc. to work on own strengths and self-care. Despite manualization (Dr.-Hans-Riegel Stiftung, 2021; German manual in supplements), techniques were adapted to the client’s needs, skills, and goals (Feniger-Schaal & Orkibi, 2020; Jones, 2007). The project aimed to support children’s resilience after the potential traumatic event of the flood disaster by providing DT in schools and kindergartens. The aim was to reach all children in the Ahrtal. This study reports the main evaluation results. To answer our research question of whether DT workshops effectively strengthen child resilience after a flood disaster, we used observational assessment questionnaires completed by the educators of the participating children (ages 3–11). It was a field study with five to seven measurement points (see *Methods*), the environmental conditions were not standardized. For ethical reasons, the only option to implement a control group was a within-group design, since the foundation aimed to include all children affected and offer participation to all institutions interested.

Hypotheses. Based on the above reported research on the harmful effects of natural disasters and the positive effects of DT on children, we hypothesized that child resilience, *observed by educators*, changes over the course of the measurement time points in the following ways:

H1a. From before to after the flood, child resilience decreases (observed in hindsight);

H1b. From the pretest to the posttest of the workshop week, child resilience increases; with a significant difference compared to the change during the control week [effect between the intervention or

experimental group (EG) and the control group (CG)];

H1c. From posttest after the workshop to the follow-up, child resilience increases; we further hypothesized that

H1d. The intervention is feasible and acceptable (from the perspective of the educators).

In addition, we explored the data set to see whether demographic or other control variables influenced the change in resilience across the measurements.

Methods

Sample

Drama therapy workshops reached an estimated 600 children affected by the flood disaster. $N = 376$ children were observed by 19 educators. We had to exclude data of $n = 138$ of the observed children from data analysis due to lack of parental consent (mostly forgotten to take or to transmit), due to missing data at more than two measurements for the experimental group (EG), and respectively at one or more measurements for the control group (CG). The resulting data sample consisted of educator's observations of $N = 238$ children, who participated in the intervention (EG), of those $n = 127$ children were also observed in a control week (CG) preceding the intervention. We sent out control group questionnaires to the bigger institutions that had sufficient waiting time –from the sending out time at least two weeks before their workshop started- which led to the $n = 127$ datasets.

The data set yielded the following demographic data (this data in table form see [Tables 2 and 3](#)): The $N = 238$ children of the main sample consisted of $n = 122$ girls, and $n = 116$ boys, most of them in the age

group of 6–8 years ($n = 184$; 3–5 years: $n = 34$; 9–11 years: $n = 20$). There were $n = 187$ school children, and $n = 51$ kindergarten children; $n = 48$ with migration background, and $n = 184$ without; $n = 33$ without siblings, $n = 100$ with one sibling, $n = 49$ with two siblings and $n = 22$ with 3 + siblings. Of the $N = 238$ children, the degree of affectedness by the disaster was measured on a 10-point Likert-scale from 0 =not at all to 10 = very strongly, there was an additional open answer field for educators' comments; degree of affectedness was low in $n = 107$ children, moderate in $n = 20$ children, high in $n = 11$ children, and severe in $n = 30$ children. Social behavioral problems (SBP) were measured on a similar 10-point Likert-scale from 0 =none to 10 =very strong, and with an open answer field for specifications of the educators. At baseline, SBP were low in $n = 115$ children, moderately low in $n = 40$ children, moderately severe in $n = 33$ children, and severe in $n = 31$ children. The socio-economic status (SES) of $n = 36$ children was low, of $n = 42$ children moderately low, of $n = 64$ children moderately high, and of $n = 80$ children high (scale with these four options); $n = 203$ children had an attachment figure in the institution, $n = 19$ children did not, according to the educators' observations (Yes/No answer option).

Recruitment was realized by the Dr.-Hans-Riegel foundation, Bonn. Before conducting the workshops, the foundation sent information material for educators and parents and the questionnaires to the participating facilities. The institutional staff handled the communication with and gathering of informed consent from the parents. Acceptance of the project was high with positive feedback from all institutions addressed. Completing the questionnaires was unpaid and voluntary and did not influence workshop participation. We emailed reminders, in cases in which questionnaires were not returned after the study ([Ernst, 2022](#)). Motivation to participate in the evaluation was high, yet in multiple cases, evaluation compliance was hindered by the ongoing

Table 2

Descriptive values for child resilience per measurement time, means (SD).

Variable	Levels	N	t_{E1} before flood	t_{E2} after flood	t_{E3} pre workshop	t_{E4} post workshop	t_{E5} follow-up
Total	<i>Experimental group</i>	238	3.71 (.57)	3.61 (.69)	3.60 (.69)	3.77 (.61)	3.85 (.66)
Sex^a	<i>Girls</i>	122	3.70 (.57)	3.54 (.69)	3.51 (.69)	3.70 (.61)	3.78 (.66)
	<i>Boys</i>	116	3.72 (.59)	3.68 (.66)	3.67 (.69)	3.83 (.64)	3.91 (.67)
Age Group	<i>3–4 y</i>	19	3.74 (.42)	3.61 (.54)	3.76 (.31)	3.75 (.42)	3.83 (.49)
	<i>5–6 y</i>	59	3.84 (.57)	3.68 (.59)	3.68 (.64)	3.79 (.53)	3.94 (.59)
	<i>7–8 y</i>	140	3.69 (.56)	3.64 (.73)	3.59 (.74)	3.76 (.68)	3.84 (.72)
	<i>9–11 y</i>	20	3.44 (.65)	3.21 (.62)	3.21 (.62)	3.76 (.45)	3.67 (.53)
Institution	<i>Kindergarten</i>	51	3.83 (.61)	3.67 (.60)	3.75 (.58)	3.75 (.47)	3.87 (.53)
	<i>School</i>	187	3.68 (.57)	3.60 (.69)	3.55 (.69)	3.77 (.61)	3.84 (.66)
Migration Background	<i>Yes</i>	48	3.48 (.56)	3.38 (.59)	3.40 (.61)	3.63 (.48)	3.81 (.46)
	<i>No</i>	184	3.75 (.55)	3.66 (.69)	3.63 (.70)	3.79 (.63)	3.86 (.71)
Number of Siblings	<i>0</i>	33	3.63 (.52)	3.49 (.66)	3.51 (.69)	3.67 (.53)	3.78 (.63)
	<i>1</i>	100	3.81 (.51)	3.71 (.60)	3.71 (.61)	3.85 (.59)	3.97 (.62)
	<i>2</i>	49	3.60 (.68)	3.50 (.77)	3.53 (.76)	3.81 (.64)	3.86 (.71)
	<i>3 +</i>	22	3.58 (.51)	3.57 (.80)	3.46 (.79)	3.75 (.53)	3.79 (.59)
Degree of Affectedness by Disaster	<i>Low</i>	107	3.63 (.51)	3.56 (.56)	3.56 (.58)	3.73 (.46)	3.86 (.57)
	<i>Moderate</i>	20	3.74 (.67)	3.62 (.78)	3.52 (.70)	3.66 (.50)	3.67 (.53)
	<i>High</i>	11	3.90 (.68)	3.65 (.62)	3.65 (.59)	3.78 (.52)	3.76 (.50)
	<i>Severe</i>	30	3.71 (.72)	3.49 (.62)	3.66 (.67)	3.62 (.53)	3.81 (.43)
Social-behavioral problems (SBP)	<i>Low</i>	115	3.92 (.48)	3.97 (.59)	3.93 (.51)	4.04 (.54)	4.15 (.51)
	<i>Mod. low</i>	40	3.63 (.45)	3.50 (.51)	3.48 (.53)	3.70 (.40)	3.76 (.48)
	<i>Mod. severe</i>	33	3.45 (.52)	3.20 (.49)	3.18 (.63)	3.46 (.54)	3.62 (.52)
	<i>Severe</i>	31	3.13 (.53)	2.84 (.61)	2.77 (.71)	3.12 (.59)	3.02 (.75)
Socio-economic status (SES)	<i>Low</i>	36	3.37 (.60)	2.99 (.68)	2.86 (.74)	3.31 (.70)	3.28 (.81)
	<i>Mod. low</i>	42	3.70 (.56)	3.59 (.67)	3.54 (.63)	3.77 (.63)	3.80 (.57)
	<i>Mod. high</i>	64	3.77 (.53)	3.85 (.68)	3.84 (.62)	3.94 (.59)	3.98 (.65)
	<i>High</i>	80	3.77 (.54)	3.71 (.57)	3.70 (.55)	3.81 (.49)	3.99 (.52)
Attachment figure	<i>Yes</i>	203	3.76 (.51)	3.66 (.65)	3.65 (.66)	3.82 (.58)	3.88 (.65)
	<i>No</i>	19	3.16 (.66)	2.99 (.68)	3.05 (.72)	3.30 (.62)	3.60 (.76)

Note. This table shows the child resilience means and standard deviations (in parentheses) of the educator observation of the children participating in the workshops (experimental group [EG]). The Child Resilience Scale maps resilience from 1 (lowest possible resilience) to 5 (highest possible resilience). t_{E1} , t_{E2} , t_{E3} , t_{E4} , and t_{E5} are the measurement times throughout the study, of which t_{E1} and t_{E2} were collected in hindsight (before t_{E3}). The resilience values are shown overall for the EG (top row) and for the demographic and control variables: sex, age group, school vs kindergarten, migration background, number of siblings, degree of affectedness by disaster, social-behavioral problems (SBP), socio-economic status of the child's family (SES), presence of an attachment figure in the institution, and the facilitating drama therapist; Mod.=moderate;

^a We offered three categories for sex: (1) 'male', (2) 'female' and (3) 'diverse', of which 'diverse' was not chosen ($n = 0$).

Table 3

Descriptive values and change values of experimental group vs control group.

Variable	Levels	Experimental Group (EG)				Control Group (CG)			
		N (EG)	Pretest (M, SD)	Posttest (M, SD)	Change Value _{EG}	N (CG)	Pretest (M, SD)	Posttest (M, SD)	Change Value _{CG}
Total		238	3,60 (.69)	3,77 (.61)	0.17	127	3,74 (.76)	3,65 (.75)	-0.08
Sex	Female	122	3,51 (.69)	3,70 (.61)	0,19	64	3,82 (.73)	3,71 (.74)	-0,11
	Male	116	3,67 (.69)	3,83 (.64)	0,16	63	3,65 (.78)	3,60 (.75)	-0,05
Age group	3-4 years	19	3,76 (.31)	3,75 (.42)	-0,01	11	3,66 (.42)	3,51 (.42)	-0,15
	5-6 years	59	3,68 (.64)	3,79 (.53)	0,11	31	3,80 (.45)	3,48 (.26)	-0,32
	7-8 years	140	3,59 (.74)	3,76 (.68)	0,17	82	3,74 (.81)	3,50 (.22)	-0,24
	9-11 years	20	3,21 (.62)	3,76 (.45)	0,55	3	2,96 (.77)	3,10 (.69)	0,14
Institu-tion	Kiga	51	3,75 (.58)	3,75 (.47)	0,00	27	3,78 (.63)	3,76 (.65)	-0,02
	School	187	3,55 (.69)	3,77 (.61)	0,22	100	3,73 (.80)	3,62 (.77)	-0,11
Migrat. Backg.	Yes	48	3,40 (.61)	3,63 (.48)	0,23	19	3,38 (.69)	3,46 (.67)	0,08
	No	184	3,63 (.70)	3,79 (.63)	0,16	104	3,78 (.76)	3,68 (.76)	-0,10
Number of Siblings	0	33	3,51 (.69)	3,67 (.53)	0,16	14	3,57 (.68)	3,52 (.79)	-0,05
	1	100	3,71 (.61)	3,85 (.59)	0,14	65	3,74 (.74)	3,65 (.69)	-0,09
	2	49	3,53 (.76)	3,81 (.64)	0,28	27	3,79 (.79)	3,78 (.74)	-0,01
	3 +	22	3,46 (.79)	3,75 (.53)	0,29	11	3,72 (.82)	3,54 (.95)	-0,18
Degree of Affectedness	Low	107	3,56 (.58)	3,73 (.46)	0,17	34	3,74 (.62)	3,64 (.55)	-0,10
	Moderate	20	3,52 (.70)	3,66 (.50)	0,14	11	3,86 (.69)	3,84 (.51)	-0,02
	High	11	3,65 (.59)	3,78 (.52)	0,13	6	3,37 (.54)	3,37 (.54)	0,00
	Severe	30	3,66 (.67)	3,62 (.53)	-0,04	19	3,77 (.50)	3,85 (.50)	0,08
SBP	Low	115	3,93 (.51)	4,04 (.54)	0,11	74	4,14 (.57)	4,01 (.51)	-0,13
	Mod. Low	40	3,48 (.53)	3,70 (.40)	0,22	17	3,54 (.41)	3,67 (.39)	0,13
	Mod. sev.	33	3,18 (.63)	3,46 (.54)	0,28	13	3,22 (.56)	2,99 (.77)	-0,23
	Severe	31	2,77 (.71)	3,12 (.59)	0,35	19	2,80 (.65)	2,76 (.71)	-0,04
SES	Low	36	2,86 (.74)	3,31 (.70)	0,45	17	2,73 (.73)	2,60 (.77)	-0,13
	Mod. Low	42	3,54 (.63)	3,77 (.63)	0,23	22	3,75 (.69)	3,64 (.68)	-0,11
	Mod. High	64	3,84 (.62)	3,94 (.59)	0,10	47	3,99 (.60)	3,97 (.56)	-0,02
	High	80	3,70 (.55)	3,81 (.49)	0,11	39	3,86 (.62)	3,75 (.53)	-0,11
Attach. Figure	Yes	203	3,65 (.66)	3,82 (.58)	0,17	112	3,77 (.72)	3,69 (.73)	-0,08
	No	19	3,05 (.72)	3,30 (.62)	0,25	9	3,07 (.95)	3,12 (.90)	0,05

Note. The table shows the mean differences in child resilience of the educator observation of the children from before to after the workshop (workshop week; EG) and from before to after a regular school / kindergarten week (control week; CG). The Child Resilience Scale (CRS) used, maps resilience on a scale from 1 (lowest possible resilience) to 5 (highest possible resilience). The values are shown overall for the workshop and the control week (two first rows) and in the following rows by demographic and control variables. Severity of being affected by the flood, type of institution (kindergarten vs. school), and age were used as moderating variables in the analysis. Migrat. Backg.=Migration Background; SBP=Social-behavioral problems; SES=Socio-economic status; Attach.=Attachment; Kiga=Kindergarten, Mod.=moderately, sev=severe;

^aSex 1 male, 2 female, 3 diverse (diverse was not chosen).

Covid-19-pandemia with many institutions being critically understaffed and temporarily closed.

The study employed a *single-factor within-group repeated measures design* to measure effects of the floods and the DT workshops on child resilience. The independent variable was time, and the dependent variable was child resilience. The resilience data were collected through observation-based assessments by the educators, and included a CG (waiting period), and the EG (intervention period). As stated above, a between-group design was not possible for ethical reasons of equal treatment and urgency of the situation.

Procedure

From October to December 2021, the RIArT prepared the evaluation study in close collaboration with the foundation and the drama therapists. Ethical consent was obtained in December 2021.

Drama Therapy Workshops. From January to July 2022, DT workshops were conducted in rooms of the respective institutions. Every interested institution and child participated free of charge. The workshops lasted three hours per day for five days (Monday to Friday): four days were organized for the children and the last day for the educational staff. Sometimes, the workshops could not be executed as planned because of Covid-19 (illness or restrictions) and other reasons. In these cases, workshop days were shifted or canceled. The workshop was designed for 4–8 children, but due to the high demand, the group size was increased to a maximum of 14 children. Educators could decide for themselves whether they wanted to participate in the workshop, which three of the 19 did.

The DT workshop protocol and aims. It is crucial for research on DT to

ensure a consistent structure and execution in the practice under study (Feniger-Schaal & Orkibi, 2020). To guarantee the quality of the intervention, a workshop concept and manual was developed by an expert group of three drama therapy co-authors of this article (MS, BM, USdR), the drama therapy professor at University Nürtingen (J. Junker), and the drama therapy professor at Medical School Hamburg (S. Klees). The manual is based on a story activating the strength of each child, while at the same time leaving options for flexible adaptation to the groups within the given framework. The workshops aimed to strengthen the children's resilience, resources, and psychosocial health in general. Trained drama therapists conducted them pursuing a stabilizing and strengthening approach. Although the flood disaster was the trigger of the intervention, the program did not focus on the event (no assessment or treatment of trauma). Instead, it was based on the individual needs and coping strategies of the children and was adapted to the respective age group and the surrounding conditions. This way, the workshops followed the idea of helping children (re-)discover and (re-)activate their strengths and capabilities and to make them resilient to unfamiliar situations in general (Dr. Hans Riegel-Stiftung, 2021). Elements of the workshops included listening to and re-enacting a fictional story, building a safe space, a treasure hunt, free play, movement, building body statues, acting out small scenes, drawing pictures of the child's and the characters' strengths, and reflecting on what the children experienced. The workshop day for the educational staff offered space for exchange between staff members, for transparency and information about self-care, child trauma, trauma education, resilience, and reflection on the workshops (Dr. Hans Riegel-Stiftung, 2021; German manual in supplements).

Evaluation of the Workshops. We evaluated changes in child resilience

over the course of the workshops (for timeline see Fig. 1).

Observations of the EG. For the EG, the educators completed four questionnaires per child about five points in time. Questionnaire A captured data about the children for two time points: before the flood (t_{E1}) and immediately after the flood (t_{E2}) – both collected *in hindsight*. The questionnaire had to be completed no later than Friday before the workshop week. The second and third questionnaires (questionnaires B1 and B2) were pre- (t_{E3}) and post-test (t_{E4}) of the workshop week. B1 was completed on Thursday or Friday before the respective week, and B2 was completed during the last workshop day – the day for the educational staff (also a Friday). Both questionnaires asked about the *current* state of the child. The fourth questionnaire (C), used as a follow-up six weeks after the workshop (t_{E5}), asked about the *current* state of the child again (all questionnaires see Supplement).

Observations of the CG. The study was conceptualized with a within-group design to reach all affected children in kindergartens and elementary schools with the workshop. Many groups that participated in the workshops (EG) had to wait several weeks until the workshops were executed. Some of these groups served as CG before participation in the workshops. For this condition, the respective educator completed a questionnaire before and after an intervention-free week for each child: Questionnaire K1 was completed on Thursday or Friday before the intervention-free control week (t_{K1}), and questionnaire K2 was completed on Friday of the respective control week (t_{K2}). This design created a control period for the EG intervention week (between t_{E3} and t_{E4}). Most institutions could not exactly meet the target timeframe of one week between K1 and K2. So, we extended the period for the CG to up to two intervention-free weeks. In the cases of the control week immediately preceding the intervention, we used B1 equivalent to K2. This allowed us to include those children for whom only K1 was completed but for whom B1 was completed at the most two weeks after K1. In what follows, we will refer to questionnaire B1 as K2 (t_{K2}) for the control groups in question. We decided to include all control groups to not lose any power.

Further Variables. We explored the data set to see whether other variables influenced the change in resilience. In this analysis, we included the variables age, sex, migration background, number of siblings, type of institution, SES, severity of being affected by the flood, presence of an attachment figure in the institution, social behavioral problems (SBP), and the drama therapist leading the workshop.

Materials and instruments

To measure resilience, we constructed the *Child Resilience Scale* (CRS) to capture changes over time. The main question for the construction was “Which resilience factors are important for children in school and kindergarten settings, and to what extent can change be expected after a four-day DT workshop for children who had stressful experiences after the 2021 flood disaster?”. Following Quinlan et al. (2016), we aimed to include all six aspects constituting resilience according to the integrative BASIC Ph-model (Lahad & Ayalon, 1993).

We employed the CRS in questionnaires A, B1, B2, C, K1, and K2 (see Appendices 1–6), which are all questionnaires of the educator observation. The CRS quantitatively measures other-reported child resilience and is completed by an adult observer. It consists of six dimensions relating to the BASIC Ph-model, each with one or two items: *relaxation* (“The child is carefree and easy-going.”, “The child is balanced and relaxed.”), *joy* (“The child laughs, is happy, and in a good mood.”, “The child can enjoy praise and compliments.”), *contact behavior* (“The child has friends.”, “The child gets along well in the group.”), *expressivity* (“The child uses the full extent of its expressive possibilities.”), *resilience* (“The child shows inner strength.”, “The child believes in itself.”), and *attention* (“The child can play in a self-forgotten way.”). The degree of agreement with the items has to be indicated on a 5-point scale from “never” (1) to “very often” (5). The resilience score is formed from the mean of the five dimensions, with high scores indicating high resilience and low scores indicating low resilience. The German CRS used in the study is shown in Fig. 2; translations of the CRS were provided by the first author (SK), who also did the construction with the fifth author (MJ).

The formulation of the CRS is based on two existing instruments and additional self-constructed items: (1) the PERIK - Positive Entwicklung und Resilienz in der Kindertagesbetreuung [Positive Development and Resilience in Kindergarten Day Care], a standardized observation form (Mayr & Ulich, 2005), and (2) the subscales *well-being* and *social relationships* of the KOMPIK – Kompetenzen und Interessen von Kindern [Competencies and Interests of Children] (Mayr, 2012), a structured observation and assessment instrument for educators in daycare centers. Both have been validated and have good quality criteria (Mayr, 2012; Mayr & Ulich, 2005). (3) The four self-constructed items are those of the dimensions *expressivity*, *resilience*, and *attention*, to complete the BASIC Ph-model categories. All items loaded on a strong general factor in the factor analysis (variance explanation of 55,23 %), we thus computed the results with the entire scale; which generally yielded the same pattern of results than computing with only the two resilience items proper; with an effect size difference of + .01). The internal consistency of the CRS was excellent, with Cronbach’s alpha = .907 (George & Mallery, 2005, p.231).

Test battery. Educators observed only the children of their own class or kindergarten group, in sum for 4–6 times: at reception of the questionnaire (questionnaire A), Thurs/Fri before the workshop week started (B1), on the Friday the workshop week ended (B2), and at the follow-up (C). The ones that also joined the CG, were additionally observed in a suited week in the latency period before the control week (K1) and after that week (K2). Educators observed the children on the 10 items of the CRS, and additionally on the demographic/control questions; children were only observed by their own teacher.

Questionnaire A (see Supplement) included the CRS twice to capture children’s resilience retrospectively for two points in time, before and after the flood. It contained questions about demographic data on the child and the family: gender, age, siblings, presence of an attachment figure in the institution [yes/no], estimated SES [from 1 “very low” to 10 “very high”], migration background [yes/no], and cultural origin. It

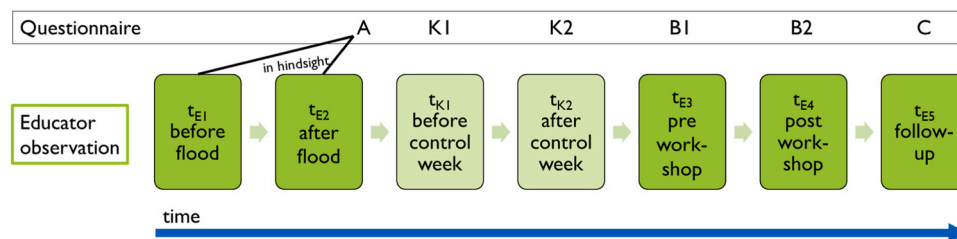


Fig. 1. Timeline of the Measurements of Resilience. Note. This figure shows the timeline of the educator observation of child resilience of child resilience, and the corresponding questionnaires. t_{E1} , t_{E2} , t_{E3} , t_{E4} , and t_{E5} are measurements of the experimental group by the educator, of which t_{E1} and t_{E2} were collected in hindsight with questionnaire A. Between t_{E1} and t_{E2} was the flood disaster, between t_{E3} and t_{E4} was the workshop, and between t_{E4} and t_{E5} was about six weeks. t_{K1} and t_{K2} are measurements of the control group before and after a regular school/kindergarten week, collected by the educator.

Wie schätzen Sie das Kind zum jetzigen Zeitpunkt ein?	nie	selten	manchmal	häufig	sehr häufig
Das Kind zeigt innere Stärke.	☐	☐	☐	☐	☐
Das Kind wirkt sorglos und unbeschwert.	☐	☐	☐	☐	☐
Das Kind lacht, ist fröhlich und gut gelaunt.	☐	☐	☐	☐	☐
Das Kind kann sich über Lob oder Komplimente freuen.	☐	☐	☐	☐	☐
Das Kind wirkt ausgeglichen und entspannt.	☐	☐	☐	☐	☐
Das Kind nutzt das volle Ausmaß seiner Ausdrucksmöglichkeiten.	☐	☐	☐	☐	☐
Das Kind kann selbstvergessen spielen.	☐	☐	☐	☐	☐
Das Kind hat Freunde.	☐	☐	☐	☐	☐
Das Kind kommt gut in der Gruppe klar.	☐	☐	☐	☐	☐
Das Kind glaubt an sich.	☐	☐	☐	☐	☐

Fig. 2. The Child Resilience Scale (CRS) in the German Original Version. *Note.* The Child Resilience Scale (CRS) was used to capture the educator observation. Translation: How do you evaluate the child at the current moment? Answer possibilities: never, seldom, sometimes, often, very often. Items are (from top to bottom) "The child shows inner strength.", "The child is carefree and easy-going.", "The child laughs, is happy, and in a good mood. ", "The child can enjoy praise and compliments.", "The child is balanced and relaxed.", "The child uses the full extent of its expressive possibilities.", "The child can play in a self-forgotten way.", "The child has friends.", "The child gets along well in the group.", and "The child believes in itself."

asked about the child’s social behavior [“The child has difficulties in social behavior” to be answered on a 10-point scale from 1 “no problems at all” to 10 “severe problems” accompanied by an optional text box], and the extent to which the child was affected by the flood [to be answered on a 10-point scale from 1 “not at all affected” to 10 “highly affected”).

Questionnaire B1, as well as *questionnaires K1* and *K2* (see Supplement), consisted solely of the CRS. *Questionnaires B2* and *C* (see Supplement) consisted of the CRS, asked about the child’s social behavior (see above), whether the educator took part in the workshop [“Yes, as an active participant”/ “Yes, as a participating observer”/ “No”], and a number of *acceptance* questions: how strongly the educator felt about the positive (resilience-building) effects of the exercises in the workshop [from 0 “very weak” to 10 “very strong”], if there were any changes in the child’s behavior and attitude that they thought could be attributed to the workshop [“No”/ “If yes, which?”], and an open text box], which specific interventions they thought were most effective [open question], and which school grade they would give to the workshop [1 “very good” to 6 “insufficient”] and about criticism and suggestions for improvement [open question].

Further Material. We sent material to the institutions containing information about the content and aim of the workshops, the survey’s conduct and timeline, data privacy and voluntariness, and a consent form regarding participation in the workshop and the study for parents and educational staff. The parents were asked to provide demographic information about the family and their *compliance with the study* [“I am ... about the intervention *Strong Kids* for my child.”], to be answered on a 10-point scale from 1 “very skeptical” to 10 “very positive”], to check for possible attitudinal and expectation influences on the children. Demographics of the family were in the end all used from the educators’ questionnaires, because we received fewer parent questionnaires back. Finally, the therapists rated the resilience and well-being of the children, which constituted an extra data set that will not be covered in this publication.

Data analysis

Handling of ambiguous answers. Boxes were rated from 1 (never) to 5 (very often). Some items had more than one box checked. In this case, the mean value of the checked boxes was included in the analysis. If a cross was placed between two boxes, this was included as the mean

value of the two surrounding boxes.

Statistical analysis. We used IBM SPSS Statistics version 27.0.1. Mainly due to the difficult post-disaster circumstances during the study, the data showed a high proportion of unsystematic as well as systematic missing values (37.4 %, related to the included cases). We imputed the missing values using *regression imputation* to avoid excluding subjects. Regression imputation is a method that uses a regression model to predict the missing values from the existing values (Zhang, 2016). With the imputed data set, we computed child resilience, and other characteristics. For descriptive analysis, we calculated means and standard deviations. We assessed change in child resilience throughout the study by one-way analysis of variance with repeated measures (rmANOVA) for each scale. We examined the differences between two consecutive points in time by post-hoc repeated contrasts, and the difference between EG and CG by an unpaired *t*-test. We used mixed ANOVA to examine the influences of SBP, and both mixed ANOVA and moderator analysis to explore the data set further.

To meaningfully compute the influences of SBP, SES, age, and the severity of being affected by the flood, we formed four subgroups for each variable. Note that this restricts the variance of the variables. For SBP scores: 1–3 = low SBP, 4–5 = moderately low SBP, 6–7 = moderately severe SBP, 8–10 = severe SBP; for SES scores: 1–3 = low SES, 4–5 = moderately low SES, 6–7 = moderately high SES, 8–10 = high SES; for scores of the severity of being affected: 1–3 = not / low affected, 4–5 = moderately low affected, 6–7 = moderately highly affected, 8–10 = highly affected; for age, we grouped ages 3–4, 5–6, 7–8, and 9–11 years. For analyzing *acceptance (hypothesis d4)*, we used the two scales on (a) the school grades (1–6; 1 = very good; 6 = insufficient), and (b) the question of the strength of the resilience-building effects of the workshop (0–10; 0 = very weak; 10 = very strong) from the educator ratings and report the themes in the two open questions.

Results

Tests of the hypotheses H1a-c: within-group results

With *N* = 238, the sample was sufficiently large (*n* ≥ 30 for each measurement) to assume a normal distribution according to the central limit theorem (Bortz & Schuster, 2016; Kwak & Kim, 2017). No outliers in the data set differed more than three standard deviations from the mean. When a mixed ANOVA was applied, corresponding variables were

transformed with the Box-Cox-transformation (Box & Cox, 1964), if equality of error variances was violated (assessed with Levene's test). To prevent alpha error accumulation, all significance values of post-hoc contrasts were Bonferroni-Holm-adjusted (Holm, 1979), when we used an unpaired *t*-test to compare them. However, the two conditions were not completely independent. We had to accept the loss of statistical power. During moderation analysis, the linear relationship between the variables - checked visually - was only partially present. Here too, we had to accept a loss of statistical power. For interpretation of effect sizes, we used the criteria of Ellis (2010).

Child resilience change by educator ratings (Hypotheses 1a-c). The change in child resilience in the educator observation over 5 points in time was significant. Overall, a repeated measures ANOVA with a Greenhouse-Geisser showed a statistically significant difference between resilience levels of the five measurements, $F(3.29, 780.06) = 19.66, p < .001, \eta^2 = .08$ [medium effect size; interpretation according to Ellis, (2010), p.41]. On average, child resilience decreased from t_{E1} to t_{E2} (before to after the flood) and continued to decrease to t_{E3} (before the workshop). Child resilience increased to t_{E4} (after the workshop) and further increased to t_{E5} (follow-up). For visualization, see Fig. 3; for descriptive values, see Table 2.

Post-hoc contrasts showed a significant decrease in child resilience of -0.09 ($SE = 0.03$) from t_{E1} to t_{E2} , $p = .009, \eta^2 = .04$. The decrease of -0.02 ($SE = 0.02$) from t_{E2} to t_{E3} was not significant, $p > .999, \eta^2 = .00$, the increase in child resilience of $+0.17$ ($SE = 0.03$) from t_{E3} to t_{E4} was significant, $p < .001, \eta^2 = .10$, and the increase in child resilience of $+0.08$ ($SE = 0.03$) from t_{E4} to t_{E5} was significant, $p = .044, \eta^2 = .03$.

Tests of the Hypotheses H1a-c: Between-Group Results (comparing EG and CG)

Child resilience change compared to control week (Hypothesis 1b). In order to test whether child resilience developed differently in the control week compared to the workshop week, we calculated an unpaired *t*-test (see Table 3). Child resilience increased during the workshop week ($M = +0.17, SD = 0.51$) and decreased during the control week ($M = -0.08, SD = 0.43$). This difference was statistically significant, with mean resilience change 0.26 (95 %-CI [0.15, 0.36]) lower during the control week than the workshop week, $t(363) = 4.83, p < .001$, Cohen's $d = .53$ [medium effect size; according to Ellis, (2010), p.41].

Fig. 4 displays the differences between the intervention week and the control week. Significant moderation effects were found for age ($n = 365$; $\Delta R^2 = 1.23\%$, $F(1, 361) = 7.69, p = .006$, 95 %-CI[-0.15, -0.03]), the type of institution (kindergarten vs. school; $n = 365$; $\Delta R^2 = 1.41\%$, $F(1,$

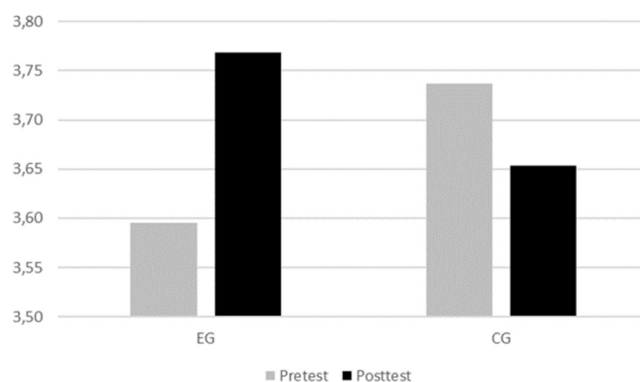


Fig. 4. Pre- and Posttest Differences on Child Resilience Scale for Experimental vs. Control Group (Means and SD; $N_{EG}=238$; $N_{CG}=127$). Note. The table shows the mean differences in child resilience of the educator observation of the children from before to after the workshop (intervention week = EG) and from before to after a regular school / kindergarten week (control week = CG). The Child Resilience Scale (CRS) used, maps resilience on a scale from 1 (lowest possible resilience) to 5 (highest possible resilience). Pretest= t_3 before the workshop, Posttest= t_4 after the workshop, intervention group= experimental group (EG). Standard deviations (SD) were for pretest $SD_{EG} = 0.69$, posttest $SD_{EG} = 0.61$, pretest $SD_{CG} = 0.76$, and posttest $SD_{CG} = 0.75$. * $t_{EG}(363) = 4.83, p < .001$, Cohen's $d = .53$.

$361) = 7.28, p = .007$, 95 %-CI[-0.52, -0.08]), and the severity of being affected by the flood ($n = 238$; $\Delta R^2 = 1.66\%$, $F(1, 234) = 5.14, p = .024$, 95 %-CI[0.01, 0.08]). These variables influenced the effect of the condition on resilience change. Examination of the means showed that the change in resilience only differed between conditions for children in elementary school, for children older than four years, and for children less than highly affected (Table 3).

Exploratory moderator analysis of effects of demographics and control variables

For an exploratory examination of the data set, we assessed the influence of the variables gender, workshop leading drama therapist, type of institution, age, number of siblings, sequence of siblings, presence of an attachment person in the institution, migration background, SES, SBP, parents' expectations of the workshop, mother tongue, single parenthood, and severity of being affected by the flood. We examined

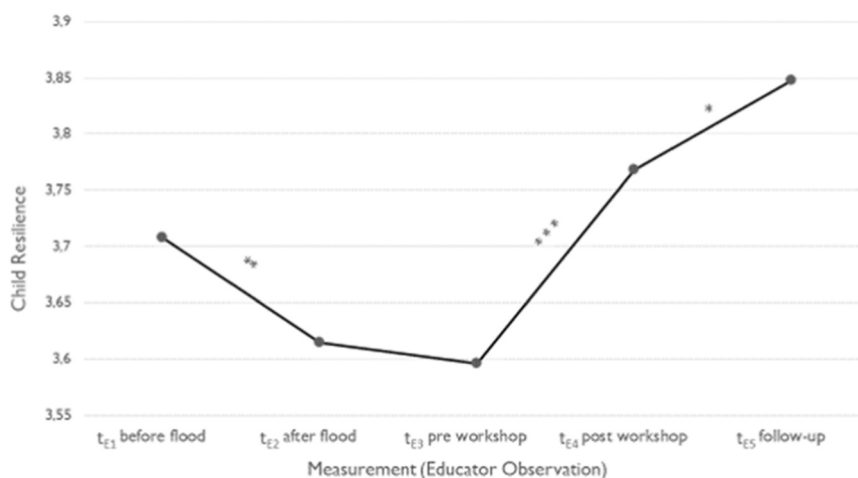


Fig. 3. Change in Child Resilience in the Experimental Group. Note. This figure shows the change in resilience of the $n = 238$ children (experimental group) across five points in time, observed by the educators: Before and immediately after the flood (t_{E1} and t_{E2} , both collected retrospectively), before the workshops (pretest, t_{E3}), after the workshops (posttest, t_{E4}), and follow-up after 5–9 weeks (t_{E5} ; for timeline and procedure, see Methods). The Child Resilience Scale (CRS) maps resilience on a scale from 1 (lowest possible value) to 5 (highest possible value). * $p < .05$, ** $p < .01$, *** $p < .001$.

each interaction effect of these variables with the condition, respectively, the time on child resilience change. In addition, we examined the change in SBP over time and its relationship with the change in resilience. Notably, the DT intervention worked for all children, independent of sex, migration background, number of siblings, parenting condition (i.e., single vs. dual), and parent expectations of the workshops (attitude toward intervention).

The variables that showed significant effects on resilience were (a) the socio economic status (SES): children of the lowest SES presented with substantially less resilience at all measurement points, with $F(4.46, 324.07) = 7.90, p < .001, \eta^2 = .10$, and a different pattern than the other three groups; interestingly, the children with the lowest SES showed the highest increase in resilience after the workshop, but then again a drop at the follow-up, whereas all other groups showed an increase at the follow-up (for all values see Table 2). It further made a difference for the amount of resilience displayed by the children (b) whether the children had an attachment figure in the institution or not, with $F(3.29, 723.22) = 3.04, p = .024, \eta^2 = .01$, where children with an attachment figure showed a higher resilience at all measurement points, but interestingly, change values after workshop and from t_{E3} to follow up were higher for children without attachment figure (while their overall values were lower throughout; see Table 2); and which drama therapist lead the group with $F(10, 430) = 2.39, p = .009, \eta^2 = .05$. The children's resilience changed differentially between t_{E3} and t_{E4} , dependent on the therapist who led the group (with a small effect size), whereas longer-term resilience change between t_{E4} and t_{E5} was relatively similar across therapists (see Table 2). Last but not least, (d) the existence of social behavioral problems (SBP) before the workshops with $F(3.15, 225.47) = 28.52, p < .001, \eta^2 = .29$ had an influence on the development of resilience: The more SBP children displayed, the lower their baseline-level of resilience, the more it dropped from t_{E1} to t_{E2} (after the flood), and the more it rose after the workshop (t_{E3} to t_{E4}). For children with severe SBP, resilience dropped again at follow-up (t_{E4} to t_{E5}), whereas for all other groups, it continued to rise at follow-up (see Fig. 5 below).

Child SBP was recorded by the educators at baseline (questionnaire

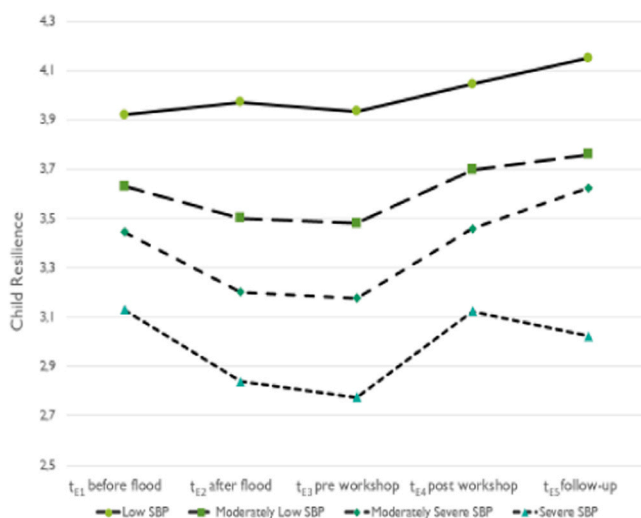


Fig. 5. Change in Child Resilience by Severity of the Children's Social Behavioral Problems (SBP). Note. This figure shows the change in child resilience of the children participating in the workshop over five points in time, observed by the educator, divided by levels of social behavioral problems (SBP) the child showed after the flood ($n = 219$). The Child Resilience Scale (CRS) used maps resilience on a scale from 1 (lowest possible resilience) to 5 (highest possible resilience). Children's SBP were rated by educators on a scale from 1 (no problems at all) to 10 (severe problems) at measurement t_{E2} and were grouped for statistical analysis (1–3 = low SBP ($n = 115$), 4–5 = moderately low SBP ($n = 44$), 6–7 = moderately severe SBP ($n = 33$), 8–10 = severe SBP ($n = 31$)).

A), after the workshop (t_{E4}), and at follow-up (t_{E5}), on a scale from 1 (no problems at all) to 10 (severe problems). Overall, a repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean SBP levels showed a statistically significant difference between the three measurements, $F(2, 262) = 16.19, p < .001, \eta^2 = .11$, with $n = 132$. On average, child SBP decreased from $t_{E1/2}$ ($M = 4.05, SD = 3.09$) to t_{E4} ($M = 3.42, SD = 3.06$) and continued to decrease until t_{E5} ($M = 3.16, SD = 2.72$). Post-hoc contrasts showed a statistically significant decrease in child SBP of -0.63 ($SE = 0.17$) from $t_{E1/2}$ to t_{E4} ($p < .010, \eta^2 = .09$) and a statistically significant decrease of -0.89 ($SE = 0.17$) from $t_{E1/2}$ to t_{E5} ($p < .001, \eta^2 = .18$). The decrease in child SBP of -0.27 ($SE = 0.15$) from t_{E4} to t_{E5} was not statistically significant, $p = .207, \eta^2 = .03$. To assess whether the changes in SBP showed a relationship with the development of resilience, we calculated a Pearson correlation of resilience change during the workshop (t_{E3} to t_{E4}) and SBP change from baseline ($t_{E1/2}$) to after the workshop (t_{E4}) ($n = 157$) and to follow-up (t_{E5}), respectively ($n = 168$). We found small negative correlations for resilience change with SBP change from $t_{E1/2}$ to t_{E4} ($r = -.181, p = .023$) and to t_{E5} ($r = -.183, p = .017$). Thus, the SBP of children who became more resilient during the workshops decreased. SPB was also significantly correlated with SES, $r = -.213$ (218), $p = .002$, with higher SPB in children of lower SES. SPB was also the only variable covarying with sex: boys showed significantly more severe SBP than girls $r = -.329$ (219), $p = .000$, more so at t_1 than at t_5 (Pearson two-sided correlation). The full list of observed behavior changes by educators is in the Supplement.

Test of hypothesis 1d: Acceptance of the intervention

Out of $n = 146$ school grades the educators provided to evaluate the workshops, $n = 18$ were 'very good' (German grade 1), $n = 125$ 'good' (German grade 2) and $n = 3$ 'poor' (German grades 4,5,6). The mean grade was $M = 1.94$ ($SD = 0.57, range = 1-6$) on a scale from 1 = 'very good' and 6 = 'insufficient' directly taken from the German school grade system. The ratings of how strong the resilience-supporting effects of the workshop were on a scale from 0 to 10 (0 = 'very weak'; 10 = 'very strong') from the educators' ratings resulted in a $M = 7.70$ ($SD = 1.20; range = 4-10$). Three out of 19 educators had participated in the workshops (as participant observers). While on many occasions educators and therapists received positive feedback from parents and children as well as wishes that the drama therapist should come back, the acceptance of parents and the children was not directly measured. In sum, there was a high acceptance of the workshops by the educators.

The educators enlisted the following positive feedback (in post-test and/or follow-up): They particularly appreciated the safe and playful setting that allowed the children to freely express themselves. Exercises such as building a cave, finding superpower, dressing up, shaking song, team-building, attending to own strength and weaknesses, mindfulness, role play with self-selected roles, perspective and action taking allowed the children to experience their own strength and to find back to their own agency. The possibility to decide which offer to accept without performance pressure allowed children to thrive and flourish. "Children perceived themselves as co-creators, playing and working together without having to strive for a fixed goal." Being in motion and action nourished creativity, the opportunity to live phantasies enhanced free expression and safety in different roles. Exemplary quote: One educator stated that "children loosened up during the week, [...] feedback was consistently positive, the final discussion informative"; she described the therapists' assessments of the children as coinciding with her own, and that she started using the exercises in her lessons.

The educators enlisted the following critique. Most often they had 'no critique'. Educators wanted the DT therapists to come back, stay longer, come on a regular basis and be part of their regular curriculum. They appreciated the open, uncomplicated and professional contact with therapist and project team, and regretted when they had to take a COVID-break; they wished for more participatory opportunities, higher transparency of the therapists and project team, the possibility to learn more techniques, with participation of staff and parents. Exemplary

quote: “In retrospect, I think it would be useful to work with the teachers as well. That way, the success would not fade in the children. More attention should be paid to the sustainability of the successes achieved. Work with the parents may also be important.”

Discussion

The present study evaluated a DT project for kindergarten and elementary school children affected by the flood disaster in Germany in July 2021. Findings suggest a strengthening of the resilience of the children after the DT workshops from both the educators’ ratings. There was a significant difference between the intervention group and the within-group control group, completing the questionnaires in a regular school week, with the intervention group scoring higher on resilience after the intervention week. This effect was sustained and increased in the follow-up. Moreover, within the limitations, we found effects of age, type of institution (kindergarten vs. school), severity of being affected, social-behavioral problems, socio-economic status, the presence of an attachment figure, and the drama therapist leading the workshop on child resilience change. Overall, there was a high acceptance of the drama therapy workshops. To address the wishes for a continued intervention, three of the drama therapists (MS, USR, BM) teamed up for a sustainability offer in the Ahrtal.

Testing our hypothesis

Child resilience change from t_{E1} to t_{E2} (Hypothesis 1a) and latency period t_{E1} to t_{E2} . Hypothesis 1a was confirmed: The resilience of the children decreased from before to after the flood, according to educators’ observations. This finding is consistent with research on the consequences of adversity for children (e.g., Kingston et al., 2019; Kousky, 2016; Scully et al., 2020). The negative impact of the flood disaster on the child’s psyche was evident in our study in the declining child resilience from before to after the flood, as rated in hindsight by the educators. There is evidence in the literature that not all affected children suffer damage from disasters (Kingston et al., 2019; McDermott & Cobham, 2014), and only a minority will develop clinically relevant symptoms such as depression or moderate to severe PTSD symptoms (e.g., Le Roux & Cobham, 2022; Mordeno et al., 2018; Tang et al., 2014). In our study, we did not assess clinical diagnoses and can only talk about the relative decrease in resilience from before to after the flood as observed in daily life. In sum, it becomes clear that natural disasters adversely affect children’s resilience beyond clinical diagnoses. The model of Lahad (2017) was useful to understand individually varying reactions and to look at the item dimensions of the Child Resilience Scale (CRS). It also made us aware that we live in a time, where in some cases it is no longer possible to distinguish between man-made and non-man-made disaster, assuming that climate change is man-made.

Interestingly, the flood disaster did not worsen the resilience of all children. The ‘socially most well-adapted children’ (with the lowest SBP, the second highest SES, and a high resilience at baseline; see Fig. 5) showed a slight increase in resilience after the flood. Even though this increase is not significant, it is an exception to the overall pattern and indicates that the resilience of those children did not observably decline through the adverse event; they presented equally resilient to the educators than before the flood. Could it be them showing more strength, because of the others’ distress – a carer or ‘big sister’ effect?

Notably, from after the flood to the beginning of the workshop (t_{E2} to t_{E3}) there was no recovery; in fact, there was a non-significant decline in child resilience descriptive values. This can probably best be explained by the continued exposure to the destruction after the disaster. Houses and roads looked bombed, and infrastructure did not work for months. The absence of a rebound can further be explained by the continued Covid-19 situation as a second traumatic stressor adding to the burden of the consequences of the flood disaster. The literature confirms that a natural disaster is not a one-time stressor (Belfer, 2006; Williams et al.,

2008). The fact that there was no further significant decline between t_{E2} (after the flood) and t_{E3} (start of the workshop) may be explained by an unprecedented solidarity bringing in many voluntary helpers, and various assistance services quickly established after the flood, such as drop-in psychological centers for children and adolescents, increased service of school psychologists, and emergency care services.

Child resilience change from t_{E3} to t_{E4} , compared to control week (Hypothesis 1b). Hypothesis 1b was confirmed: The children were observed to be more resilient after the workshop week than before. Within the limitations of a within-group design, this resilience change differed significantly from the control week, after which the children’s resilience non-significantly decreased (see Fig. 4). This is the core result of our study. By comparing the intervention week with a control week, the data suggests that the positive development of children’s resilience may be attributable to drama therapy. The DT workshops strengthened the children’s resilience with a medium effect size of $d = .53$. This development suggests that resilience is not only negatively affected by adverse events but can also actively be practiced and reacquired. This finding is in line with the research findings in the introduction (Lock et al., 2020; Masten, 2018).

The interpretation of our results is supported by the findings of recent studies. A systematic review by Orkibi and colleagues (2023), showed an overall medium effect of drama-based therapies on mental health outcomes. Feniger-Schaal and Orkibi (2020) emphasized the efficacy of DT in reducing anxiety and mental health distress – two constructs inversely related to resilience. Their review, however, included only a few studies with children. A systematic review specifically looking at children and adolescents from age seven on found the most significant effects of DT on emotional distress after trauma or in clinical settings (Keiller et al., 2023). Frydman and Mayor (2023) showed that school-based DT positively influenced early childhood socio-emotional skills, and highlight that DT is suitable to address adverse experiences such as those in our study.

Moderators of the Effect of DT. Children less affected by the flood, children already in school, and older children (age 5 or more) developed resilience through the workshops, compared to the control week. Severely affected children, children younger than age 5, and kindergarteners showed no observable change in resilience during the workshops. The fact that children severely affected by the flood did not benefit from the workshops contrasts with our finding of children burdened by low SES and severe SBP (Gartland et al., 2019; Mak et al., 2020; Mao & Agyapong, 2021; Winsemius et al., 2018; Thompson et al., 2013). Our assumption that additionally stressed children likely benefited more from the workshops did not hold for direct exposure to the flood disaster. Based on previous DT research (Frydman & Mayor, 2023; Van Westrhenen & Fritz, 2014), we expected that severely affected children would also benefit from the intervention, which was not the case. Methodological issues may have had a further influence here (see Limitations). However, the result can be explained by research indicating that children more exposed to adversity are less able to adapt (Masten, 2021), and severe trauma, in general, has more lasting effects than less severe trauma (Masten, 2018). Severely affected children likely need more individualized or long-term care to develop resilience and overcome traumatic experiences than the one-time workshop was able to offer. Research findings show that DT is appropriate and effective for different age groups, including kindergarten children below age 5 (Feniger-Schaal & Orkibi, 2020; Martin et al., 2018; Van Westrhenen & Fritz, 2014). However, differences in effects in childhood have only been studied between broader age groups (see Orkibi et al., 2023), thus studies with a more differentiated view need to be conducted.

Child resilience change from t_{E4} to t_{E5} (Hypothesis 1c). Hypothesis 1c was confirmed: The children showed a significantly higher resilience at the time of the follow-up measurement than immediately after the workshops. In the period after the workshop, the flood and Covid-19-pandemic continued to strain the children’s lives (Masten & Motti-Stefanidi, 2020; Walsh, 2020). Therefore, we assume that

children's resilience would not have increased in the absence of a workshop (which is also evident from the period between t_{E2} and t_{E3}). Even without a comparison group, we can assume that it was drama therapy that strengthened the children's resilience beyond the intervention. Our follow-up measurement took place 5–9 weeks after the workshop. In this relatively short period, we cannot yet speak of a stable long-term effect of DT. Nevertheless, results suggest that the workshops increased the children's resilience beyond the actual four workshop days.

There are few studies on long-term effects of DT. McArdle and colleagues (2011) found a rapid reduction in behavioral and emotional symptoms in the three months following a DT intervention for school children, stabilizing by three years after the intervention. This finding corresponded to the teacher rating, comparable to our educator observations. In addition, studies have found a longer-term effect of DT on behavioral problems in children at risk due to inadequate parental care (Feniger-Schaal & Koren-Karie, 2021), on childhood social anxiety disorder (Anari et al., 2009), and on loneliness and anxiety in children with grief (Boron et al., 2021). These studies have in common that weekly DT sessions were offered over several weeks – whereas we examined a one-time but longer-lasting intervention. It is likely that DT offered as a continuous intervention in addition to the workshops would increase the success regarding the strengthening of resilience and stabilize positive effects over time. However, our one-time DT intervention and its effects on children's resilience beyond the intervention comes to promising conclusions. For the research side, it is imperative that the long-term effects of DT, even months to years after the intervention, be investigated in further studies. Thus, in circumstances where continuous interventions cannot be offered, particularly in the aftermath of disaster, mobile DT teams could offer workshops for a booster effect for the children, with an evaluation team checking short term and long-term effects.

Acceptance (Hypothesis 1d). Acceptance of the intervention from the educators' perspective was high; 146 school grades resulted in a mean value of 1.94 ($SD = 0.57$), – an overall 'good' on the German school grading system (1 = 'very good' to 6 = 'insufficient'). The ratings of the resilience-strengthening effects from 0 (very weak) to 10 (very strong) resulted in a mean value of 7.70 ($SD = 1.20$) – an indicator of a high belief in and acceptance of the resilience-strengthening effect of the intervention from the perspective of the educators.

Limitations of the study

Sample size, standardization and control group. The study has a number of limitations: We had a large sample size of 238 (educator observation, EG), and 127 (educator observation, CG) children. Large samples usually lead to high power, which is basically good. However, if the sample is too large, even barely present effects may become significant (Sullivan & Feinn, 2012). For this reason, it is helpful to consider effect sizes in addition to significance. The most important outcomes for our study – changes in resilience due to the DT workshops – had medium effect sizes (Ellis, 2010). We also found medium to large effect sizes for the interaction effects of SES and SBP with time, and for the decrease of SBP over the course of our study. These results are substantial, and we can continue to assume a positive impact of the workshops on the children, and influences of SES and SBP. However, the increase between the end of the workshops and the follow-up (t_{E4} to t_{E5}) showed only small effect sizes, likewise, the effects of attachment figure and drama therapist. Results with small effect sizes need to be interpreted with caution and require further research.

Implementing the research as a *field study* did not guarantee complete standardization. The period between the flood disaster and the first assessment varied due to organizational challenges (contacting institutions, waiting for consent forms, finding suitable rooms, and sick leave due to Covid). Therefore, the children's condition might have differed simply because of the time that had passed. Furthermore, the more distant the flood disaster was, the less accurate the retrospective

educator's assessment of children might have been. The environment and materials available for the workshops also differed according to how much the institutions were affected. The completion conditions of the parents, therapists, and educators were not controlled, so external influences cannot be excluded. Educators took between 5 and 9 weeks to complete the follow-up questionnaires after the workshops (6 weeks were planned), mostly due to the burden of the disaster and Covid on the institutions. The *dose of the intervention was low* (3 hours on 4 days = 12 hours), research usually rather looks at continuous DT interventions. There was no independent *control group*, but a waiting period of children of the EG. Since the project was made available to all interested parties in the ethical spirit of post-disaster care, every group that participated in the control week also participated in the workshop. Therefore, the effects of time (improvement in mental state due to greater distance from the traumatic event) cannot be completely ruled out. Furthermore, it is important to note that all participants in the study were affected by double trauma: In the time the study was conducted (January to July 2022), there was a third wave of COVID-19 impacting all participating institutions, with closures because of staff shortness and several rescheduling. It is not possible to separate the effects of these traumatic events.

Limitations through expectancy and response effects. Expectancy effects of the educators need to be considered. None of them were blinded, and they were an active part of the project. The *Rosenthal effect* is a well-known expectancy effect, in which the experimenter's expectations affect the experiment's outcome (Rosenthal & Fode, 2007). In our study, the expectations of the educators were probably influenced by the announced resilience-building effect of the workshops. Their response to the project was very positive, which could have led to overestimating its effects. The *social desirability bias* describes the tendency to provide answers in a way that makes oneself appear in a favorable light (Crowne & Marlowe, 1960). It occurs frequently and has been reported to bias survey results (Gittelman et al., 2015). It occurs in self-report surveys (Van de Mortel, 2008) but can also apply here. Even in the case of pure observations, the rater may try to make the ratee appear in a positive light and thus bias the responses positively (Croucher et al., 2019). Finally, we did not find any statistical correlation between the child resilience change and the *parental expectations*, measured by the compliance item of being 'very skeptical' to 'very positive' about the workshops. From this item, it seems that parent's expectations did not influence the change in their children's resilience.

Limitations of outcome measures. The resilience assessment was not clearly separated from other constructs, as is often the case in resilience research. It is possible that our questionnaires surveyed a more general mental health status of the children. Because of the pressing time to start the intervention, questionnaires and their discriminant and convergent validity could not be examined before use. In constructing the questionnaires, we relied on the BASIC Ph-model of resilience (Lahad & Ayalon, 1993) and integrated all of its elements. Accordingly, our CRS questionnaire measured the resilience construct derived from Lahad's theory, putting together empirically pretested ($n = 6$) and newly generated ($n = 4$) items. The scale worked well for this context, with a general factor allowing its aggregation, but its psychometric qualities need to be examined in a more scrutinized way in the future.

Children's voices are not explicitly reflected. Another point of criticism is that we measured the resilience of the children *only via observations and not via self-reports*. Originally, we had planned two measures of child self-report: (1) a smiley-scale for measuring child well-being (see *Methods*) and (2) children's drawings connected to the flood disaster. From the smiley scale employed by the therapists, it was not possible to draw any aggregated conclusion about the effectiveness of the DT workshops, because, depending on their age, the children often chose the smiley in their favorite color, or the smiley their friends had chosen. In addition, many children were sad when the intervention was over and tended to choose sadder smiley faces precisely because they had enjoyed the workshop. The results were thus not interpretable with respect to our

research question. To address this issue and obtain further information approaching the perspective of the children, the therapists' written comments about the children and a collection of drawings of the children in connection with the flood will be further analyzed.

Future studies

As described above, the evidence base for DT is only starting compared to other therapy forms. Future studies are called to further investigate the evidence for DT's effectiveness. Furthermore, some specific questions remain open to be investigated in future studies:

What would be needed to ensure that children who are *severely affected by environmental disaster* can be supported with drama therapy? What alternative services can be set up specifically for this group? Would an increase of dose or length be effective? Here, existing knowledge from post-disaster care can serve. Investigating the therapeutic factors of effective post-disaster interventions could shed light on the crucial elements of change in severely affected children. In further projects, one could integrate these elements into existing services, adapt them for DT use, or find DT equivalents. These studies can focus on the format of the intervention, such as the length, frequency, or setting (individual vs group), or the content of individual techniques and exercises.

How can post-disaster drama therapy be designed to be effective for *very young children* (under five years)? For answering this question, cooperation with developmental and child psychologists should be sought. Interdisciplinary studies could investigate whether and which elements from child psychotherapy, play therapy, and others, that are effective for very young children, could be integrated into or adapted for DT. How effective is DT in the long run, and how can a sustainable long-term effect be achieved for *particularly vulnerable groups*? For this purpose, studies on DT must include *follow-up measures* recording change not only over weeks but over months or even years. In addition, it would be essential to record the extent to which children are affected or at risk and to observe the outcomes of the different groups separately.

What are the central *therapeutic factors* of DT interventions for children? Are they the same for different age groups? Alongside this study, a preliminary investigation of therapeutic factors, particularly the factor of embodiment (Koch & Fuchs, 2011), from the perspective of the study therapists was conducted by Kinnen (2022). Kinnen's findings are in line with the CRS factor loads of expressiveness and resilience. Studies on therapeutic factors for different age groups of children need to follow (Norcross & Wampold, 2019).

Practical and clinical implications

Implications for Emergency Aid in Children. From our findings, several implications for supporting children after disasters can be derived. Our results suggest that drama therapy can strengthen the resilience, and social behavior of the children affected and can be used independently of different nationalities, genders, and ages. Notably, as a complement to existing child mental health services, which are often overburdened and unable to provide specialized trauma-related intervention (McDermott & Cobham, 2014), DT is a flexible and inexpensive element of disaster aftercare. The workshops conducted according to the manual (Dr. Hans Riegel-Stiftung, 2021) are effective for school children or children older than age four. Especially for vulnerable children (low SES, SBP, no attachment figure), but also for less vulnerable children, DT can rebuild resilience after a traumatic event. A four-day format for the children, plus an additional day for training the educational staff, is well suited to have an effect during and beyond the workshops. However, a longer-term, more regular or single offer should be established for more vulnerable children, particularly to address any drop in resilience after the intervention. Olteanu and colleagues (2011) recommend continuing to provide post-disaster mental health services for several years after the disaster and training school officials and pediatricians to meet children's

mental health needs, which may also occur later in time (delayed distress) (Osofsky et al., 2015). For young children (3–4 years in kindergarten), alternative support services or adapted DT interventions need to be created to strengthen their resilience and resources. Additional support for the youngest and the more severely affected children is crucial since problems in early childhood can have a substantial impact later in life (Hemmeter & Conroy, 2018).

Implications for Prevention. Disaster care for children should begin before disasters occur to protect their functioning and well-being (Kousky, 2016; McArdle et al., 2011). Drama therapy can be employed to preventively strengthen child resources and support them respond well to future challenges. Additional work can be done with children on their SBP, a strong risk factor for resilience. This work could be implemented through school-based targeted interventions, parent trainings (McArdle et al., 2011), or again, theater interventions. Our study and the literature suggest that DT and theatre interventions are suited to reduce psychosocial and behavioral problems among children (Berghs et al., 2022; Edwards et al., 2020; Zyga et al., 2018). The social infrastructure for children can be strengthened (Aldrich & Meyer, 2015). This includes a person of trust for each child at the institution (attachment figure), which is a protective factor for resilience, as suggested by our study.

Practical implementations. Implementations should be considered in light of climate change and future disasters. Children and adolescents – an enormously vulnerable population – have not yet received the attention they need to be protected from disasters (Osofsky & Osofsky, 2018; Peek, 2008). Therefore, future research should focus on interventions suited to provide children with the resources and support to remain healthy over time. Indeed, many children and adolescents recover well from disasters, when supported (Osofsky et al., 2015). Given our findings, and the high acceptance of the intervention, future research, professional policies and practice should create possibilities to *make DT available for children nationwide* – both in prevention and in disaster aftercare.

Summary and conclusions

Our results suggest that drama therapy workshops can strengthen children's resilience after a natural disaster. This seems to be true for children of different sex, migration background, and SES, but not for very young (under age 5) and severely affected children. These two groups of children may need different, more continuous or longer-term interventions. Because of the within-group design, results are suggestive, not conclusive. In sum, DT can serve an important purpose, especially for vulnerable children: Our study suggests that DT had a particular resilience-building effect for the most vulnerable children with low SES and with severe SBP (note that there were more boys in these groups), as well as children without an attachment figure in the institution. The positive effect of the intervention lasted at least 5–9 weeks (follow-up) after the workshop for all children, particularly for children with higher SES and lower SBP. Acceptance of the intervention was high. Generalizability to other children in similar situations seems likely. Notably, results suggest that the workshops decreased problematic social behavior (SPB) in children.

Our findings suggest that DT can potentially contribute to child post-disaster care and may be recommendable as an intervention method in this context, with no adverse events reported. Generalizability is limited though by the fact that this was a singular study with a manualized approach based on a specific model. However, the possibility of using DT in the aftermaths of disaster for children of different age groups, and independent of sex and migration background, illustrates the breadth of its potential effects. While the research basis of DT needs further development, our findings suggest that DT may increase the resilience of children under adversities. Children seem to know this and naturally immerse themselves in arts and drama techniques such as role play with their own body or symbolic figures in coping with new situations. The

imaginary space that opens by creating as-if situations is vast and offers opportunities for the development of skills and ideas, test acting, test relating, behavioral rehearsal, playfulness, communication skills, emotion expression, emotion regulation, self-efficacy beliefs, agency, and self-esteem. Guided by a professional drama therapist, children can strengthen their individual and community resources and resilience, not only after disaster. Role play, perspective taking, enactment and the mastery that comes with it can be assumed to be embodied resilience boosters. They may protect children from adversities and foster healing. Drama therapy may have the potential to strengthen the health of our children, from the highest functioning to the most vulnerable.

Ethics approval

This study was conducted in line with the principles of the Declaration of Helsinki. Ethics approval was granted by the Data Protection Officers (Landesdatenschutzbeauftragte) of the ministries in North Rhine-Westphalia and Rhineland-Palatinate in December 2021 (Ref.: 6.08.22.001:1454, Ref.: 51 111–32/452–21).

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CRediT authorship contribution statement

Klees Simone: Writing – review & editing, Methodology, Conceptualization. **Merschmeyer Bettina:** Writing – review & editing, Methodology, Conceptualization. **Hues Henning:** Writing – review & editing, Resources, Project administration, Investigation, Conceptualization. **Koch Sabine C.:** Writing – review & editing, Writing – original draft, Supervision, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Junker Johannes:** Writing – review & editing, Supervision, Conceptualization. **Ernst Natalie:** Writing – review & editing, Investigation, Formal analysis, Data curation. **Stange Sarah:** Writing – original draft, Methodology, Investigation, Formal analysis. **Juhart Manuela:** Writing – review & editing, Resources, Investigation, Data curation, Conceptualization. **Kinnen Julie:** Writing – review & editing, Resources, Investigation. **Gruber Harald:** Writing – review & editing, Supervision, Conceptualization. **de Ribaupierre Ulrike Schwab:** Writing – review & editing, Supervision, Methodology, Conceptualization. **Schlüter Maren:** Writing – review & editing, Methodology, Conceptualization.

Declaration of Competing Interest

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.aip.2025.102254](https://doi.org/10.1016/j.aip.2025.102254).

Data availability

Data will be made available on request.

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Analysis of songwriting group music therapy programme for informal caregivers of older adults

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Factors of change

ABSTRACT

Songwriting (SW) is a music therapy technique commonly used to alleviate the burden that informal caregivers usually experience. Detailed descriptions and analyses of SW programmes are necessary to understand the underlying factors of change occurred during these interventions. The main purpose of this study is to describe a songwriting group music therapy (SGMT) programme, including the analyses of differences in the meaningfulness and content of song lyrics based on three SW approaches: individual song parody, group song parody, and original songwriting. This 10-session programme was applied to 60 informal caregivers. The Meaningfulness of Songwriting Scale was administered and Linguistic Inquiry and Word Count (LIWC-22) software was used to analyse lyrical content. SW approaches showed significant differences between them, being more meaningful, presenting more content of social processes, and less affective content as the intervention progressed. The main variable affecting outcomes was the number of care hours provided by the caregivers. The SGMT enhanced group cohesion, providing a safe space for caregivers to explore their authentic needs and emotions. This study highlights the importance of providing detailed intervention programmes to replicate and adapt the interventions to caregivers' needs. This adaptation can be achieved thanks to the versatility of the SW.

In clinical research studies of informal caregivers of older people with dependency, there is a growing interest on the application of psychosocial interventions, especially regarding the shown effective creative arts interventions (Irons et al., 2020; Watt et al., 2024). Among these therapies, it can be found music therapy (Wilhelm & Wilhelm, 2020), being the therapeutic songwriting one of the most commonly used techniques with informal caregivers (Steiner-Brett, 2023). This music therapy intervention is getting higher scientific interest with evidence demonstrating its positive impact on the quality of life of family caregivers (Baker, 2017; Baker et al., 2018; Baker & Yeates, 2018; Ferguson, 2006; García-Valverde et al., 2020; Klein & Silverman, 2012; O'Kelly, 2008; Pérez-Núñez et al., 2024).

Therapeutic songwriting is the process in which a patient or group of patients are involved with the music therapist in the creation, notation, and/or recording of lyrics and music, within the context of a therapeutic relationship, addressing the psychosocial, emotional, cognitive, and/or communication needs of the patient/s (Wigram & Baker, 2005). One of

the strengths of songwriting (SW) is its versatility, addressing a broad range of clinical and non-clinical goals, reaching them through different methods, approaches and orientations. Among the different orientations, SW has emerged as a frequently used technique in psychodynamic music therapy practice. The aims of the SW within analytically oriented frameworks are to bring repressed conflicts into conscious awareness, foster recognition and acceptance of hidden aspects of the self, release energy constrained by defence mechanisms, and redirect this energy towards positive goals (Baker, 2015).

Regarding the different methodologies, Baker (2015) provides a SW methods categorization depending on whether the emphasis is on the creation of the lyrics and/or the music. The two most popular approaches are song parody, which is more focused on the lyrics, and original songwriting, centred on both music and lyrics creation (Baker & MacDonald, 2014). Song parody consists of rewriting all or part of the lyrics of a pre-composed song. This approach is recommended when there is limited time to create the song and when SW participants need

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structure, for example, for those songwriters that may not be emotionally or psychologically ready for a deeper therapeutic process (Baker, 2015). In contrast, original songwriting involves the creation of completely original lyrics and music. This approach can be used within known structures, creating the lyrics and music from the ground up, but guided by pre-existing musical structures (e.g. chorus and verses). Original songwriting is typically used when a more in-depth exploration is possible, considering the group, environment, and participants' characteristics, being challenging for those with cognitive or language difficulties. The song parody approach can be used to demystify the SW process, providing a preparation for the original songwriting, helping to overcome defence mechanisms and resistances, illustrating that, with the support of the music and music therapist, anyone can create a song (Baker et al., 2008, 2009; Baker, 2015; Wigram & Baker, 2005).

The effectiveness of the SW is influenced by various factors, including songwriters' health status, which must be considered by clinicians as guidance when choosing the SW method to employ (Baker, 2015). Therefore, it is essential for clinical practice to consider the impact that environment, sociocultural, individual and group factors could have on the SW process (Baker, 2013a, 2013b, 2014). For instance, as Baker (2015) stated, the songwriter's previous relationship with music affects, as an individual factor, the motivation and degree of engagement during the SW process.

Considering the informal caregivers' needs, it is relevant to pay attention to their psychological, social, and emotional well-being because it could determine their level of participation in the SW process. The main reason why this well-being could be affected is the burden that the role of the informal caregiver generates (Alves et al., 2019; Rodríguez-González et al., 2021). Referring to informal caregivers of older adults with dependency, some variables can predict a tendency to develop this burnout, including sex of the caregiver, care hours, married caregivers, and older adults' functional dependence (Gratao et al., 2012; Ruisoto, Ramírez, et al., 2020; Vaingankar et al., 2016). These variables could inform which SW strategies the clinician may need to adopt to accommodate any individual or sociodemographic factors that may influence the process (Baker et al., 2008).

A protective factor against burnout in informal caregivers is social support (Cejalvo et al., 2021; Ong et al., 2018; Ruisoto, Contador, et al., 2020). SW is inherently a social activity because it involves the collaboration of at least two people, a songwriter or group of songwriters, and therapist (Baker, 2015). The social nature of SW offers opportunities to engage in teamwork, supporting and being supported by others. Through the group SW process, participants can experience a sense of belonging to a group, connecting, and bonding with others (Baker & MacDonald, 2014). Due to the group-based processes and products inherent within group therapeutic SW, patients may experience universalisation and normalisation when they share and listen to other patients' narratives (Silverman et al., 2016). Considering the protective role of social support and the isolation that caregivers often experience due to the nature of caregiving, conducting group interventions with them is highly important to strengthen their social networks (Lauritzen et al., 2015). Therefore, SW is a very valid technique applicable in group format with informal caregivers.

Music-based interventions are especially difficult to describe fully and transparently, and there are few studies with sufficient description of music therapy interventions to enable cross-study comparisons, generalisation, and integration into practice (Robb et al., 2011). From a scientific and clinical point of view, clear intervention programmes descriptions are needed to investigate therapeutic components which are effective and to enable their transfer into future therapeutic work. There is a lack of studies that systematically describe the SW music therapy intervention with informal caregivers of adults. Baker (2017), developed a group therapeutic SW intervention protocol designed to address caregiver well-being, which included 3 SW models: insight-oriented SW, narrative SW, and psychoeducational SW. Inspired by this study, García-Valverde et al. (2022), presented a theoretical

protocol intervention programme, based on a new conceptual framework for selfcare. The group SW intervention consisted of twelve 60-minute sessions, following the original songwriting method and dividing the process into four phases. Both studies focused on informal caregivers of people with dementia, with no articles identified involving specifically caregivers of older individuals with dependency. Moreover, there are no studies with informal caregivers that compared different SW methods. In fact, very few studies offer a comparison between them, regardless of the target sample (Baker & MacDonald, 2013).

Furthermore, replicating music therapy interventions at a clinical level not only requires a detailed description of the intervention design, but also an understanding of the processes of change behind it (Baker et al., 2015). Despite the wide application of SW, there is a lack of understanding about the factors of change that are active during the SW process (Baker, Silverman & MacDonald, 2016; Baker & MacDonald, 2013). Thus, more research is needed to increase the knowledge of the outcomes implicated during the SW process. Baker, Silverman & MacDonald (2016), stated that the meaningfulness of the SWs is understood as a mechanism of change, finding that the more meaningful a SW process is for a person, the greater the potential for its positive effects. Hence, assessing the meaningfulness of songwriting could provide more information about the therapeutic changes resulting from SW processes.

As the SW creates artefacts, the result is a permanent record of the therapeutic SW process, providing lyrics that remain for further analysis (Baker, 2013c). It was discovered that the writing itself revealed a lot about an individual's psychological state. According to Pennebaker et al. (2003), words can "convey psychological information over and above their literal meaning and independent of their semantic context." Lyric analyses reflect how SW can enable patients to express what is believed to be important and can extend to understanding their therapeutic experiences (O'Callaghan & Grocke, 2009). Furthermore, the therapeutic process could be understood from the psychoanalytic perspective considering songwriting as: (a) a self-integration process, (b) a symbolic projection of a person's unconscious self, (c) an enabler of transference experiences; (d) a vehicle for reality contemplation, and (e) a transitional object (Baker, 2015).

Research objectives

The main objective of the study is to describe and analyse the songwriting group music therapy (SGMT) programme for informal caregivers of older adults with dependency.

The specific objectives are:

- 1) To describe the created SGMT intervention programme based on three different SW approaches (i.e. group song parody, individual song parody and group original songwriting).
- 2) To analyse and understand the factors of change behind each SW approach and how they contribute to the therapeutic process. In order to study this contribution, the secondary objectives are to:
 - a. Report the meaningfulness and describe the content of lyrics of informal caregivers' compositions in SGMT.
 - b. Analyse the differences in meaningfulness and content according to the SW approach used.
 - c. Explore the relationship between meaningfulness and content in the different SW approaches.
 - d. Explore associations between measured descriptive variables (socio-demographic factors, caregiving-related factors, and relationship with music factors) and the SWs' results found in meaningfulness and content.

Research questions

In order to address the aforementioned objectives, the following research questions are formulated:

1. Are there differences in the meaningfulness and content depending on the SW method used?
2. Is there any relationship between meaningfulness and content in the different SW methods?
3. Is there any relationship between the previous descriptive variables and the results found in relation to meaningfulness and content?

Method

Participants

A convenience sampling method was carried out. Sixty caregivers participated, including 54 women (90 %) and 6 men (10 %). Caregivers were contacted through eight different social and healthcare services offered to informal caregivers in [location masked for blind review]. Initially, 63 caregivers indicated interest in participating in the 10-session music therapy programme. Due to their inability to attend the intervention sessions, two caregivers withdrew before the SGMT intervention, and another caregiver withdrew after the first session.

Participants met the following inclusion criteria: (a) the main informal caregiver of an older adult; (b) the dependant person was over 60 years of age; (c) at least 18 years of age; and (d) provided informed consent.

Exclusion criteria were: (a) not residing in [location masked for blind review]; (b) under 18 years; (c) had uncompensated sensory deficits that prevented assessment responses; (d) illiteracy; and (e) clinician-diagnosed with a severe or serious mental illness.

Instruments

Sociodemographic, caregiving data and relationship with music

A 35-item ad hoc questionnaire was applied, which collected participants' sociodemographic and caregiving data, including age, sex, marital status, educational level and occupation. This instrument also included questions about the caregiving situation, for example, nature of kinship or number of care hours provided per week. Caregivers' previous relationship with music was also assessed through the following three questions: 1) "Do you like music?" (Yes/No response); 2) How important is music to you in your day-to-day life? (5-point Likert scale response, from "nothing important" to "very important") and, 3) How often do you listen to music? rated from 1 (never) to 5 (very often).

Functional independence

The Barthel Index (Mahoney & Barthel, 1965) includes 10 items assessing the level of functional independence and ability to carry out activities of daily living. Each item is rated differently, using a 0, 5, 10 or 15-point scale, ranging from complete dependence (unable to perform the task) to complete independence (able to perform the task without assistance). The global score goes from 0 to 100, with higher scores indicating higher independence, providing a quantitative measure of the individual's overall level of functional independence. The Spanish version of the questionnaire has a good internal consistency with .86 alpha Cronbach (Cid Ruzafa, Damián Moreno, 1997). In this study Cronbach's alpha coefficient was .92.

Meaningfulness of songwriting

The Meaningfulness of Songwriting Scale (MSS) (Baker, MacDonald & Pollard, 2016; Baker, Silverman & MacDonald, 2016) is a psychometric 21-item scale designed to measure the perceived meaningfulness of SW process. The MSS assesses various aspects of the SW process and its emotional, relational and cognitive significance to the participant. These items are measured using a five-point Likert scale in the positive direction, from Strongly Disagree to Strongly Agree. Total scores range from 21 to 105, with higher rating indicating greater meaning derived from the process and song created. The MSS has demonstrated strong internal consistency (Cronbach's alpha of .98) (Baker, Silverman &

MacDonald, 2016). A Cronbach's alpha coefficient of .92 was obtained in this study.

Computerized analysis of song lyrics

The Linguistic Inquiry and Word Count (LIWC) (Tausczik & Pennebaker, 2010) is a text analysis software instrument designed to quantify and analyse the linguistic content of written or spoken text. LIWC-22 (Boyd et al., 2022) is the latest version, comprising a dictionary of over 12,000 words and phrases, categorised into sub-dictionaries to assess various psychosocial constructs. All the categories are classified on: summary variables, linguistic dimensions, psychological processes and the expanded dictionary. Only the summary variables and psychological processes have been used for this study. LIWC-22 uses four summary measures (analytical thinking, clout, authenticity, and emotional tone), that are algorithms constructed from various LIWC variables based on previous empirical research. The obtained data are standardised scores that have been converted to percentiles ranging from 1 to 99. The "psychological processes" component of the instrument includes four main categories: drives, cognition, affect and social processes, providing percentages of total words within a text. To report the psychological processes data, LIWC-22 assigns each word to a category, using its curated dictionary, and then reports the percentage of words that belong to each of the categories. Table 1 provides a description of the summary variables and the hierarchical structure of the psychological processes' variables along with example words, adapted from Boyd et al. (2022). Validity studies of LIWC-22 have demonstrated its effectiveness in capturing various linguistic and psychological constructs across a wide range of text types, including social media posts, essays, transcripts, and other forms of written communication.

Table 1
LIWC-22 dimensions description.

Category	Description/ subdimensions	Interpretation/most frequent words
Summary variables		
Analytical thinking	Metric of logical, formal thinking	People low in Analytical Thinking tend to write and think using language that is more intuitive and personal and tend to be viewed as friendlier, more personable, and less cold and rigid.
Clout	Language of leadership, confidence, status	The relative social status, confidence, or leadership that people display through their writing or talking.
Authentic	Perceived honesty, genuineness	When people reveal themselves in an "authentic" or honest way, they tend to speak more spontaneously and do not self-regulate or filter what they are saying.
Emotional tone	Degree of positive (negative) tone	The algorithm is built so that the higher the number, the more positive the tone. Numbers below 50 suggest a more negative emotional tone.
Psychological Processes		
Drives	Affiliation, achievement and, power	we, our, work, us, help, own, allow, best
Cognition	All-or-none, cognitive processes and memory	all, no, never, know, can, want, something, really, but
Affect	Positive tone, negative tone, emotion and swear words	good, well, new, love, bad, wrong, hate, worry, fear, happy
Social processes	Social behaviour and social referents	you, we, he, she, care, friend, parent, mother, father, her, him, help, thank you, deserve

Procedure

Data collection

The research was registered in clinicaltrials.gov (ID NCT06028815) and was conducted in accordance with the Declaration of Helsinki. Prior to the data collection, the University of Deusto Research Ethics Committee approved the research (Ref: ETK-42/20-21). The first author contacted eight different social and health services offered to caregivers of older people with dependency in Biscay, Spain. After the first researcher described the project to the service professionals, all centres agreed to be study sites and allow participant recruitment by providing informative project talks to caregivers using their services. Those who agreed to participate signed informed consent forms and provided contact details to the first author. Caregivers then proceeded to begin the 10-session intervention. The MSS questionnaire was administered three times, immediately after finishing each SW process, which is detailed on the next section. Lyrical data was collected throughout the SGMT intervention.

SGMT programme

The intervention programme presented in this section has been briefly described in a previous study where a mixed method approach was used to analyse the experience of participating in the SGMT intervention on informal caregivers of older people with dependency (authors, 2024). The results of this pre, post and follow-up study showed significant decrease, sustained over time, in trait anxiety and depression and an increase in subscales including inner peace, social functioning, and mental health. A thematic analysis was carried out obtaining three themes, finding that SGMT participation could: (a) enhance personal growth; (b) bring out and enable work on emotions, and (c) promote helpful interpersonal dynamics.

Special emphasis has been given in the current study to the description of the procedure followed during each of the SW approaches, enabling the subsequent analysis of the intervention process. To present a transparent description of the SGMT programme intervention, the checklist for reporting music-based interventions was followed (Robb et al., 2011). A total of 10 one-hour sessions were held weekly in a small group format (4–7 people). Eleven participant groups were led by a trained music therapist who is also a trained psychologist. All groups received the same intervention protocol, using therapeutic SW as the main technique. Music material was used like small percussion instruments (e.g. xylophone, maracas, small handpan, and, tambourine) and non-musical (audio-playback equipment, sheets, pencils and crayons).

The therapeutic process was divided into three different phases: phase 1- “Getting to know each other” (sessions 1–3); phase 2- “Sharing and Creating” (sessions 4–7); and phase 3- “Saying goodbye” (sessions 8–10). Each phase had specific therapeutic objectives, and the main technique (SW) was used throughout each phase.

The SGMT intervention included a semi-directive approach, encompassing a dynamic flow of movement from greater to lesser structure and directivity throughout the sessions. The music therapist structured the sessions more in the first phase, but as a safe space was created, including group cohesion and each participant’s musical-self developed, the structure dissipated. It also started with a more directive approach where the music therapist guided the process, but the dynamics were depending more and more on the caregivers, being in charge of their own therapeutic process. According to this approach, the communication along the SGMT intervention transitioned from verbal to more musical. This programme design aimed to facilitate the resolution of unconscious inner conflicts and to overcome possible defence mechanisms that might be active.

This intervention programme was theoretically based on Fiorini’s, the “creating psyche” model (Fiorini, 2007), and the Priestley “Analytical oriented music therapy” (AOM) model (Wigram et al., 2002). The Fiorini model was reflected both during the overall therapeutic process,

and the different SW processes. The intervention and each song composition began with “the given”, represented by a known song melody, or a personal or group problematic situation in order to provide structure and safety. After that, the issue was considered by means of the SW, which participants could consider as “impossible” and entail blockages and emotions such as fear, uncertainty and insecurity. Finally, a real and tangible “possible” was created, which was the composition itself, offering caregivers the experience of managing to overcome “the impossible” and to experience personal growth. The AOM model involves periods of verbal and musical interaction, seeking the balance between verbal and musical communication. Although this is an improvisation model, in this SGMT intervention we adapted it to the use of SW which also combines language and music. The SGMT process itself consisted of transferring the main communication from verbal to musical, enabling the transference through different defence mechanisms like projection or symbolization. This combination of interactive models, allowed caregivers to verbalise their concerns, start with the known and “the given” that it is the verbal communication, and process their emotions through a different and unknown tool, that is, musical communication.

Fig. 1 outlines the SGMT programme where each of the three phases is aligned with a different SW approach, specifically chosen taking into account the theoretical models and the music therapist’s approach previously presented. An exhaustive description and explanation of the three SW approaches is detailed below.

SW Process. The higher structure and directivity of the phase 1 is represented in the first SW approach, where a “song parody songwriting” was carried out in a group format. This was a very structured SW approach, since a pre-selected theme was used. The music therapist, asked (with a more directive role) “What do you expect from music therapy sessions?” Participants could answer with only one word (e.g. learning). Then, the therapist asked caregivers how that previous word (learning) could be useful for them (e.g. to feel better). Participants’ verbal responses to the questions were used as the first song’s lyrics. The objective of this first composition was to provide participants with a base of security and support, and enable self-confidence in their creation process. This structure was also reflected in the music, since a traditional well-known song (e.g. “La Bamba” or “La cucaracha”) was selected by the group providing the melodic framework. It was essential to use a known song because the participants needed to have the melody perfectly internalised. Once the caregivers’ song was composed, all of them sang the song while playing instruments.

This first SW approach allowed participants to express their needs and expectations about their own music therapy process, reflecting on how the opportunity of participating in the SGMT intervention can be useful for them. This first SW phase was designed as a group song to begin to explore the dynamics and roles of the group members and to encourage the development of a connection between them. Fig. 2 shows the procedure followed by all groups. The process reflects the flow of the activity and the applicability of the theoretical methodology previously explained. These diagrams have been created based on Baker’s (2015) work.

In the second phase, the song parody approach was used again. Nevertheless, this SW was conducted in an individual format, favouring the expression of individual needs, supported by the group. Doing the song parody individually provided participants with an individual space within the group dynamics. This approach enabled participants to individually elaborate on what they needed to work on in the group. The process was less structured than the earlier SW experience, as the caregivers were familiar with the activity, the choice of the theme was semi-structured and the music therapist did not adopt the directive position as during the previous phase. To create the lyrics for the individual song parody, the music therapist proposed that each participant could decide about who they wanted to write about and what they want to say to them. This design allowed participants to work on their goals and needs, expressing their emotions and thoughts. Additionally, the

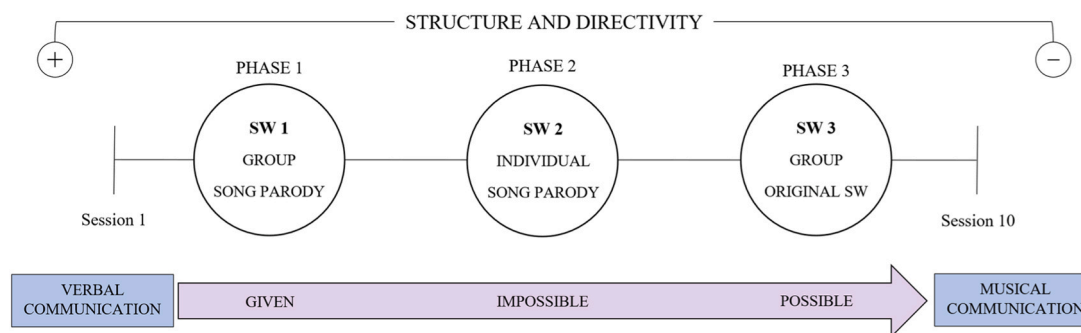


Fig. 1. SGMT intervention programme.

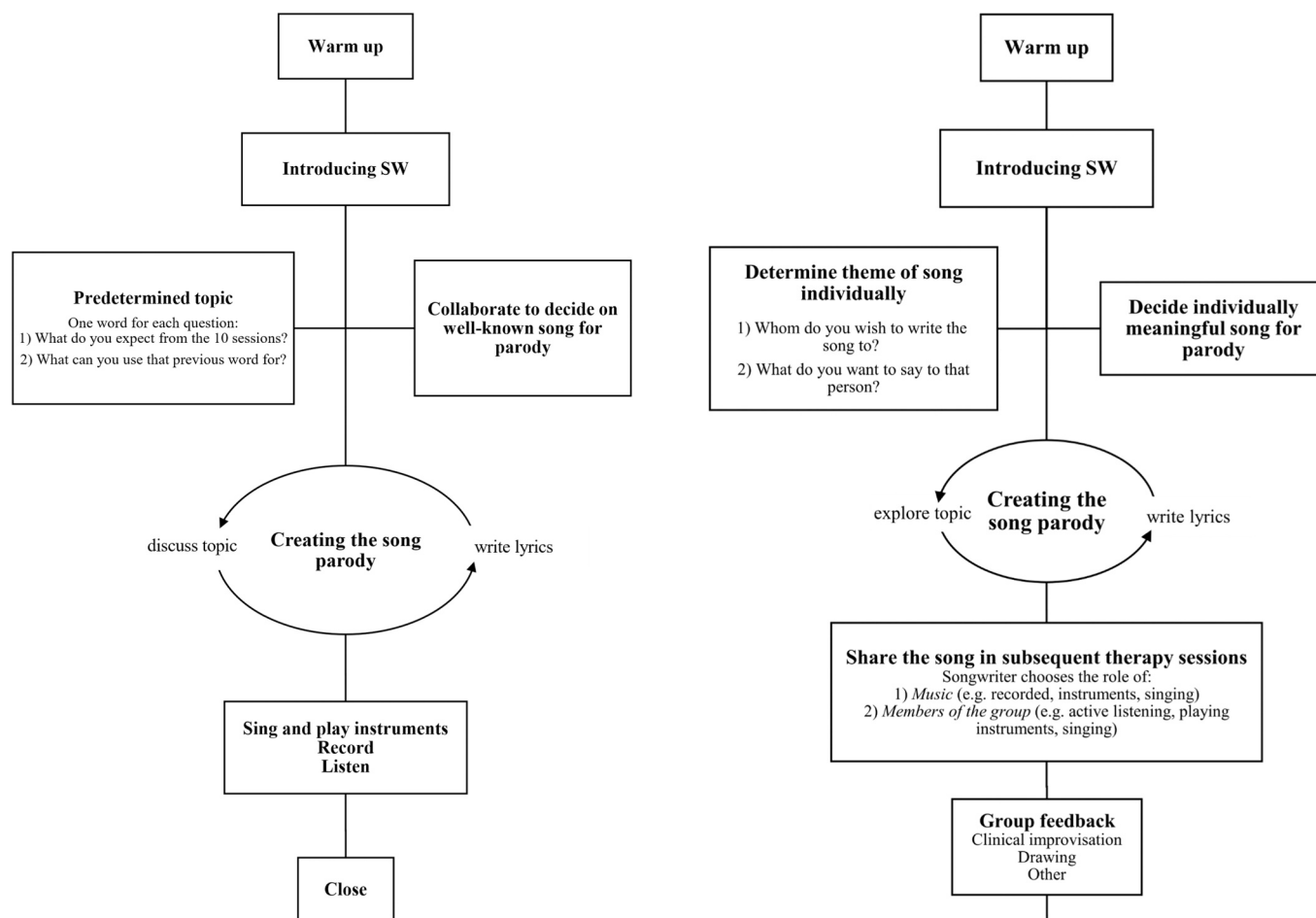


Fig. 2. Steps involved in the group song parody method (SW 1).

parodied song in the SW 2 was chosen by each caregiver, and it had to be meaningful for them. In this case, the music had that function of support and security because it was a song familiar to the person, but also possibly more emotionally charged than the song used in phase 1 because it belonged to their sound history.

In Fig. 3 the moment of sharing the song becomes more relevant. As one of the objectives of this phase is to seek that balance between individual and group dynamics, the caregiver who shared the individual composition with the group, decided the role of the music (playing the parodied song, singing a cappella, with or without instruments), and how the group members were involved in its performance (singing with the caregiver, playing instruments or just listening). Then, each group member gave the caregiver non-verbal (clinical improvisation or drawing) followed by verbal feedback, leading to a collaborative group

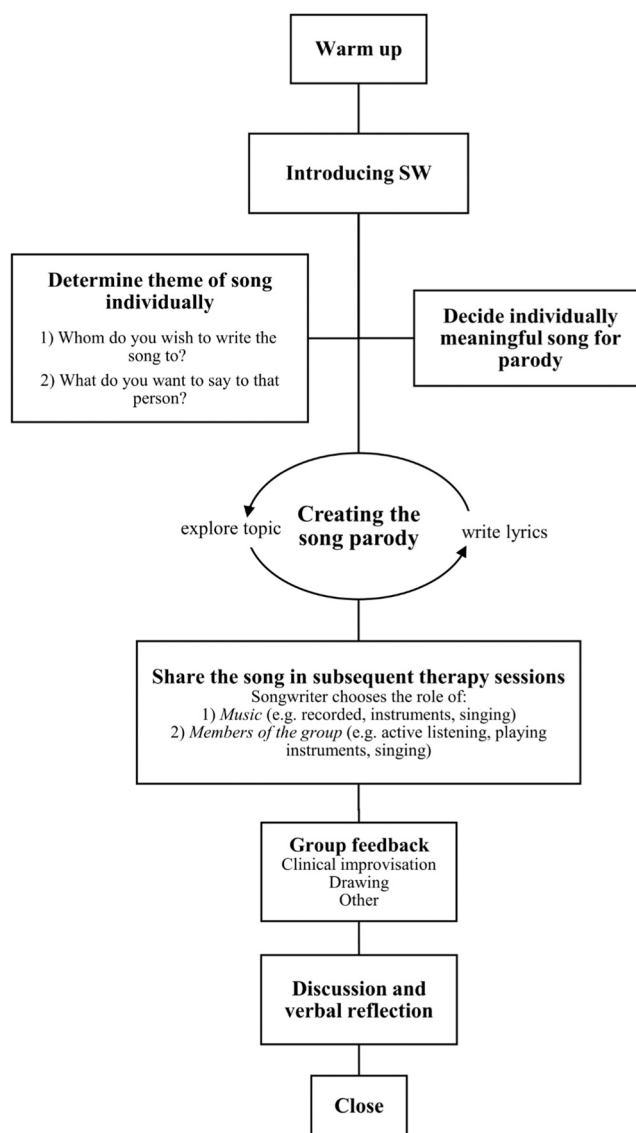


Fig. 3. Steps involved in the individual song parody method (SW 2).

discussion. This dynamic gave each participant the opportunity to share their individual compositions with the group, choosing how they wanted to share their song compositions. The aim was to achieve a harmony between verbal and musical communication.

Finally, during phase 3, the “group original songwriting” was performed. At this point of the SGMT intervention, the group is expected to be cohesive and autonomous enough to be able to create the SW without

much structure or direction provided from the music therapist. The objective of this SW approach was to reflect on the experiences lived during the sessions and to elaborate and give form to the emotions and thoughts that arose in order to close the group process. This SW 3 was an original composition since both the lyrics and the music were created by caregivers, expressing what they needed and enabling them to close what they had lived in the session. The theme and music are free, relying on the existing group cohesion in this phase of the treatment.

Fig. 4 shows the flowchart illustrating the approach to compose the final song. To begin the activity, participants were invited to dialogue and reflect on what they would like to transmit as a community of caregivers. In this case, the music therapist offered them a known structure (ABABCB form), that could be followed if desired: Verse 1 (A) – Chorus (B) - Verse 2 (B)- Chorus (B) - Bridge (C) – Chorus (B). Once the lyrics were written, in order to create the music, caregivers discussed how the music would be presented in each part of the song, choosing instrumentation and musical parameters such as volume, rhythm, and dynamics. The music therapist created a guitar base for the song before the final session, wherein caregivers sang the song and played

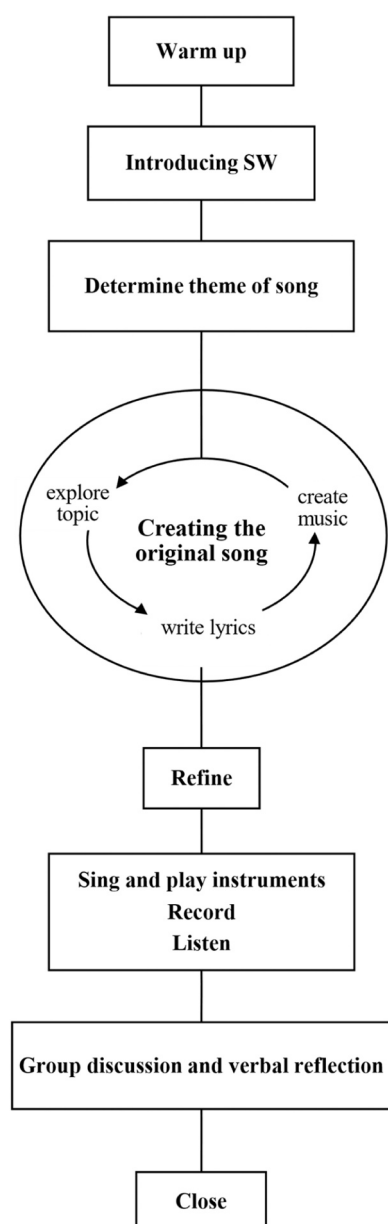


Fig. 4. Steps involved in the original songwriting method (SW 3).

instruments several times until it was recorded. Then, they listened to the composed song, discussing and reflecting on their feelings and experience about the final SW product.

Statistical analyses

The SPSS (Statistical Package for the Social Sciences) version 27 programme was used to perform all the quantitative analyses. Descriptive statistics were used to describe the participant sample. Continuous variables were described by mean and standard deviation, and categorical variables by frequency and percentage. All data were introduced directly from the caregivers' responses, except the song lyrics. Firstly, the lyrics translation was carried out, since the groups were conducted in Spanish and the lyrics were in that language too. This translation was necessary for the optimal use of LIWC-22 because the software processed the data by default using English LIWC dictionaries, which are the only actively maintained and updated by the software developers. The lyrics were individually translated by four bilingual researchers and then discussed among themselves the discrepancies found, so as not to lose the original meaning of the songs. All the lyrics created during the 10 sessions and in the eleven groups were included in the LIWC-22 analysis, whether generated by the group (SW 1 and SW 3) or the individuals (SW 2). After obtaining the data with LIWC, they were entered into SPSS with the rest of information. Regarding the MSS, the global scores were calculated for each SW. Kolmogorov–Smirnov test was used to verify the normal distribution adjustment of the sample for each of the variables of the study. Since most of the variables did not have a normal distribution ($p < .05$), non-parametric tests were applied. A p-value below .05 was defined as statistically significant.

In order to answer the research questions the following non-parametric test were used:

- To analyse the differences between the different SWs, Friedman and Dunn-Bonferroni post hoc tests were carried out (research question 1).
- To measure the relationship between LIWC-22 data and MSS Spearman's coefficients were used (research question 2).
- To examine the relationship between previous descriptive variables (level of dependency, importance or frequency of music, age and hours of caring) and SWs results Spearman's coefficients were used (research question 3).

Results

Sample characteristics

A total of 60 informal caregivers participated in the SGMT intervention, aged between 42 and 86 years (66.27 ± 9.83). Participants were mostly female (90 %), married (66.7 %), upper secondary or lower educated (74.9 %), and retired or unemployed (55.0 %). Further informal caregivers' details are found in Table 2.

In relation to the kinship of the caregiver in this study the sample was composed of 27 sons and daughters (45 %), 26 spouses (43.3 %), 4 brothers and sisters (6.7 %) and 3 caregivers classified as "other" (5 %), dedicating an average of 42.07 hours per week to caregiving. In addition, the profile of the cared person was 32 men (53.3 %) and 28 women (46.7 %), with a mean age of 81.68 ($SD = 10.27$) and a dependency level of 48.42, indicating a moderate dependency according to Barthel's ranges. A total of 96.7 % of caregivers affirmed that they liked music and that it was important or slightly important in their daily life of 3.87 ($SD = 0.96$). They listened to music with a frequency of 3.8 ($SD = 0.80$), nearly to frequently.

Descriptive MSS and LIWC data

Regarding the results related to the SGMT intervention, the

Table 2*Sociodemographic characteristics of the caregivers.*

Sociodemographic variables		n (%) n = 60
Sex	Male	6 (10 %)
	Female	54 (90 %)
Marital Status	Married	40 (66.7 %)
	Living as a couple	5 (8.3 %)
	Divorced	3 (5 %)
	Separated	2 (3.3 %)
	Single	6 (10 %)
	Widow/er	4 (6.7 %)
Educational Level	Primary or below	8 (13.3 %)
	Lower secondary	17 (28.3 %)
	Upper secondary	20 (33.3 %)
	Higher vocational training	7 (11.7 %)
	Bachelors or equivalent	4 (6.7 %)
	Masters or equivalent	2 (3.3 %)
	Doctoral or equivalent	2 (3.3 %)
Occupation	Employed	11 (18.3 %)
	Unemployed	7 (11.7 %)
	Retired	26 (43.3 %)
	Housework	13 (21.7 %)
	Other	3 (5 %)

descriptive statistics of the variables are reported depending on the three types of SW. Firstly, with respect to the MSS, the meaning of the three types of SW were rated in 57 responses each, with the means as follows: SW 1 (81.30 ± 12.58), SW 2 (83.05 ± 14.17) and SW 3 (88.79 ± 10.85). Secondly, the information processed by the LIWC software in relation to the three SW approaches ($n = 60$ each SW), can be found illustrated in Fig. 5. It shows both the summary variables (analytic, clout, authentic, and tone); and the psychological processes category (drives, cognition, affect, and social processes).

Research question 1: differences on MSS and LIWC

Additional tests were applied in order to statistically analyse the differences between means of these SW approaches' variables (Table 3). The first one was the Friedman test, that was carried out to compare the total understanding scores of MSS and LIWC for the three types of SW. Significant differences were found between the SWs methods, $\chi^2(2) = 50.033$, $p < .001$. The next step carried out was the Dunn-Bonferroni post hoc tests, where significant differences were identified on MSS and LIWC variables on the paired comparison between SW methods. Most of the significant differences found presented a medium-high effect size.

Research question 2: relationship between MSS and LIWC data

The data between MSS and LIWC were correlated for each SW, obtaining that the meaningfulness was correlated positively with the "tone" content dimension in the SW 1 ($Rho = .327$, $p = .013$) and, on the SW 3 the MSS correlated negatively with the "affect" ($Rho = -.291$,

$p = .028$).

Research question 3: relationship between previous variables and MSS-LIWC data

In order to find out if some of the SWs' results presented are related to previous variables, additional spearman correlations were performed. When analysing the correlations between the MSS with previous descriptive variables there were no correlations. Regarding the LIWC variables, in the first SW the "analytic" content was positively correlated with the level of dependency ($Rho = .303$, $p = .019$), as well as the "tone" with the number of care hours ($Rho = .431$, $p = .001$). In the SW 2, it correlated positively "clout" with importance of music ($Rho = .323$, $p = .012$) and "authentic" negatively with the number of the care hours ($Rho = -.260$, $p = .045$). The SW 3, presented multiple correlations. On the one hand, the care hours positively correlated with "clout" ($Rho = .372$, $p = .003$) and with "social processes" ($Rho = .308$, $p = .017$). On the other hand, the age of the caregivers correlated negatively with "authentic" ($Rho = -.326$, $p = .011$), and positively with "affect" ($Rho = .280$, $p = .030$).

Discussion

Informal caregivers often experience burden due to the continuous care, leading to isolation and decreasing social networks (Hajek et al., 2021). Therefore, working with them to enhance their quality of life is highly important, especially with group interventions to address this social need (Lauritzen et al., 2015). Music therapy is taking on a very important role in the work with informal caregivers of older people with dependency, employing especially the therapeutic songwriting (Irons et al., 2020). The challenge about this therapy is that research studies usually do not provide a detailed description of music therapy programmes, which makes it difficult to replicate (Robb et al., 2011). This study presents an intervention programme comprising three phases based on three SW approaches. Therefore, the main objective of this research was to describe and analyse the intervention programme for family caregivers of older people with dependency. In order to understand the underlying factors of change emerged (Baker et al., 2015; Baker, Silverman & MacDonald, 2016; Baker & MacDonald, 2014), this study explored how the three SW approaches used in the programme might contribute to the clinical therapeutic process.

The results demonstrate the therapeutic evolution expected when designing the intervention programme. Firstly, regarding the first research question, it was observed that the compositions presented more meaningfulness for the caregivers as the process progresses. This meaning was more present from the SW 2 onwards, with a significant difference between the SW 2 and SW 3. However, for the caregivers the greatest difference in the meaningfulness of the SWs was between the group ones (SW 1 and SW 3). The therapeutic process itself was reflected through the course of this variable, since as the therapy progresses, the

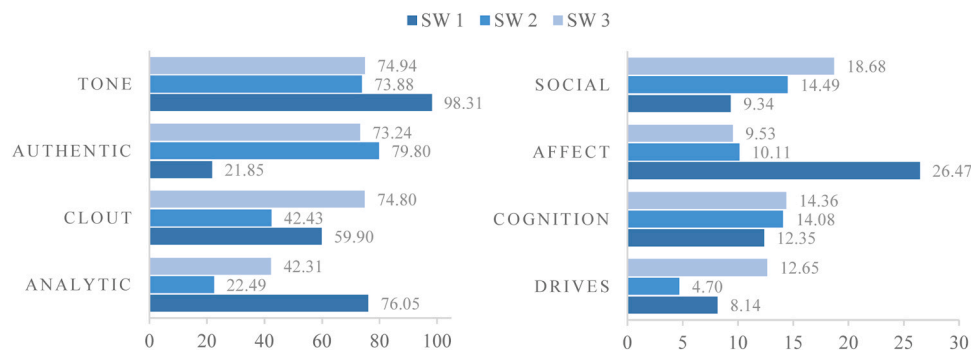
**Fig. 5.** Summary variables and psychological processes from LIWC for each SW.

Table 3

Results of Friedman test and post-hoc analysis between the three types of SW.

Songwriting Variables	<i>p</i> Friedman	Post-Hoc Analysis					
		SW1-SW2		SW2-SW3		SW1-SW3	
		<i>p adj.</i>	<i>r_{pb}</i>	<i>p adj.</i>	<i>r_{pb}</i>	<i>p adj.</i>	<i>r_{pb}</i>
MSS	< .001	1	-	.009	0.28	< .001	0.36
LIWC-22							
Summary Variables							
Analytic	< .001	< .001	0.66	.024	0.24	< .001	0.42
Clout	< .001	.120	-	< .001	0.39	.085	-
Authentic	< .001	< .001	0.76	.513	-	< .001	0.65
Tone	< .001	< .001	0.55	1	-	< .001	0.55
Psychological Processes							
Drives	< .001	.002	0.31	< .001	0.70	< .001	0.40
Cognition	.022	.134	-	1	-	.024	0.24
Affect	< .001	< .001	0.56	1	-	< .001	0.64
Social processes	< .001	.014	0.26	< .001	0.38	< .001	0.64

Note. MSS = Meaningfulness of Songwriting Scale; LIWC-22 = The Linguistic Inquiry and Word Count; *p adj.* = Bonferroni's correction; *r_{pb}* = point biserial correlation effect size.

compositions became more relevant for the caregivers. Baker, Silverman & MacDonald (2016) stated that the impact of the group process and dynamics may play a role in the degree of meaning derived from the process. Furthermore, this increasing meaningfulness can be understood as the caregivers engaged more deeply in the SW process, with the compositions becoming a transitional object that helped to access unconscious feelings and thoughts. The literature regarding the comparison of SW methods is practically non-existent. Baker & MacDonald (2013), (2014) applied both parody and original songwriting with students and retirees, concluding that original songwriting was more transcendent and personal compared to the parody one. This finding supports the idea that original songwriting may serve as a free associative SW, being a more effective medium of symbolization for caregivers and to explore their inner world. As Baker (2015) stated, while creating lyrics is important in transforming thoughts and emotions into a concrete form, the music also plays an important role in the change process as the music express and/or symbolize the inner conflicts. The efficacy of the SW process, in part, depend on how relevant the musical experiences are for the songwriters, being the original songwriting more focused on the music creation than the parody one.

Secondly, continuing with the first research question, differences in the content of the songs were also found depending on the method of SW. Regarding the analytical thinking, there was a decreasing tendency throughout the sessions. The SW 2 was the least analytical, probably because it was the most personal as it was created individually. The most analytical was the first composition, presenting a marked difference when compared to the other SWs. From a psychoanalytic perspective, this finding could reflect the caregivers' initial use of some defence mechanisms like the intellectualization. As the process progressed to SW 2, the caregivers dissipated some of their resistances, moving toward self-exploration and the confrontation of repressed feelings and thoughts. This means that the caregivers were becoming less rigid and cold, evolving towards a friendlier and more personal behaviour (Pennebaker et al., 2022).

The clout content was higher in group SWs, presenting this confidence and security focused on the group (Fox & Roynce Stafford, 2021). Despite this, the significant difference was between the individual song parody (SW 2) and the group original songwriting (SW 3), not occurring between the SW 1 and SW 2, which may be due to the fact that this variable took more relevance at the end of the process, when the group, worked through the group transference, was cohesive and felt more confident

In reference to the authentic content, it was greater as the intervention progresses. The least authentic was the SW 1, so when comparing it with the following SWs it is where the greatest differences were found. This may be due to the fact that at the beginning of the

intervention the caregivers did not already know each other, so the group was not formed and cohesive yet. Caregivers might not feel confident enough with the other members of the group and in a place that was not safe enough to be honest with themselves and their emotions, relying on defence mechanisms such as projection, showing resistances and blocking their real needs (Baker, 2013a; Markowitz et al., 2023). As the intervention progressed, the caregivers began to establish a stronger therapeutic alliance, characterized by trust and safety within the group, allowing insight and an integration of previously repressed aspects.

In the same line, the tone content decreased after the SW 1, which only presented positive emotions, observing a tendency to positivism. This data could be an indicator of unrealistic and excessive positivism, activating repression and reaction formation, hiding their real emotions, blocking, and not showing emotions with a more negative or realistic connotation (Goodman, 2022). As the authentic content, this might occur because it was the first SW they had to face, being the beginning of a type of intervention they were unfamiliar with and not feeling confident with the group to show their emotions.

Regarding the content related to psychological processes, it was found that the drive was in the group, since this content was higher in the group SWs. The most remarkable was the SW 3, since it was the one that presented the greatest differences when compared to the previous ones. This means that the highest drive content emerged at the end of the process, when group transference relationships and strong bonds has already formed within the group. The cognition variable did not present remarkable findings, since it was not a common need of the caregivers and it was not presented as a goal of the therapy. Nevertheless, it is worth mentioning that this variable increased throughout the sessions to a small extent, with a notable difference between the SW 1 and SW 3, which may be due to the greater insight and self-reflection generated by the therapy (Barnett, 1978; Van Camp et al., 2017).

The affective content presented a similar pattern as the tone variable previously mentioned, being significantly higher in the SW 1 compared to SW 2 and SW 3, resolving the inner conflicts. Finally, the content related to social processes increased significantly throughout the intervention, with higher content observed in each SW. This indicated higher levels of object relations as the group became a symbolic space working through internal conflicts and resistances. Based on the results thus far, it could be suggested that, in the SW 2, as it was individual, this content would decrease, but it maintains the upward trend, with the highest social content being found in the SW 3. This result really shows the process caregivers were going through as a group, the way they internalized group dynamics, and the relevance that the other members of the group have had for them, reinforcing the idea that the intervention designed consolidates social bonds.

The discussion of all the results related to the first research question (content and meaningfulness differences) leads to confirm that therapeutic work done through SWs has created a group cohesion that provides a safe space for informal caregivers. The stimulus for the caregivers' therapeutic work is the group. Many studies have been conducted about the factors that contribute to the success of therapy, and it has been found that in group therapy, the cohesion is a driver of success in therapy, being one of the most important predictors of outcomes in group therapy (Burlingame et al., 2018; Pappas, 2023). The SWs analyses allowed to identify defence mechanisms (i.e. projection, intellectualization, repression and symbolization) activated by the caregivers at the beginning of the therapeutic process, being the compositions a transitional object within which they could transform their unconscious conflicts into conscious ones. The group transference worked through the SWs enabled a decrease of resistances and an increase in both the insight and stabilising object relations.

This conclusion reached in response to the first research question is supported by the findings of the second research question. The latter is concerned with exploring the relationship between both the meaningfulness and the content of the SWs. In this sense, the first composition was more meaningful when the emotional content was more positive. Nonetheless, this changed completely at the end of the process, finding SW 3 more meaningful when the affective content was less positive. Baker, (2013a) stated that the strength of cohesion is directly related to the degree of honesty, authenticity, and support felt by group members. The level of intimacy, trust, and safety of the group are important factors in driving the therapeutic composition process, as they are more willing to open up with authenticity.

These findings, derived from the therapeutic intervention carried out through different SW methods, could be influenced by other previous characteristics of the sample, leading this statement to the third research question (Baker, 2015). Firstly, it was found that meaningfulness of SW was not influenced by previous variables. This indicates that the results presented are due to the designed intervention itself and not to prior variables. Secondly, regarding the content of the compositions, the prior variables did not present a longitudinal trend throughout the intervention that could lead to a conclusion about their influence. However, it is worth mentioning that in SW 2 the previous relationship with music was relevant, a finding that was not present in the other SWs. It could be observed that the variable clout was related to the importance and presence that the caregiver gave to music in his or her life. This may be due to the more personal role that music plays in this SW, since the song played was chosen by them and was part of their sound history. This finding supports the information provided by Baker (2015) who stated that the relationship with the music could influence the SW process.

Another aspect to be highlighted is the weekly hours that caregivers dedicated to the caring, being a previous variable present in all the SWs, which might be an aspect that can influence on the results presented. At the beginning of the therapy, caregivers who presented emotions with a positive tone are those who dedicated more hours to caregiving. In addition, the highest analytical initial content was related to caregivers who care for individuals with higher levels of dependency. These findings indicated that caregivers with more caregiving burden presented greater initial resistances and blocks. In the middle of the process, these blocks continued, with authentic content being lower in those caregivers who dedicated more hours to caregiving. Nevertheless, as the process progresses, the clout and social content was more present in those who invested more hours per week in caregiving, with insecurities dissipating and the social aspect taking importance. Interaction findings suggested that the results about the therapeutic intervention were more present in those caregivers with higher levels of dedication to caregiving. Several studies have concluded that hours of care and level of dependency are variables that predict greater burden (Gratao et al., 2012; Ruisoto, Ramírez, et al., 2020; Vaingankar et al., 2016), so these findings are very encouraging and promising for the scientific and clinical community.

Limitations and future research

In order to replicate the current programme and to consider the interpretations of the reported results, it should be recognized as a limitation that the songs had been translated from Spanish to English and the content of the songs could have been lost. In the same line, the software used (i.e. LIWC-22) has as its own limitation the impossibility of detecting sarcasm or irony. In order to address this concern, it is proposed as future research to explore the meaning of the lyrics through qualitative content analysis, which is an identified gap in the literature on older adults. Another limitation is the dual role of the music therapist that conducted the sessions, who was also the main researcher, being possible that this could lead to some biases in the study. Furthermore, there was no control design that could confirm whether the results are due to the intervention programme itself. Therefore, future research could apply this intervention changing the order of the SWs or employing other SW approaches in order to verify whether the outcomes are similar or not. This research focuses on analysing this specific intervention programme based on the combination of three SW techniques, hence it could not be drawn conclusions concerning solely one of the SW approaches. Chasing this objective, it could be advisable to design other intervention programmes examining each method separately to better understand their individual impacts. Additionally, to explore the effectiveness of the different SW methods employed in this study it could be beneficial to extend the program over a longer period. It would be interesting to apply the intervention programme presented in this study to other types of informal caregivers, if possible with bigger sample sizes, like those who care for children and evaluate its possible validation. For future research, as previous studies have shown that group size is a variable that can influence on the group SW process (Baker, 2013a), the intervention could be applied to larger groups and check the variability of the outcomes. Finally, although this study highlights factors that may explain the therapeutic change, it does not provide causal findings that explains the mechanisms of change behind it. Therefore, future studies with analyses that address this objective, such as structural equation modelling, may be worthwhile.

Conclusions

The present study provides empirical outcomes that lead to a better understanding of the factors of change occurred during the SGMT intervention. It can be concluded that group cohesion, worked through the intervention programme based on different SW approaches, promotes insight and enables caregivers' therapeutic process. The SW intervention has enabled caregivers to connect with their authentic needs and emotions. This has been possible thanks to the social bond created throughout the sessions, providing a safe and trusting space, where caregivers felt comfortable to express those emotions and reduce initial internal resistances. It is also concluded that this intervention programme is more beneficial for those caregivers with greater caregiver overload. Additionally, this study reflects the need to adapt the interventions to the times and needs of the caregivers. Hence, the work and training of the therapist to select the most appropriate therapeutic tools for the population to which the intervention is directed is relevant. One way to manage this is by regulating the structure and directionality used throughout the therapeutic process. Carrying out this adaptation in music therapy is possible thanks to the versatility of the SW technique and the different approaches that can be used. It is hoped that with this description of the intervention programme created, other music therapists will be able to replicate it at clinical level and provide a clear basis for future research.

Ethics approval

This work has been approved by the Research Ethics Committee of the University of Deusto [ETK-42/20–21]. An informed consent was

provided to participants. They had to sign it if they agreed to participate. In this informed consent they were informed that the participation was voluntary and they could drop it whenever they wanted. They were also informed about the data privacy.

Consent for publication

In the informed consent is included the consent to publish.

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CRediT authorship contribution statement

Amayra Imanol: Writing – review & editing, Writing – original draft, Supervision, Project administration, Investigation, Funding acquisition, Formal analysis, Conceptualization. **García-Sanchoyerto Maddalen:** Writing – review & editing, Methodology, Data curation. **O’Callaghan Clare:** Writing – review & editing, Supervision, Project administration, Investigation, Conceptualization. **Pérez-Núñez Paula:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Caballero Patricia:** Writing – review & editing, Validation, Resources, Project administration, Methodology, Funding acquisition. **Martínez Oscar:** Writing – review & editing, Project administration, Investigation, Funding acquisition, Data curation.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Paula Perez Nunez reports financial support was provided by Basque Government. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

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Dance therapy and the criminal justice system: Considering traditional and critical perspectives in prisons, forensic mental health and addiction care

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ABSTRACT

Dance therapy can be beneficial for people detained in prisons and other correctional facilities, yet conceptualising research and practice with incarcerated participants can be complex and multifaceted. On one hand, traditional perspectives align with behaviourism and take a medical approach to analysing and articulating the benefits of dance therapy for criminal cohorts. On the other hand, social justice perspectives highlight the limitations of individual behavioural change and look to broader socio-political contexts to explain the ways in which institutions and systems adversely impact the lives and experiences of criminalised people. Taking these different views into consideration, our article blends traditional (behavioural) and contemporary (critical) perspectives and seeks to crystallise findings from the research literature in a way that honours the relevance of two distinct, yet complementing, paradigms. Beginning with a systematic review, we draw on the Risk-Need-Responsivity and Good Lives Model to contextualise data from an objectivist standpoint. We then position ourselves more critically to examine the constraints of the medical model and suggest alternatives to treatment-focused discourse. Our paper concludes with recommendations for further research and practice which are rooted in our belief that more collaborative models for engaging people in prison and related settings are possible, and worth pursuing.

1. Introduction

This article incorporates two complementary perspectives on the role of dance therapy in the criminal justice system. It begins with a systematic literature review positioned within an objectivist frame, and reports on findings about the effect of dance therapy for people in prisons, forensic mental health care, and accessing supports for substance use addiction. As authors, we pursue a two-step perspective and *chassé pas de bourrée*¹ from a traditional to a more contemporary approach, where we adopt a critical perspective and reconsider how people, practice, and systems could be conceived of differently. We question the inherent assumptions from the behavioural treatment model and point towards alternatives. The article then concludes with recommendations for practice and research based on a crystallised view, where all the different colours of the crystal are celebrated as they are held in different lights. Crystallization (Ellingson, 2009) is a form of qualitative inquiry which purposefully blends different epistemological perspectives to generate novel, creative, and empirical approaches to knowledge production.

This two-step perspective emerged out of a now complete PhD project (see Dumaesq, 2020) involving a partnership with the local Department of Justice where a participatory-focused dance therapy research project was established within that community. The overall aim of the research was to learn from women navigating the justice system about their personal perceptions and experiences of using dance therapy in a community correctional context. At the time of the PhD collaboration, a Court Manager and Advanced Case Manager recommended a systematic literature review be undertaken to help advocate for dance therapy services in prisons and correctional units in the state of Victoria, Australia. We duly complied.

1.1. Extending on existing literature reviews: dance therapy in prisons and addiction recovery

Our review extends on Dawn Batcup's earlier publication which explored the use of dance movement psychotherapy in forensic settings, prisons, and other medium secure forensic units (2013). According to Batcup, dance movement psychotherapy enables prison cohorts to gain

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¹ A swift transitional movement in ballet where the dancer transfers their body weight quickly from foot to foot.

critical distance from bodily-felt feelings and emotions. Through therapeutic dance and movement, Batcup suggests that negative emotions and behaviours may be transformed into more pro-social attitudes and behaviours which may help to reduce recidivism. Based on this, Batcup recommends dance movement psychotherapy as a specialist assessment and treatment method within forensic settings. This claim will be elaborated on in our review through a systematic approach to analysing therapeutic outcomes, which are discussed in accordance with treatment goals articulated by Corrections Victoria.

Following Batcup's review, several other reviews have more recently emerged which focus on creative arts and movement-based interventions in forensic care. Dance therapist Fabian Chyle and colleagues, for instance, described emotional and behavioural outcomes associated with body-based and movement-focused interventions in prisons in two narrative reviews (Chyle et al. 2018; 2020). Their review focused on movement interventions in a general sense and referred to limited dance therapy studies, therefore leaving scope for further exploration of dance therapy as a stand-alone intervention. In a more recent systematic review, Abbing et al. (2023) analysed the effectiveness of creative arts therapies (music, dance, art, and drama) and offered empirical insight into how the creative arts interventions might be incorporated into existing forms of treatment in forensic settings. In this review the authors found dance therapy to be associated with improved social skills and greater empathy in prison populations. However, only one dance therapy research study was included in the review, that being a study by Koch et al. (2015). Similarly, Meekums and Daniel's (2011) review of creative arts therapies in prisons suggested that the arts are linked to improved arousal levels, emotional literacy, and quality of life. As specific data on dance therapy was not available in Meekums and Daniel's study, we see a need for further research into the specific application of dance therapy as distinct from other creative arts modalities and other body-movement interventions in prisons.

1.2. Incorporating a focus on addiction recovery

Alcohol and drug use are extremely common amongst prison populations: In Australia, around 65 % of people in prison report to have used drugs in the last year (Alcohol & Drug Foundation, 2024). Drug and alcohol use is considered a key risk factor when it comes to re-incarceration or continued criminal offence. In many instances, treatment for substance addiction is provided alongside other mental health and psychiatric treatments in forensic institutions (Abbing et al. 2023). For this reason, we, like Batcup (2013) have chosen to incorporate a focus on addiction in our systematic review. To date however, empirical research on the efficacy of dance therapy for addiction recovery is sparse. This limitation is noted by Megrnahan and Lynskey (2018) who published a systematic review on creative arts therapies and substance misuse, finding no dance therapy studies to meet the inclusion criteria at the time of publication. Adams and Stickley (2019) do include one dance therapy publication (Kirane, 2018) in their rapid literature review, although this is incorporated into a broader discussion around the role of art activities and arts therapies (drama, art, and music) for people using substances. We note that a recent study by Bourdon and Kirane (2024) does however articulate important findings in relation to the use of dance therapy in addiction contexts, and we elaborate on in our review. Nonetheless, our experience of exploring the literature confirms a research gap when it comes to demonstrating the efficacy of dance therapy in addiction recovery, particularly as this intersects with the criminal justice system.

1.3. Aim

The aim of our review is to systematically aggregate findings from the dance therapy literature with a focus on prisons, correctional services, and addiction recovery. Furthermore, we link key findings from the literature to pre-eminent criminological frameworks, such as the

Risk-Need-Responsivity Model (Andrews et al., 1990) and the Good Lives Model² (Ward, 2002a; Ward, 2002b), and use this to articulate a rationale for the use of dance therapy within a recidivist and rehabilitative model of care.

1.4. Research question

The overarching research question for this review is: What findings are relevant to dance therapy within the field of criminology and the overlapping area of addiction recovery? A sub question is: How might these findings support the policy goals and rehabilitation aims relevant to this sector, as identified by Corrections Victoria³?

2. Methods

2.1. Study design

We have used an objectivist approach to systematically review and appraise the existing research literature on dance therapy and prison populations. Qualitative and quantitative studies are included in our review and the PICO framework (Eriksen & Frandsen, 2018) serves as a basis for data extraction. Empirical studies relating to the use of dance within prisons and correctional units have been selected, along with studies relating to addiction recovery.

2.2. Inclusion/exclusion criteria

- English language only
- Uses specified methodological design to address clearly defined research question
- Includes participants of all ages
- Includes participants located in prisons or in related forensic settings, including drug and alcohol rehabilitation
- Includes participants of all genders
- Utilises dance therapy as an approach and is facilitated by a dance therapist
- Full-text locatable by the researcher
- Excludes literature reviews
- Excludes Master-level theses and book chapters

Due to the very small number of available research studies yielded through our systematic search, we later chose to include studies which did not directly involve clients as recipients of an intervention but instead involved practitioners as respondents or informants. This decision allowed us to report on treatment goals and outcomes relating to creative arts therapies – including dance – in forensic units (Smeijsters & Cleven, 2006; Smeijsters et al., 2011) and also enabled us to understand dance therapists' attitudes and practices regarding treatment for opioid use (Kirane, 2021). The inclusion of these studies allowed for a deeper understanding of key client issues in correctional settings and areas of therapeutic focus within dance therapy and enabled us to learn more about how dance therapists perceive their work in the context of addiction care, which is an area that strongly overlaps with correctional services. {{{Tables 1}}}

² It is worth noting that Lutz et al. (2022) have published an excellent review and comparative analysis of these models in forensic psychiatry and readers wishing to learn more about the relationship between the Risk-Need-Responsivity model and Good Lives Model may find this helpful reading.

³ Corrections Victoria is part of the Department of Justice and Community Safety and oversees the management of prisons and correctional services in the state of Victoria, Australia. <https://www.corrections.vic.gov.au/>

Table 1
Overview of findings.

Dance therapy & prisons/forensic settings = 5 studies									
	Research focus	Population Characteristics (i.e. general population of people with specific mental health diagnoses?)	Recruitment	Theoretical framework	Study Design	Intervention (session structure and/or dance therapy methods used to engage participants)	Data collection	Results	Socio-political context (Does the study consider larger socio-political context when reporting on findings?)
Koch et al. (2015). Breaking barriers: Evaluating an arts-based emotion regulation training in prison. <i>Arts in Psychotherapy</i> , 42, 41–49. doi: https://doi.org/10.1016/j.aip.2014.10.008	Evaluate whether a combined dance & drama therapy intervention is effective for emotion recognition and regulation, increase in body awareness, reduction of aggression, development of empathy and/or improvement of interpersonal relations or participants	Male inmates in Germany Male prison inmates n = 47 Mean age 34 years. 91.5 % German native speakers, 6.4 % Russian, and 2.1 % Turkish Participants appear to be drawn from general population (i.e. no mention of specific diagnosis)	Recruited from three different prisons. Informed consent provided through inmate signature. No further details regarding recruitment provided.	Little explicit reference to theoretical frameworks however scholarship from cognitive sciences (Gallese, 2005; Gibbs, 2006) and phenomenology is cited (Fuchs, 2012), suggesting embodied cognitive and behavioral focus	Pilot study, with a pre-/post-test waiting-group design	Dance/movement and drama therapy-based training in a workshop-format. Based on Aikido stick fighting Session structure: A 110 cm long wooden stick was used. Physical experiences focused on: “establishing interpersonal boundaries, attacking, defending, retreating, empowering, stopping, or redirecting” (p. 42) Participants took turns playing roles (perpetrator versus victim) Five-day intervention from 9am to 4pm Integrated arts therapies (dance, drama, music and art) Intervention offered twice a week over five-week period. 90-minute sessions. 10 sessions for two intervention groups. Session structure: Dance therapy component of the study focused on connecting mind and body, increasing emotional regulation skills, and developing positive self-image Methods used: Dance/movement Improvisational	Self-report questionnaire and implicit-association test (IAT)	Increase in body awareness and social competence, experienced distance to their own aggression, and experienced a higher degree of closeness to the group and trainer (all important in violence prevention). No changes occurred on anger and on explicit as well as implicit aggression measures	No
Kõiv, K. & Kaudne, L. (2015). Impact of Integrated Arts Therapy: An Intervention Program for Young Female Offenders in Correctional Institution. <i>Psychology</i> , 6, 1–9. doi: 10.4236/psych.2015.61001	Evaluate the impact of CATs including dance therapy on young women in a correctional institution; to measure changes to conduct, emotional, peer problems, hyperactivity, and prosocial behaviour	Young females in high security correctional centre in Estonia n = 29 Ages 14–17 Participants appear to be drawn from general population (no specific diagnosis) and are young women who reportedly exhibit emotional and behavioural issues	Recruited from the only state correctional facility in Estonia, a long-term residential centre. Authors note that participants agreed to participate voluntarily. No further details regarding recruitment provided	No explicit reference to theoretical frameworks but research questions suggest implicit developmental theory underpinning. For instance, intervention is designed to developmental needs such as “self-concept and lack of self-esteem; problems with expressing and regulating emotions; inability to resolve interpersonal problems and build positive relationships with peers” (p. 3)	Quasi-experimental design; intervention-control group pre-test/post-test design	Dance/movement and drama therapy-based training in a workshop-format. Based on Aikido stick fighting Session structure: A 110 cm long wooden stick was used. Physical experiences focused on: “establishing interpersonal boundaries, attacking, defending, retreating, empowering, stopping, or redirecting” (p. 42) Participants took turns playing roles (perpetrator versus victim) Five-day intervention from 9am to 4pm Integrated arts therapies (dance, drama, music and art) Intervention offered twice a week over five-week period. 90-minute sessions. 10 sessions for two intervention groups. Session structure: Dance therapy component of the study focused on connecting mind and body, increasing emotional regulation skills, and developing positive self-image Methods used: Dance/movement Improvisational	Self-report: Strengths and Difficulties Questionnaire (SDQ) and a modified Behavior Checklist (BC)	Statistically significant reductions in frequencies of aggressive behaviour and emotional & behavioural problems; increase in pro-social behaviour. Note however, it is difficult to determine how much positive change can be attributed to dance therapy alone given the intervention was an integrated arts program.	No

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Table 1 (continued)

Dance therapy & prisons/forensic settings = 5 studies									
Smeijsters, H., & Cleven, G. (2006). The treatment of aggression using arts therapies in forensic psychiatry: Results of a qualitative inquiry. <i>The Arts in Psychotherapy</i> , 33(1), 37–58. doi: 10.1016/j.aip.2005.07.001	Explores the use of arts therapies in reducing recidivism. Research aim is to identify problem areas in clinical practice and to develop treatment methods with enough clinical trustworthiness.	Arts therapists working in forensic settings in the Netherlands and Germany N = 31 Participants are members of the network of arts therapists in forensic psychiatry, each working in one of 12 forensic clinics	No explicit details provided regarding recruitment, but given that participants are professional arts therapists, it is likely that recruitment occurred via established networks such as professional associations	Little reference to specific theoretical frameworks, however the concept of ‘tacit knowledge’ is presented which provides a rationale for interviewing clinicians about their direct experiences and work with forensic populations	Qualitative, naturalistic inquiry, and dialectical knowledge building (dialogue between practitioners and researchers)	approaches. *Methods used were integrative of dance, music, drama and art, for example participants were asked to express emotions through “drawing, movement, rhythm and voice, [and] picked items” (p. 9) See Appendix in Köiv & Kaudne for a for a full description of activities offered. Dance therapy as well as drama, music, art. Methods used in dance therapy: Respondents (dance therapists) report using methods such as moving to the same rhythm in synchronicity, slow movements, conscious relaxation and eye contact, movement games, Laban Movement Analysis, exploring tension increase and decrease through controlled movement (p. 43–44)	Semi-structured questionnaires, interviews and focus groups	Responses from practitioners indicates that the methods used in dance therapy are geared toward working with aggressive behaviors on a bodily level by allowing clients to experience the somatic sensations linked to destructive behaviors and finding alternate ways to express oneself through movement. Dance therapy respondents report using dance/ movement to target problem areas such as self-image and emotional issues (i.e. expressing emotion and discharging/ regulating anger and aggression). All arts therapies (dance, drama, music, and art) focused strongly on behavior and emotions in terms of treatment goals. The research resulted in “several	No

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Table 1 (continued)

Dance therapy & prisons/forensic settings = 5 studies									
Smeijsters, H., Kil, J., Kurstjens, H., Welten, J., & Willemars, G. (2011). Arts therapies for young offenders in secure care—A practice-based research. <i>The Arts in Psychotherapy</i> , 38(1), 41–51. doi: https://doi.org/10.1016/j.aip.2010.10.005	To present a treatment theory (i. e. practice-based research) which explains how arts therapies target and help transform risk factors into protective factors.	Arts therapists working in institutions for young offenders in the Netherlands and Germany N = 27 Eight drama therapists, five music therapists, seven art therapists, and seven dance-movement therapists from six clinical settings	No explicit details provided regarding recruitment, but given that participants are professional arts therapists, it is likely that recruitment occurred via established networks such as professional associations	Practice-based evidence (PBE) is discussed and underpins the study's focus on developing treatment theories which are informed by direct client work in forensic settings	Naturalistic/constructivist research methodology in combination with grounded therapy methodology and action research principles	Dance therapy as well as drama, music, art. Methods used in dance therapy: Respondents (dance therapists) report using mirroring, Authentic Movement, creating a dance to express feelings in static form, investigation of movements that match feeling states such as anger, stick dance, boxing movements, kicking or hitting dance movements, relaxation exercises, and jogging (p. 47–48)	Open interviews, group techniques, Delphi techniques and participatory observation.	consensus-based areas of treatment such as patients' limited perception, compulsive control, lack of emotional expression and empathy, high emotional tension, impulsivity, lack of interpersonal boundaries, and destructive aggression" (p. 53) Practitioner responses suggest dance is used to support self-image and emotions. Helps to express, regulate and discharge anger and aggression.	The authors consider the importance of having practice interventions assessed by the accreditation committee of the Ministry of Justice.
Tepper-Lewis, C. (2019). Description and evaluation of a dance/movement therapy programme with incarcerated adolescent males. <i>Body, Movement and Dance in Psychotherapy</i> , 14 (3), 159–176. doi: https://doi.org/10.1080/17432979.2019.1631885	Describe and evaluate the effectiveness of dance therapy on self-restraint skills; goal of the research is to measure expected increased participants' self-restraint skills which are thought to be associated with reduced recidivism (the risk of -reoffending)	Adolescent males in non-secure placements in the USA n = 3 14–17 years of age Mental health diagnoses included Attention De cit Hyperactivity Disorder (ADHD), combined type; Oppositional De ant Disorder (ODD); Conduct Disorder; Cannabis Use	Recruited from non-secure placements (unclear how many sites). Authors note that participation in the project was voluntary, and parental/guardian consent provide. No further information regarding recruitment offered.	Laban Movement Analysis and Chacian theory. Outcome measure used indicates a behavioural focus (i. e. impulse control, responsibility, suppression of aggression)	Case study design; program evaluation	Individual dance therapy sessions. Weekly sessions unless declined, absence or public holiday 5–6 sessions on average for each participant Session structure: Chacian structure of warm-up, empathic reflection/thematic development, and closure. Methods used: Warm up: body isolations, followed	Pre and post test; researcher recorded movement observations post-session	Self-restraint scores increased for two participants and decreased for one indicating partial improvement in self-restraint	No

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Table 1 (continued)

Dance therapy & prisons/forensic settings = 5 studies									
		Disorder; Alcohol Use Disorder; Unspecified Trauma and Stressor Related Disorder; and Unspecified Learning Disorder.				by more integrated whole-body movements Empathic reflection: spontaneous movements that originated from the participant and which were then exaggerated or extended on by the therapist. Thematic development: Imagery used to develop the symbolic meaning of the movements. Closure: Stretches and body yawns. Modelling of self-regulation techniques to use outside of sessions. Brief verbal discussion. Laban Movement Analysis used to record therapist's observations			
Dance therapy & addiction recovery = 3 studies									
Bourdon, J. and Kirane, K. (2024). Using implementation methods to study a combined dance/movement therapy (DMT) and cognitive behavioral therapy (CBT) protocol at an inpatient substance use setting. <i>The Arts in Psychotherapy</i> . https://doi.org/10.1016/j.aip.2024.102148	Develop and evaluate a manualised protocol for combined DMT and CBT in a substance use disorder setting. Aim of the study is to examine patient engagement and to capture patients' attitudes about the intervention.	N = 85 patients, male and female. White = 85 %; Hispanic / Latinx = 8 % Primary substances used by patients were alcohol (67 %) followed by opioids (12 %), and sedatives (6 %)	Convenience sample inpatient addiction treatment and rehabilitation centre. Protocol was considered treatment as usual, and hence authors state that participants were "not consented for the study, nor does this constitute human subjects research (Pearl IRB ID 2023-0158)" p.2 "Informed consent was not needed because this study was done with the intent of internal education and quality	12-step model and Mindfulness-based principles	Manualized treatment protocol study	DMT/CBT proposal following a 4-session manualized structure. Session structure: Followed a Chacian approach of warm up, thematic development, cool down. Debrief to end. Methods used: Body an micromovement awareness, creativity and expression, primitive expression to encourage symbolism and play, Authentic Movement CBT principles were incorporated into sessions and four core topics were explored in each session: 'Impulse Inventory', 'Studying Impulses',	Engagement was measured by the therapist after each session via a Microsoft Excel tracking sheet (Microsoft Corporation, 2018). 3-point Likert scale used to measure engagement. Attitudes were measured in the exit interview using REDCap Exit interview conducted on subset of patients (N = 29 Data analysed using R Software Package	Most patients reported receiving some (55 %) or substantial (23 %) benefit from the protocol. Almost a quarter (23 %) reported no benefit overall. The two skills that were reported to be the most beneficial to patients were "Using nonverbal communication to express my thoughts and emotions related to addiction" and "Having my peers participate with me in movement psychotherapy."	No

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Table 1 (continued)

Dance therapy & prisons/forensic settings = 5 studies									
			control. It does not constitute human subjects research (Pearl ID 2023-0158)." P4				'Subconscious Movement', and 'Body Language'. Sessions conclude with debriefing session. N/A		
Kirane, K. (2021). Dance/ Movement Therapists' Attitudes and Practices Toward Opioid Use Disorder. 43, 115–131, <i>American Journal of Dance Therapy</i> . https://doi.org/10.1007/s10465-021-09350-1	Examine the attitudes and practices of dance/ movement therapists regarding the screening and treatment of patients with opioid use disorder	Dance therapists working in a variety of settings n = 310 Majority of respondents were female (96 %). Average age 44 years, and White (81 %)	Recruitment followed pilot testing of sample questions with five registered practitioners, and was then approved by a University ethics board. Eligible respondents were over the age of 18 and were contacted by email. 1236 members were contacted through the American Dance Therapy Association (ADTA). Respondents must have (1) graduated from an ADTA approved dance/ movement therapy program and be practicing dance therapists, or (2) must be currently enrolled in an ADTA approved graduate program	Theoretical underpinnings not explicitly communicated, however strong emphasis on interdisciplinary approaches to addiction care is described in the introduction	25-question survey (online)		Data from the 25-question online survey was collected in a de-identified format and exported to Microsoft Excel (version 14.2.0)	Most practitioners believed they possess an opportunity to respond as well as improve treatment for opioid use disorder in their area of practice. However, many respondents did not report screening patients for substance use disorder on a regular basis, nor provide addiction-focused interventions on a regular basis, administer naloxone, or refer for addiction care routinely. Authors suggest a mismatch between practitioner attitudes and therapeutic practice and recommend further addiction training for dance therapy professionals.	No
Reiland, J. D. (1990). A preliminary study of dance/ movement therapy with field-dependent alcoholic women. <i>The Arts in Psychotherapy</i> , 17 (4), 349–354. doi: http://doi.org/10.1016/0197-4556(90)90055-U	Examine changes to women's perceptions of self, other and environment through individual dance therapy sessions	Women, all inpatients of a short-term (four to six weeks) alcoholic unit of a private psychiatric hospital. n = 4 Ages between 30 and 66 Primary diagnosis of alcoholism (all women); no other	Participants each responded to a request to participate and understood they could withdraw at any time. No further recruitment information provided	Cognitive and developmental theories. Reference to American psychologist, Herman Witkin ("field dependence-independence")	Preliminary study, no control group	Dance therapy Six one-hour individual sessions 2x week for three weeks Session structure and methods: Commenced with therapist-led warm up. Therapist initiated movements that "facilitate attachment" such as mirroring	Drawing-of-the-Human-Figure Test; scored by three independent raters using ABC rating scale	Improved self-perception occurred (author notes very small trial size)	No

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Table 1 (continued)

Dance therapy & prisons/forensic settings = 5 studies	
known psychiatric diagnoses. Medical illnesses associated with alcoholism such as hepatitis and chronic liver dysfunction	movements, use of props (balls, scarves, stretch band). Exploring body boundaries (patting body parts), isolating and stretching body parts and moving body as a whole (p. 351).

2.3. Search strategy

The following databases have been searched: Academic Search Complete, CINAHL, Cochrane Central control trial register and Cochrane systematic reviews EMBASE, ERIC, Medline, PsycINFO and SPORTdiscus. The cut-off date for the search was 7th of January 2019, with no cut off limit for earlier studies. A follow up search was more recently undertaken in September 2023 to locate subsequent publications with one additional primary study identified at this time (Tepper-Lewis, 2019). Later during the peer review process another hand search of the literature was undertaken, revealing a more recent publication on dance therapy and addiction (Bourdon & Kirane, 2024) which was also selected for review.

2.4. Search terms

The following search terms were used: dance therap* or dance movement therap* or dance movement psychotherap* or dance psychotherap* . This simplified search strategy was chosen in consultation with research-focused librarians at the University’s biomedical library. Given the relatively small number of research articles published within the field of dance therapy (comparative to other disciplines) it was deemed more rigorous and systematic to import all dance therapy literature to date into Endnote and to select prison, criminal justice or addiction-related papers from there.

2.5. Data analysis

Abstracts were scanned against the inclusion criteria, and full-text articles selected. Categories for data analysis included: research focus, population characteristics, recruitment, theoretical framework, study design, intervention, data collection, and results. Data were deductively extracted using the above categories to organise information and elucidate the therapeutic outcomes relevant to each study. We also included a question around socio-political context as we were curious to see if the literature discussed client issues, outcomes, and findings in relationship to broader systemic or structural forces.

3. Findings

Five articles were located which showed empirical outcomes relevant to prison and correctional-based dance therapy. Three additional research articles were located which focused on dance therapy within an addiction recovery context. In total, eight articles matched the selection criteria.

3.1. Therapeutic outcomes: dance therapy, prisons, and forensic mental health

Findings from the data reveal there to be several domains in which therapeutic change was observed, recorded and/or described within dance therapy and prisons/forensic mental health literature. These domains of change are largely behavioural in nature and speak to improvements in social reciprocity and reductions in aggressive behaviour. This aligns with a risk-focused perspective and the underlying prioritisation of behavioural management within prison and correctional settings. Below are some examples from the literature which point toward key areas of therapeutic change as indicated by the data:

- **Encourages pro-social behaviour:** Pro-social behaviour refers to a range of positive behaviours which are generally considered to be friendly, altruistic, sharing or helpful, or, behaviours which help to reduce stereotypes (Piotrowski et al., 2015).
A pilot study by Koch et al. (2015) who measured improvements in social competence and body awareness provides evidence that dance therapy may help to improve social competency and pro-social

interactions. This supports the findings from a quasi-experimental study which similarly reported on improved pro-social behaviours following an integrated arts therapies intervention, of which dance movement therapy was one modality used (Köiv & Kaudne, 2015). In Tepper-Lewis' (2019) study, some improvements in suppression of aggression and impulse control were observed. While suppression of anger is not a healthy way to process emotion, impulse control and exercising restraint over one's aggressive urges is considered critical in managing risk and reducing recidivism. Ideally, identifying and practicing alternate ways of expressing anger and destructive urges can be explored and applied in a therapeutic context.

- **Decreased anti-social behaviour, aggression & violence:** Anti-social behaviour refers to actions that result in harm to others, either emotionally or physically. In the forensic literature manifestations of anti-social behaviour such as violence and aggressive behaviour are often associated with anti-social personality traits or personality disorder and are considered key risk factors for violence (for example, see de Barros et al., 2008 and Filov, 2019). Finding alternate ways to express oneself can be helpful in reducing anti-social or harmful behaviour.

The research on dance therapy in prisons indicated a slight decrease in episodes of aggressive behaviour, as evidenced in Köiv & Kaudne's study (2015). With a similar focus on reducing aggressive behaviour, Tepper-Lewis (2019) found that individual dance therapy sessions were effective in improvising self-restraint in 2 of 3 participants. Tepper-Lewis associated this with a potential reduction in conduct disorder (2019, p. 173), implying that improved self-restraint may have correlated with a decrease in aggressive or harmful behaviour. Conduct disorder is a term used in psychiatry to describe a mental health condition affecting children and adolescents whereby persistent anti-social and aggressive behaviours are displayed, and is often followed by little guilt or overall indifference to harm caused to others (Yale Medicine, 2024). Another study by Smeijsters et al. (2011) looked at treatment goals used in forensic dance therapy programs with young people⁴ and report findings which indicated the value of dance therapy in expressing and discharging anger and aggression, which is believed to support emotion regulation. This study expanded on similar findings from a previous grounded theory study which suggested dance therapy can be used to help clients find alternate ways of expressing feelings related to destructive aggression in a more acceptable way (Smeijsters & Cleven, 2006, p. 49). This was also noted by Koch et al. (2015) who measured improvements in social competence and body awareness through participation in dance therapy. According to Koch et al. (2015), dance therapy allows individuals to gain distance from aggressive behaviours which can be critical in violence prevention (Koch, et al., 2015) to better understand how dance therapy can impact behaviour, particularly in the social domain.

- **Supports mental health and emotion regulation:** A high number of incarcerated individuals experience mental health challenges, including a diagnosis of mental illness. This may be co-occurring with addiction and/or disability. Mental health supports are typically offered in prisons though are primarily used in forensic psychiatric care. Emotion regulation is a term used to describe the degree of control that person has over managing their emotions and how this is expressed.

The literature suggested dance therapy can support mental health in correctional settings. For instance, a study which combined dance therapy with drama, art, and music therapy reported outcomes such as emotion regulation and improved self-image in young people engaged in

the justice system (Smeijsters et al., 2011). This finding could be further examined to help communicate the link between improved self-image and prosocial conduct in young people navigating the justice system. Tepper-Lewis also noted emotional expression and regulation as contributing factors when it comes to improving self-restraint in a younger participant group (2019, p. 173).

3.2. Therapeutic outcomes: dance therapy and addiction recovery

Additional findings from the literature on dance therapy and addiction recovery suggested similar benefits within social, emotional and psychological domains. Substance use is a core criminological risk factor (i.e. contributing to the risk of re-offending) and is therefore an aspect of human behaviour that is targeted in recidivist approaches. Given the close connection between drug and alcohol use, and, criminalisation, we have extracted additional data from the research literature to help position dance therapy as a necessary core support in the criminal justice system and within overlapping addiction recovery services.

- **Social and emotional expression:** Dance therapy supports people to explore and express their emotions and feelings in a safe and supported manner. In correctional settings and in addiction recovery, this often takes place in a group context which provides a social setting through which to express oneself and find meaningful connection with others.

In their study of a manualised therapy protocol Bourdon and Kirane (2024) described ways in which dance therapy might be integrated with cognitive behavioural strategies in addiction recovery groups. Participant attitudes and engagement pertaining to dance therapy were observed throughout the intervention and data was collected through observational and interview methods. Most participants reported receiving (some) positive benefits, while 23 % reported no benefit overall. Interview data suggested that participants benefited from the opportunity to express non-verbally through the use of dance/movement as they explored emotions and attitudes pertaining to addiction. In addition, the social context of the work was noted as participant reports indicated the importance of engaging with peers in movement psychotherapy. These findings are suggestive of emotional and social benefits which are important aspects of recovery. The authors provided an in-depth overview of how this was supported in practice, through a combination of dance therapy methods, CBT principles and mindfulness based approaches. Given the prevalence of addiction in the prison community alongside the core focus on addiction treatment as stipulated in the RNR model, Bourdon and Kirane's helps to position dance therapy as a much needed addition to addressing criminological risk and need factors in prisons and intersecting services such as addiction recovery support. This study is particularly noteworthy due to the author's focus on manualised protocols and the merging of dance therapy with CBT approaches, which is more likely to be embraced within addiction and criminal justice setting than traditional psychodynamic applications.

- **Changes to self-perception and self-image:** Self-perception refers to the ideas a person has about themselves and who they are (The Britannica Dictionary, 2024) and can be constructed through self-appraisal or external feedback from others; self-image is a related term which refers to the way a person thinks about themselves or sees themselves in term of their abilities or character (Britannica.com).

As well as supporting social and emotional expression, other studies on dance therapy and addiction pointed to positive changes in self-perception and self-image following. Reiland (1990) for instance reported positive improvements in women's perceptions of self, other, and their environment as observed through a short-term preliminary study.

⁴ The authors do not specifically define "young people", referring only to young offenders or young people "who have been committed by a juvenile court to an institution" (Smeijsters et al., 2011, p. 41)

In regard to self-image, Reiland discussed how dance therapy was used to access a sense of mastery and control over one's body, cultivate a more accurate body image and to "develop a more articulated sense of body boundary" (p. 351), which the author identifies as being a significant factor in supporting clients to cultivate a healthy sense of individuation. The research investigation was small in scale but provides some basis for considering dance therapy as a useful tool in improving self-perception, with the author going on to discuss the role of self-perception in fostering healthier attachments in women experiencing substance misuse. Attachment-based approaches to dance therapy can also help to address another area of risk and need as described in correctional services guidelines (i.e support for healthy attachment within family/partner relationships). Hence, this research study suggested that shifts in self-perception and self-image might also be linked to attachment and regulation patterns which is a meaningful outcome to consider in light of other known risk factors like family violence.

In addition to these findings from the research literature, Kirane (2021) explored practitioner attitudes and outlooks and discovered that, while dance therapists hold an optimistic outlook in regard to the use of this modality in addiction services, more training and understanding of how dance therapy supports recovery is needed. In a 25-question online survey Kirane (2021) learnt that many dance therapists see themselves as being positioned to contribute positively toward innovations in addiction care, mainly in the context of the US opioid crisis. Practitioner attitudes and outlooks are promising, yet the survey findings suggest that many dance therapy respondents did not report screening patients for substance use disorder on a regular basis, nor did they see themselves as providing addiction-focused interventions routinely; the same was found for the administration of naloxone and referral to addiction care services. Kirane's research suggests a high degree of openness and receptivity in the field of dance therapy when it comes to contributing to addiction recovery and the author therefore calls for more awareness of training opportunities to assist in the wider integration of dance therapy within addiction treatment services.

Kirane's (2021) recommendation is relevant to dance therapists looking to provide services to those in prisons and correctional facilities given the prevalence of substance misuse in prison cohorts. It is also relevant for dance therapy scholars to develop further research around the specific role this modality plays in supporting addiction recovery, as this will enable dance therapy to be better positioned within forensic treatment services where a strong focus on addiction support is stipulated within professional guidelines as per the risk and need approach. The next section focuses on the Risk-Need-Responsivity model (RNR) and contextualises the findings according to this dominant framework in order to more thoroughly locate dance therapy outcomes within an existing recidivist model.

Finally, when considering the research findings it is important to note that some studies reported on mixed arts applications whereby dance therapy was offered alongside or integrated with other art forms. This means there are some instances in the research literature where dance therapy could not be directly or causally related to positive results and some caution is therefore warranted when evaluating the current research. For example, Smeijesters (2006) and Smeijesters et al. (2011) reported on interviews undertaken with dance, music, art, and drama therapists: In these studies the dance therapy methods and therapeutic focus were described in a distinct manner and it was possible to obtain a sense of how dance therapy session structures and techniques/methods were used with clients and related to therapeutic outcomes – though readers should note that results were observational (i.e qualitative, naturalistic) and not quantifiable. For Kõiv, K. & Kaudne's (2015) study, dance therapy was offered as part of an overall creative arts application and it was more difficult to determine positive results with confidence in this instance given that the intervention involved a combination of all art forms. As we mentioned in our introduction section, we see a strong need for dance therapy specific studies in this area of research where the effects of dance therapy are clearly distinguished from other creative

arts modalities.

4. Two alternative frameworks

4.1. Traditional contextualisation using the risk-need-responsivity framework

In the state of Victoria, the criminal justice system utilises a Risk-Need-Responsivity (RNR) approach to support recidivism (Corrections Victoria, 2016a, 2016b). This theoretical framework was originally developed by Canadian researchers Bonta, Andrews, and Gendreau in 1990 and is now widely used in criminology to assess risk and develop treatment recommendations, including referrals to programs and services such as mental health, addiction support, housing and employment, family violence, sexual assault services and more. The RNR outlines several key risk factors that are frequently targeted in correctional services through careful case management and treatment support. Hence, the RNR model is known for its role as an assessment tool in crime prevention and correctional services and is used for both prediction and intervention purposes (Andrews & Dowden, 2007; Forensic Fundamentals, 2024). The RNR framework lists eight factors that are understood to lead to criminal activity, these being: 1. *Criminal history*, 2. *Anti-social personality patterns*, 3. *Pro-criminal attitudes and thoughts*, 4. *Pro-crime associates*, 5. *Family/partner relationships*, 6. *Lack of education and employment opportunity*, 7. *Lack of pro-social leisure/recreational activities* and 8. *Substance abuse* (Bonta et al., 1990; Corrections Victoria, 2016a, 2016b). Each of these areas are considered key domains of "criminogenic need" and are generally regarded as "problem areas that are changeable and so can be targeted to reduce the risk of reoffending" (Corrections Victoria, 2016b, p. 5). Following identification of dynamic or changeable risk-need areas (<https://forensicsfundamentals.com.au/topic/understandings/>) appropriate supports and referrals are sought such as psychoeducation, addiction support, psychiatric care, trauma counselling and more. A good example of this is substance use addiction which is considered a dynamic or changeable risk factor. Recovery supports for alcohol and drug addiction are therefore offered both inside prison and upon release, for instance whilst on parole and/or whilst completing community correctional orders. Addressing substance use addiction with prison cohorts is considered to be a vital aspect of targeting criminogenic need (i.e therapeutically addressing aspects of human behaviour that are thought to be changeable and dynamic). It is through that by addressing core areas of risk and need, re-offending is less likely to occur.

In the following table (Table 2) we use the RNR model to illustrate the ways in which dance therapy addresses key areas of criminogenic need. Using a process of deductive categorisation, we consider dance therapy to be capable of targeting at least half of the core risk-and-need factors identified by Corrections Victoria, including treatment for addiction which is listed as number eight in the RNR model. To help highlight the role of dance therapy in helping to target core risk areas we have sourced additional literature to enable us to elaborate on the relationship between dance therapy and criminological risk factors as defined by the RNR model. This includes perspectives from reviews, theoretical papers, and practitioner observation relevant to dance therapy and prisons (Batcup, 2013; Meekums, 1991; Milliken, 2002, 2008; Oktay, 2001; Seibel, 2008), family violence (Devereux, 2008; Leventhal & Chang, 1991; Meekums, 1991), substance misuse (Kirane, 2018, 2021; Milliken, 1990; Potocek & Wilder, 1989) and community correctional services (Dumaresq, 2023). We see practice observation and theoretical literature as a form of practice-based evidence (Aigen, 2015) which offers a more proximate, context-specific and situated account of how dance therapy is applied and received in correctional and addiction services. As such, we draw together empirical findings as well as therapist observation in Table 2 to contextualise dance therapy through the lens of criminogenic risk and need.

As well as the above criminogenic needs listed in Table 2, the RNR

Table 2
Criminogenic needs and dance therapy.

Case management goals	Dance therapy literature
Eight criminogenic needs (risk factors)	Research question: How can dance therapy to support criminogenic risk and need factors, based on evidence and/or anecdotes from the literature?
1. Criminal history	N/A.
2. Anti-social personality pattern	The use of Motivational Interviewing (MI) can be integrated into dance therapy models. This can be beneficial in supporting clients to identify and differentiate of thoughts, feelings, sensations, and actions through a creative and embodied approach (Kirane, 2018). This may also help support insight and awareness around anti-social personality patterns, laying the foundations for further therapeutic work. Furthermore, dance therapy can: Support clients to gain a sense of distance from their own aggression and deepen self-understanding through improved bodily awareness (Koch et al., 2015). Dance therapy may help to: Reduce episodes of aggressive or violent behaviour (Koiv & Kaudne, 2015) and partially improve self-restraint (Tepper-Lewis, 2019). Explore somatic sensations linked to anti-social behaviors and finding alternate ways to express and communicate (Smeijsters & Cleven, 2006). Develop new movement patterns which can assist in recalibrating anti-social behaviours and strengthening pro-social competencies (Milliken, 2002; 2008).
3. Pro-criminal attitudes and thoughts	Dance therapy can be used as a specialised assessment and treatment option (Batcup, 2013). Dance therapy research suggests that the use of dance therapy in correctional contexts may help to address factors relating to pro-criminal attitudes and promote pro-social communication through: Improving pro-social attitudes and behaviours, including social competencies (Koch et al., 2015; Koiv & Kaudne, 2015). Partially improving self-restraint which can help reduce the risk of conduct disorder (Tepper-Lewis, 2019). Regulating and discharging negative emotion through dance/movement, including anger and aggression, which may help to improve self-image and overall emotional state (Smeijsters et al., 2011).
4. Pro-criminal associates	N/A. Lack of evidence to support this area of risk/need.
5. Family/partner relationships	Dance therapy can support healthier family/partner relationships, and provide resourcing to cope with the bodily trauma associated with abuse and oppression through: Helping to “re-choreograph” (Devereux, 2008) dynamics of abuse in family relationships where women and children have experienced domestic violence. Increasing feelings of self-worth and agency and to transform feelings of helplessness, ambivalence, and immobilisation into self-empowered action (Leventhal & Chang, 1991). Cultivating healthier and more secure attachments between care givers and children (Meekums, 1991). Using attachment-based approaches to help clients self-regulate emotions by providing education around how the body itself can become a resource for healthier self-regulation (Devereux, 2008).
6. Education/employment	N/A.
7. Lack of pro-social leisure/recreational activities	Dance therapy is a mind-body intervention that integrates “physical elements of exercise and psychosocial therapeutic components” (Ho et al., 2018, p. 2). Dance therapy offers pro-social therapeutic support which can be integrated within a leisure-focused or recreational approach to

Table 2 (continued)

Case management goals	Dance therapy literature
	therapy. Anecdotal evidence suggests that, following regular dance therapy sessions, participants present as “more communicative, with their muscle tone relaxed and their interpersonal skills improved” (Seibel, 2008, p. 109). Dance therapy can be used as a trauma-informed approach to help promote physical exercise, relax the body and mind, and, have fun (Dumaresq, 2023). Client-led movement, dance and rhythmic activities allow for self-expression without judgement (Oktay, 2001).
8. Substance abuse	Dance therapists possess an open and positive attitude regarding the integration of their skillset within an addiction support context (Kirane, 2021). Dance therapy can help to address substance use and addiction through: Combining dance/movement with cognitive behavioural and mindfulness-based approaches to support social and emotional outcomes (Bourdon & Kirane, 2024). Identifying and expressing a clients’ motivation to change through creative movement; dance therapy can be used as part of a Motivational Interviewing (MI) approach (Kirane, 2018). Transforming addictive patterns and behaviours through experiencing altered mind states without the use of drugs or alcohol (Fisher, 2005). Translating The 12 Step recovery program into movement form (Potocek & Wilder, 1989) which allows clients to explore alternatives to drug taking through a creative medium. Exploration of topics relevant to addiction recovery (i.e. fear, control, ambivalence and loss) can be addressed through dance therapy warm-ups, group development, and thematic exploration (Milliken, 1990). Improving self-perception and self-esteem (Reiland, 1990) which may assist in supporting the overall recovery process.

framework highlights several non-criminogenic needs which are important to consider. These factors include a lack of accommodation and employment possibilities, or day-to-day barriers such as lack of transportation and childcare. Other concerns include physical health conditions, as well as emotional and mental health challenges. Table 3 connects findings from the dance therapy literature with the above areas of non-criminogenic need. Again, we draw on additional literature (i.e. Barton, 2011; Koch et al., 2007; Koch et al., 2019a; Fenner et al., 2017; Martin et al., 2018; Meekums et al., 2015; Punkanen et al., 2014; Christopher et al., 2024) to illustrate how dance therapy might address specific categories of non-criminogenic risk and need.

As seen in Tables 1, 2, and 3, the literature supports the use of dance therapy in addressing key areas of criminogenic need – including addiction recovery – as well as areas of non-criminogenic need. Access to dance therapy in prisons, forensic units and addiction centres is therefore a viable strategy which may help to address key risk-and-need areas. While the volume of literature reviewed in this literature review is limited, it does suggest overall positive, albeit modest, results. Further research is needed to understand how dance therapy might positively impact on mental, emotional, and social wellbeing in prisons as well as support withdrawal and recovery from addiction. This could then be studied in correlation with other behavioural elements such as prosocial cognitions, attitudes, and behaviours.

4.2. Alternative contextualisation using the Good Lives Model (GLM)

We now present an alternate reading of the literature which we have contextualised through the lens of The Good Lives Model (GLM): The

Table 3
Non-criminogenic needs and dance therapy.

Case management goals	Dance therapy literature
Non-criminogenic needs (other risk factors)	Research question. How can dance therapy to support criminogenic risk and need factors, based on evidence and/or anecdotes from the literature?
Practical and material needs (childcare, accommodation, transportation, clothing, finances). Physical, emotional, and Psychological needs	N/A.
Mental health	Dance therapy takes a body-mind approach which views physical, emotional, and psychological health as interconnected. Dance therapy helps to: Direct attention toward body awareness and promote healthy insight into recognising emotions as they manifest somatically (Koch et al., 2015). This lays a solid foundation for further mental health work. Provides both physical benefit as well as emotional and psychological wellbeing: while dance-for-wellbeing interventions typically focus on physical outcomes such as functional mobility, gait or balance, dance therapy outcomes highlight psychological gains (Koch et al., 2019). This suggests that dance is supportive of physical, as well as emotional and psychological needs. Dance therapy has been associated with: Improved stress management and coping abilities (Barton, 2011; Martin et al., 2018) Reductions in anxiety, depression and/or psychological distress (Koch et al., 2007; Punkanen et al., 2014). Improving psychotic symptoms and anger control during episodes of psychosis – along with other creative arts therapies (Fenner et al., 2017). Improving symptoms of general depression (however, only a small number and low quality of studies (Meekums et al., 2015). Improvements in management strategies for treatment-resistance depression (Christopher et al., 2024).

GLM was originally developed by New Zealander, Tony Ward, who first published on this model in 2002. Nowadays the GLM is widely used in correctional services and aims to reduce recidivism by promoting personal goals, values, and strengths within the rehabilitative process. Ward himself described his framework as a “constructive, strength-based capabilities approach” (2002a, p. 172) which draws on elements of the risk management approach yet offers a more resource-focused and strength-based perspective to that of the RNR. The GLM is rooted in positive psychology and highlights protective factors or “primary goods” (Ward, 2002a, p. 173) which refer to areas of human existence and experience considered to be beneficial and associated with heightened wellbeing. Readers may detect that the values and principles expressed through the GLM are also congruent with those of the recovery model (Anthony, 2007; Jacob, 2015; Slade et al., 2008). The recovery model is widely utilised within the mental health sector, with the concept of personal recovery occupying a central role in this framework. Developing and defining one’s own purpose in life one’s life and experiencing a sense of mastery or autonomy (i.e personal recovery) is considered an important aspect of rehabilitation in general and the recovery paradigm has therefore become a more prevalent way of thinking within forensic mental health (Lutz et al., 2022). As such, frameworks such as the GLM and the recovery model are relevant for those working in correctional services, mental health, and addiction care services.

In the state of Victoria for instance, professional guidelines refer to the GLM as a key theoretical influence and highlight the importance of primary goods within case management. Community connectedness, joy, pleasure, play, creativity, community and sense of belonging are

thought to be integral to offender⁵ rehabilitation and recidivism (Corrections Victoria, 2016b, p. 10) and complementary to a risk management approach. The core principles of the GLM - *life, knowledge, excellence in play and work, agency, inner peace, and relatedness* –also reflect more humanistic approaches to therapy than that of the RNR model which is more behaviourally focused. Humanistic therapy takes an “abundance-oriented” approach (Rowan, 2002, p. 77) which contrasts with the problem-oriented and deficit-focus of the RNR. Unlike the RNR model which focuses largely on behaviour and cognitions, the GLM is underpinned by the concept of basic human good and sees life satisfaction and personal strengths and resources as important components of living a good life that is rich in meaning, dignity and agency. In many respects, a good life requires access to external – as well as personal – resources and the right sets of conditions in which to flourish: Such contextual factors will be explored in our critical discussion to follow.

In terms of aligning the dance therapy literature with traditional perspectives on offending and rehabilitation, dance therapists can draw on the GLM principles in combination with the RNR mode to communicate the relevance of dance therapy through a combined risk-need and humanistic/strengths-based perspective. This model is useful for practitioners as it communicates the benefits of dance therapy in a manner that is congruent with person-centred values and principles. Practitioners can feel confident in advocating for the profession in ways that speak the language of the justice system - and that of mental health and addiction care services - and does so in a way that aligns with a more humanistic approach to therapy.

Table 4 includes data from the research literature reviewed, as well as as practitioner observations/practice reflections, and some perspectives from the broader dance therapy research archives. In Table 4 we intend to highlight the ways in which dance therapy can help to strengthen key protective factors such as play, peace, and relatedness, and as such, contribute toward personal and functional rehabilitation and recovery. Again, this resource is intended for practitioners to use and offers a concise overview of how the dance therapy literature supports humanistic and recovery-focused outcomes in correctional and addiction services. For example, literature from dance therapy and addiction care suggests that changes to self-perception may be linked to group dance therapy experiences (Reiland, 1990): This finding alone connects with the GLM’s definition of agency i.e. connecting with one’s autonomy, power, and self-directedness. Another finding from the dance therapy and addiction literature suggests that cognitive behavioural strategies and mindfulness-based approaches can be integrated into dance therapy programs, and that this can support the recovery journey through strengthened peer connection and creative expression of one’s addiction and path to recovery (Bourdon & Kirane, 2024). We believe that such experiences gained in dance therapy sessions can contribute toward greater inner peace, agency, relatedness to others, pleasure, and other facets of the GLM as elucidated in Table 4.

⁵ The term “offender” is used consistently in the criminal justice sector to describe people who have committed a crime. Despite our discomfort with this term, we have purposefully adopted this language in our systematic review to align with the terminology used in the literature as well as within the correctional sector. Our intention in developing a systematic review was to comply with the demands of the sector, including the key terms used within the system. As part of our two-step approach to reviewing the literature we intentionally contrast traditional problem-focused perspectives with a more critical and humanistic orientation and go on to offer suggestions for more inclusive language in our discussion section. While the use of key correctional terms such as “offender” may present as a conceptual challenge to the reader we wish to convey that our use of language is intentional and congruent with the methodology of crystallization: that being the illumination and juxtaposition of different epistemological perspectives within the one text.

Table 4

The Good Lives Model and dance therapy.

GLM domain		Dance therapy principles, processes and/or aims
Life	<i>Including healthy living and functioning</i>	Dance seeks to promote healthy living and holistic wellbeing using dance and movement to support the physical, emotional, social, cognitive and cultural wellbeing. Dance therapy offers a creative medium through which to: Practice social and independent living skills (Barton, 2011) Improve overall “vitality” (Koch et al., 2007; 2014) and quality of life through client-centred, movement-based therapy Integrate cognitive behavioural principles and mindfulness-based activities into a healthy pursuit such as dance (Bourdon & Kirane, 2024). Dance therapy can be used as part of a multidisciplinary approach to assessment and referral. Dance therapists can work with clients to: Identify key issues through somatic activities and creative movement and work to transform destructive behaviours into more positive expressions (Smeijsters & Cleven, 2006) Promote healthy self-awareness (Barton, 2011) and self-perception (Reiland, 1990) Cultivate positive self-image and emotions through insight and expression of feelings (Smeijsters et al., 2011) Collaborate with both clients and other service workers, acting as a “bridge” for further referral (Kirane, 2018)
Knowledge	<i>How well informed one feels about things that are important to them</i>	Dance therapists can: Use structured play (Kirane, 2018) to address health and wellbeing issues and can provide recreational opportunities for clients wishing to participate in creative and inclusive dance sessions. Emphasis the role of peer group connection which has been found to be beneficial for people engaging in addiction recovery (Bourdon & Kirane, 2024) and correctional centres (Koch et al., 2015). Encourage a pro-social approach to dance which focuses on fun and enjoyment, relaxation, exercise, and positive social engagement (Dumaresq, 2023).
Excellence in play	<i>Hobbies and recreational pursuits</i>	Dance therapists can: Use structured play (Kirane, 2018) to address health and wellbeing issues and can provide recreational opportunities for clients wishing to participate in creative and inclusive dance sessions. Emphasis the role of peer group connection which has been found to be beneficial for people engaging in addiction recovery (Bourdon & Kirane, 2024) and correctional centres (Koch et al., 2015). Encourage a pro-social approach to dance which focuses on fun and enjoyment, relaxation, exercise, and positive social engagement (Dumaresq, 2023).
Excellence in work	<i>Including mastery experiences</i>	Dance therapy offers an opportunity for clients to: Experience mastery at the most basic level - the body (Milliken, 2002). Understand bodily ‘resources’ (Meekums et al., 2015) through trauma-informed psychoeducation; this can help to promote skill-acquisition in the domains of self-regulation and self-mastery within a body-centred framework. Experience mastery of one’s inner experience including the ability to exercise self-restraint (Tepper-Lewis, 2019)
Excellence in agency	<i>Autonomy, power and self-directedness</i>	Dance therapy can help support: Personal autonomy, though

Table 4 (continued)

GLM domain		Dance therapy principles, processes and/or aims
Inner peace	<i>Freedom from emotional turmoil and stress</i>	exploring healthy individuation and building self-esteem (Leventhal & Chang, 1991). Transform dynamics of helplessness, shame or guilt reconnect with a personal sense of power; this can encourage feelings of agency associated with developing a stronger sense of self through dance and movement activities (Leventhal & Chang, 1991). Ability to regulate emotions and actions which can lead to more satisfying social relationships and support healthy self-esteem (Koiv & Kaudne, 2015).
Relatedness	<i>Including intimate, romantic, and familial relationships</i>	Dance therapy may help to: Support and help stabilise the sympathetic nervous system (Koch et al., 2007, p. 341). Enable clients to feel more “comfortable,” “peaceful,” and “not self-conscious” (Barton, 2011, p. 168). Provide a creative approach to stress management (Martin et al., 2018); dance therapy includes specific activities and exercises focused on relaxation (Koiv & Kaudne, 2015, p. 9; Potocek & Wilder, 1989, p. 42). Dance therapy is focused on: Improving relationships (Barton, 2011; Batcup, 2013) Finding new ways of relating to one another (Devereaux, 2008). Stimulating social connectivity through peer empathy and relationship and encouraging safe expressions of shared intimacy through techniques such as ‘mirroring’ (Fisher, 1990)
Community	<i>Connection to wider social groups</i>	Current gap in the literature under review. More research on post-incarceration and dance therapy are needed.
Spirituality	<i>In the broad sense of finding meaning and purpose in life</i>	Through heightened, or peak experiences in dance, clients may discover: An aspect of healing which is sometimes described as spiritual (Perlmutter, 1992, p. 47). Ways of addressing existential questions which enables clients to make “meaningful connections” between dance and presenting life situations (Leventhal & Chang, 1991, p. 140)
Pleasure	<i>Feeling good in the here and now</i>	Dance therapy is associated with: Elevated mood states which support the experience of pleasure stimulating “vitality” including joy and lust for life (Koch et al., 2007). increased motivation, coping, strength, energy, and enjoyment increased, and decreased depression, lifelessness, anxiety, tension and tiredness decreased (Koch et al., 2007, p. 347).
Creativity	<i>Expressing oneself through alternative forms</i>	Play, aesthetic experience, authenticity, nonverbal communication, symbolising and creativity are suggested therapeutic mechanisms across all arts therapies (Martin et al., 2018). Dance therapy is:

(continued on next page)

Table 4 (continued)

GLM domain	Dance therapy principles, processes and/or aims
	A creative resource-oriented approach which may assist clients to use and gain strength in nonverbal modes of expression (Koch et al., 2007). A medium through which feelings and emotions related to addiction or other issues can be shared via movement and creative non-verbal communication (Bourdon & Kirane, 2024).

5. Discussion

So far, we have utilised traditional perspectives to position dance therapy as a viable service in prisons and related settings like addiction care. To do so, we have aligned our thinking with the medical model and have used commonly accepted frameworks to contextualise our systematic review findings. Now, our two-step perspective invites us to *chassé pas de bourrée* toward a more critical angle where we begin to question some of the assumptions of the medical model and moreover, offer alternatives and emerging recommendations for practice. Our rationale for centring the medical model as a focus for our critique reflects our understanding that the current dance therapy research on prisons and addiction care, as well as theoretical papers and practitioner reflections, largely assumes a medicalised stance when conceptualising the role of dance therapy in correctional and addiction recovery services. In order to highlight some of the limitations of medical, or treatment, approaches to dance therapy in this sector we will firstly commence with a description and analysis of the role of the medical model in therapy before offering recommendations that are focused on developing more critical, collaborative and contextually-informed approaches to research and practice in this area.

5.1. The expert model in healthcare

In our discussion we use the term *medical-behavioural paradigm* to point toward a traditional perspective that emphasises therapeutic change at an individual behavioural level and is nested within an expert-driven and biomedical approach to the treatment of illness and disease. This terminology is our own, though others have written extensively on the limitations of the biomedical model, such as Engel (1977), whose call for a new medical model continues to find resonance in our thinking. Our view is informed by Engel as well as others in our creative arts therapy profession who have eloquently questioned implicit assumptions within the medical model (Aigen, 2015; Allegranti, 2015; Rolvsjord, 2006) as well as dominant narratives in a more general sense (Hadley, 2013; Sajjani et al. 2017).

Before delving into a critical discussion, it is worth firstly defining the medical model. A clear definition is articulated by Rolvsjord et al. (2005) who describe the “medical model of psychotherapy” (p. 19) as a meta-perspective within westernised approaches to healthcare. According to our colleagues, the medical model positions the therapist or clinician as an expert who “defines the problem or deficit and knows what the best procedure is to use in order to change or mend it” (Rolvsjord et al., 2005, p. 19). Synonymous with the medical model is the construct of the treatment plan. Treatment planning typically includes referrals, assessment, goal setting, intervention, documentation, and evaluation. Clinicians play a key role in designing, delivering, evaluating, and reporting on therapeutic outcomes and patient progress within a treatment model approach to care. Their role may also include diagnosing and treating pathologies and assessing and communicating changes in a patient/inmate’s presentation to a wider treating team.

As we reviewed the literature we observed that the notion of *treatment* features strongly in the dance therapy literature, suggesting a medical model approach to therapy. Our colleagues refer to treatment methods (Smeijesters & Cleven., 2006), treatment theories (Smeijesters et al., 2011) and articulate a desire for outcome-focused and efficacy-based research (see Abbing et al., 2023; Batcup, 2013; Koch et al., 2015; Kõiv & Kaunde, 2015; Meekums & Daniels, 2011). We are not surprised to encounter a clear emphasis on medical and treatment perspectives in the literature given the criminal justice system typically promotes behavioural based and expert-led therapies and assumes a treatment stance in relation to patients/inmates. While we accept the medical model as an important feature of our healthcare system, we nonetheless wish to draw attention to some of the limitations of this paradigm, particularly as it intersects with prisons and correctional settings in which power is notably and asymmetrically skewed.

While the expert-model of care enables clinicians to better understand and implement evidence-based treatment options, we suggest that in the context of prisons and correctional units, an expert-approach can further entrench pre-existing and unequal power dynamics between researchers and participants (or therapists and clients). Relationships between therapists/clients, researchers/participants, and correctional staff/offenders are inherently unbalanced in these settings, and therapy itself may in fact be viewed as a form of carceral control. Results from a recent study by Preston et al. (2022) for instance reveal that people in prison may see mental health services as more likely “serving the goals of the prison system, including control and punishment” (p. 1) rather than promoting healing and empowerment. Furthermore, therapy services delivered in prisons may be experienced as punitive, rather than therapeutic, by people in prison as they can be withheld or offered in a manner suggestive of an underlying reward-system (i.e., therapy may be made available or denied to promote compliance and prosocial behaviours). Psychological therapies may also be mandated in forensic facilities which can amplify carceral authority and minimise individual choice and control. While dance therapy and other arts therapies arguably offer a more holistic approach to forensic mental health care, practitioners should remain alert to the constraints of the correctional system, including the ways in which the prison apparatus - by its very nature - clashes with deeply held therapeutic principles of empowerment and personal agency (Preston et al., 2022).

Resultant Recommendation: We encourage dance therapy researchers and practitioners to consider how they might choose to share power with people in prison through more collaborative approaches to practice-based research. Journeying “beyond the role of the expert therapist” (Rolvsjord, 2006, p. 12–13) entails centring participant voice and experience to better understand the perspectives, desires, needs, frustrations, goals, and recommendations of imprisoned people. Further integration of client narratives within the research literature would also help to shine a light on topics that are pertinent and pressing to people held in custody. We see the incorporation of direct lived experience as vital in prisons and forensic mental health research and believe this may go some way to addressing unequal power relationships between researchers and participants, and subsequently, between therapists and clients in a professional practice context.

5.2. The expert model and the limitations of individual behaviour change

Honouring lived experience and centring the voices of people in prison is important, as is recognising that criminality and correctional intervention(s) take place within a complex web of interlocking socio-political relationships. Australian criminologists, Carlton and Segrave (2013) see the behavioural/evidence-based “what works” model as problematic as it decontextualises the individual from the socio-political context and proposes a reductionist theory of change when it comes to recidivism (i.e. the ceasing of offending behaviours). This critique is echoed in critical trauma and mental health literature, for instance, Tseris (2019) describes the way in which the medical model

“invisibilizes” socio-political contexts in trauma discourse, meanwhile over-focusing on individual deficits and problems (Tseris, 2019, p. 8).

As we reviewed the research literature in the field of dance therapy, we noticed a strong emphasis on individual deficits and problems in discourse, which led us to consider both the strengths as well as limitations of individual behavioural change as an underlying assumption or theory in both research and practice. To firstly summarise some of the strengths of behavioural change as seen in the research: Koch et al. (2015) were able to articulate a reduction in levels of anger and aggression, as were Kõiv & Kaudne (2015), who evaluated changes in aggressive behaviour and other emotional and behavioural challenges. In a similar vein, Smeijsters & Cleven (2006) associated dance therapy with a reduction in frequencies of destructive behaviour (Smeijster et al., 2011) and Tepper-Lewis (2018) measured weekly behaviour ratings and found that self-restraint was partially improved following dance therapy sessions. This is valuable information which shows a promising relationship between dance therapy practice and behavioural change outcomes. For those wishing to offer this service within a forensic context it is important to be able to understand and articulate the research findings which help position dance therapy as a viable therapeutic option in prisons and correctional services, particularly from a behavioural perspective.

We would argue however that an over-reliance on behavioural theories of change neglects seeing individuals in-context to other realities and therefore risks separating the personal and psychological from complex political, social, material, economic, and other external (and yet intersecting) realities. From a social constructivist perspective, the over-focussing on offending conduct in prison populations places disproportionate emphasis on the needs and behaviour of individuals (Carlton & Baldry, 2013, p. 62) which in turn, separates the person from their surrounding socio-political context. This contributes toward a reductive understanding of criminality which places blame on the individual, yet not on the systems which contribute toward criminalisation in the first place. In some cases, systemic inequity compounds or exacerbates pre-existing inequities which are correlated with criminality, such as socio-economic disadvantage and racial profiling. For example, Indigenous Australians are overrepresented in prisons and secure units at a nationwide level which indicates entrenched race-based disadvantage and marginalisation. In fact, Baldry (2013) refers to the criminalisation of Indigenous peoples as a form of continued and systemic discrimination which she, and others (Baldry & Cunneen, 2014) attribute to colonial structures and patriarchy.

Other limitations of the medical-behavioural model in criminology relate to the constraints of behaviour change theory; for some, this leads to an overly “responsibilizing” view of the individual (Kerr & Moore, 2013, p. 126), a term that is more colloquially referred to as victim blaming (Wakefield & Fleming, 2009). Victim blaming occurs when socio-political contexts and complex interlocking factors are downplayed which, in this instance, manifests as reductive and individualising narratives of risk-and-need. These simplified explanations or narratives suggest that people, and not systems, require adjustment, treatment, and correction. While it remains reasonable to focus on individual behavioural change in dance therapy - such as improved social competence and emotion regulation - we should not neglect to analyse, or at least recognise, the ways in which material inequalities, racism, colonisation, poverty, socio-economic disadvantage, and other situational and contextual factors seriously impact on well-being at the individual level, including in prisons and in addiction recovery contexts.

Resultant Recommendation. We encourage researchers and practitioners to consider the ways in which dominant narratives and models within the prison sector place disproportionate focus on the need and the behaviour of individuals and in doing so, often fail to address the structural, material, and systemic contexts of widespread incarceration. We suggest that a stronger focus on systems analysis and intersectional frameworks could be incorporated into dance therapy research to illuminate the numerous ways in which personal recovery is inextricably

linked with external factors such as public policy, social attitudes, racial discrimination, economic disparity, and other contextual factors and socio-historic circumstances.

5.3. The expert model and the march of medicalisation

Reflecting on the dance research literature, we also observed a strong reliance on medicalised language to describe people in prison, their issues, and the need for targeted and specialised treatment interventions. *Medicalisation* is a sociological term referring to the way in which human circumstances, challenges, problems, and behaviours (such as offending) become viewed as medical issues and hence, are treated as such. From a critical and constructivist standpoint, medicalisation denotes the expansion of biomedical assumptions and beliefs into non-medical arenas, such as prisons, schools, workplaces, or any other area of life. Conrad, Bergey (2015) offer a clear definition of the term when they say: “Medicalization means ‘to make medical’ or more specifically the process by which previously nonmedical problems become defined and treated as medical problems, usually as diseases or disorders” (2015, p. 105).

Mental health is in fact, one of the most medicalised aspects of human life (Maturro, 2015, p. 126). This is typically expressed through the language of risk-and-need whereby “risk may be connected to the individualization of social problems, biological reductionism, and the shifting borders between normal and pathological” (Maturro, 2015, p. 126). Through the language of risk-and-need, medicalised discourse in prisons and forensic mental health actively normalises and naturalises the use of medical-behavioural interventions. This can include dance therapy, particularly when framed as a specialist assessment and treatment service. By focusing on risk, need, and specialist therapeutic intervention, we see existing dance therapy research as aligning with dominant medicalised health narratives. While people in prison may of course experience medical (and possibly psychiatric) challenges and ill health, we suggest that an *over-reliance on the medical-behavioural paradigm risks falsely conflating non-medical experiences, such as expressions of anger or displeasure, with diagnostic labels requiring medical-behavioural interventions.*

5.4. Medicalised and clinical language

Finally, language plays an important role in framing and shaping the way in which therapists view, approach, and represent the people they work with. Discursive elements of one’s environment – i.e., the language and logic used to convey ideas and reasoning – can be deeply impactful in terms of how therapy is conceptualised, offered, and received (McFerran, 2020). Although contemporary mental health frameworks now place greater focus on consumer-led care and articulate a need for collaborative involvement in treatment planning (Department et al., 2023) there nonetheless remains a strong emphasis on expert-models of care in prisons and correctional units. The expert model, when paired with the distanced, clinical, sterile, and rather “arid” tone of prison research (Jewkes, 2014, p.388) paints a picture of us (clinicians) and them (offenders) and can result in a form of discursive othering. Clinical narratives and medicalising language may subtly, yet profoundly, reinforce experiences of institutionalisation and control; this is clearly at odds with the liberatory focus of creative and expressive therapies. While dance therapy can certainly be experienced as empowering for the individual, we shouldn’t lose sight of the fact that language, particularly medicalised jargon and clinical discourse can serve to stigmatise or “other” people in prison. It can also inadvertently amplify people’s sense of institutionalisation (Carlton & Baldry, 2013, p. 56), objectification and overall sense of disenfranchisement.

5.5. Resultant recommendation

We encourage practitioners and researchers to consider the ways in

which language matters, particularly in the case of prisons and forensic psychiatric units where medical thinking is prominent. For example, *alternative ways of describing people in prison could be: participants, group members, clients, or simply, people*. In addition, we echo the call for more reflexive and emotion-based research in prisons to challenge the disembodied and objectifying tone of dominant criminological narratives (Jewkes, 2014, p. 390).

5.6. Other concluding recommendations: attending to socio-political context

As well as attending to the language used to represent participants, remaining vigilant to the ways in which dominant narratives shape discourse and practice, and adopting a collaborative stance in relation to research participants/clients, we wish to conclude with some additional comments and recommendations regarding consideration of social and political contexts for those pursuing research in this area.

As we engaged with the research studies, we discovered there to be a lack of emphasis on social-political context/s in the systematically reviewed papers (see final column, Table 1). In fact, none of the papers we reviewed considered larger socio-political context/s when discussing client issues, therapeutic focus, or reporting on study findings. Going forward, future research could aim to incorporate a focus on socio-political forces throughout different stages of the research process. This could include consideration of broader context within literature reviews, or when discussing one's research paradigm (be that objectivist, interpretivist, or mixed-methods). This could also be incorporated into the methodological processes such as collecting and analysing data, and within the presentation of findings. Researchers electing to pursue more objectivist research methodologies may find this less relevant for their work given the pre-eminent focus on individual change in quantitative research, though we nonetheless encourage all scholars to consider, at least to some degree, the way in which their research is situated within a broader socio-political context and how this informs the types of questions being asked, the types of research designs selected, the manner through which findings are communicated, and the overall framing of the issue. Whether electing to undertake objectivist, interpretivist, or mixed approaches, we encourage researchers to consider ways in which they might choose to make transparent their reasons behind selecting particular issues or behaviours for study and to discuss these issues or behaviours not only from an individual perspective, but a more contextualised standpoint which takes into account the ways in which individual behaviour and systems interact. For instance, scholars could speak to the impact of institutionalised trauma on people held in custody and the ways in which people of marginalised races, genders, abilities, class, social status, religion, etc can be more adversely impacted than others. Here, it would also be prudent to discuss or examine ways in which systems-change and transformation must also be prioritised, as well as individual change.

Given that objectivist approaches to research in this area of study are more prevalent than other types of enquiry we also recommend that more qualitative or mixed-methods research be undertaken in this area to help provide a more balanced understanding of how and why dance therapy may be useful in this context. Such studies could incorporate into their research methodology a focus on elevating participant voice through qualitative interviews or other arts-based methods of capturing personal experience. These voices and experiences could then contribute toward more systems-focused analyses of how dance therapy might contribute toward systemic change in the correctional sector. For instance, forensic mental health centres now aim to incorporate a stronger focus on personal recovery in their approach to rehabilitation (Lutz et al., 2022) meaning that participant voice is seen as an increasingly important aspect of research undertaken in secure psychiatric units. One example of this can be found in the Victorian correctional system (Forensicare: Model of Care <https://www.forensicare.vic.gov.au/model-of-care/>) where the current model of care positions

personal recovery – which is subjectively defined - as core to rehabilitative success. This emphasis on personal recovery (alongside clinical and function rehabilitation) is felt more strongly in forensic mental health than in mainstream prisons given the influence of the recovery model in psychiatric care, though the prison sector as a whole would benefit from more focus on personal recovery. This topic lends itself well to mixed method designs or qualitative research.

We readily acknowledge however the continued requests for evidence when it comes to introducing dance therapy into such settings and the pressures that researchers face when attempting to undertake studies in this area. Ultimately we believe that a diverse approach to research which encompasses measurable and statistical data as well as qualitative and critical narratives will help lead to a more nuanced understanding of how our work can be supportive in prisons, correctional facilities and in addiction support.

6. Conclusion

In this article, a systematic literature review of dance therapy in prison contexts revealed modest yet positive outcomes and displayed a consistent focus on pro-social competence and reduced anger, aggression, and self-restraint. The Risk-Need-Responsivity (RNR) model was used first to map research findings onto a theoretical framework used widely within the Victorian justice system. The Good Lives Model (GLM) was then introduced and formatted into a table (Table 4) to assist practitioners in articulating the benefits of dance therapy in accordance with a humanistic and person-centred framework. We then offered a critique of the dominant (medical) model and examined some of the inbuilt limitations of the medical-behavioural paradigm. To balance our critique, we offered an emerging set of recommendations for further practice and research, many of which focus on the need for more collaborative models for engaging people in prison, and in related areas such as addiction recovery. We also described some ways in which future research projects might consider socio-political context as part of the research process, be that throughout the entirety of the project or within specific parts such as writing a literature review or collecting and reporting on data and findings.

There are always complex structural, cultural, and institutional forces at play in research and this invariably influences the way in which academics might choose to approach a given topic. Researchers may choose to align with dominant contextual factors such as government policy and institutional paradigms – as we attempted to do by undertaking a systematic review maintaining objectivist standards - or they may equally decide to challenge the dominance of such influences in their field (McFerran, 2018, p. 53–54). We have aimed to challenge such dominance and to use the idea of crystallization to introduce diverse and sometimes contradicting perspectives together to paint a broad and layered picture of the topic at hand. We hope this review, and our attempts to *chassé pas de bourrée* between two distinct perspectives has helped readers to synthesise, crystallise, and critically consider ideas from the literature. Moreover, we hope that it will go some way toward encouraging a diversification of approaches when it comes to research and practice within criminal justice and related spaces. We look forward to further developments around the use of dance therapy in these contexts and envisage a future where more people have access to this modality and the benefits it offers.

CRediT authorship contribution statement

Katrina McFerran: Writing – original draft, Validation, Supervision, Methodology, Conceptualization. **Ella Dumaresq:** Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Conceptualization.

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Data availability

Data will be made available on request.

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Forcibly displaced adults' perspectives on change mechanisms after a resilience-building art therapy intervention

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ABSTRACT

Preventive interventions aimed at learning to cope with psychological stressors and building resilience could benefit most forcibly displaced persons (FDP). Limited research has been conducted to examine the usefulness of resilience-building art therapy for FDP. The aim of this exploratory study was to investigate the perspective of adult FDP on the process of change after a resilience-building art therapy intervention, i.e. to (a) identify the positive changes they experience, (b) the associated therapeutic factors, and (c) the mechanisms they believe to be responsible for these changes. An exploratory qualitative study using thematic analysis with descriptive quantitative data was conducted with 11 adult FDP who received an eight-session resilience-building group art therapy intervention. The participants identified three positive changes: (i) felt calmer, (ii) strengthened emotional skills and (iii) reinforced self. The results also highlight multiple therapeutic factors and some combinations of these, which could be possible change mechanisms. The authors suggest replicating the research to confirm and complete the results.

Introduction

According to the United Nations High Commissioner for Refugees (UNHCR), there were worldwide more than 110 million forcibly displaced people (FDP) at mid-2023, and this figure continues to escalate (United Nations High Commissioner for Refugees, 2023). Due to exposure to violence and forced migration, which are considered some of the most severe stressors, prevalence rates for self-reported anxiety, depression, and post-traumatic stress disorder (PTSD) are substantially higher than those reported in non-FDP population (Henkelmann et al., 2020). It is therefore highly desirable to offer interventions that strengthen their resilience. Interventions such as verbal psychotherapy or counseling are difficult to implement with this population due to the language barrier and a general shortage in multi-lingual culturally informed therapists (Feen-Calligan et al., 2020). By favoring non-verbal expression and drawing on the arts, a resource found in all cultures, art therapy (AT) has the potential to be particularly well accepted by this

audience (Rowe et al., 2017). However, we still know very little about what aspects of AT interventions work for this audience as few studies have been carried out to date (Annous et al., 2022). Before we can deliver AT interventions on a larger scale, more knowledge is needed to understand the therapeutic change process, i.e. the processes by which change occurs.

Forcibly displaced persons

Forcibly displaced people are people who have been forced to flee their country because of persecution, war, conflict, generalized violence, or human rights violations (United Nations High Commissioner for Refugees, 2022). FDP often go through a migration journey in which they experience vulnerable, dangerous, and difficult circumstances where their fundamental human rights are violated. During their transit and in the host country, their daily lives are often characterized by uncertainty about the future, numerous losses, lack of control,

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discriminating experiences and loss of hope (World Health Organisation, 2021). Some common consequences are lack of sleep, sadness, anger, and despair. However, not everyone exposed to adverse circumstances will develop serious mental health conditions, such as PTSD.

Resilience plays an important role in preventing severe mental disorders. *Resilience* is defined as the ability to remain stable under stress and bounce back quickly afterwards (Fredrickson et al., 2003) and there are several known resilience factors which prevent the development of PTSD, for example regulating emotions, problem solving skills or seeking support (National Institute of Mental Health, 2020). Although some FDP need trauma-related treatment, most can benefit from preventive interventions that recognize their individual and collective strengths and aim to strengthen their resilience factors to better cope with psychological challenges and adversity, to thrive and prevent the development of chronic mental health problems. (Agency for Healthcare Research & Quality, 2012; Ciaramella et al., 2022).

Art therapy

Art therapy is one of the creative arts therapies (CAT, i.e., art therapy, dance/movement therapy, drama therapy/psychodrama, music therapy, and poetry/bibliotherapy) and is characterized by the clinical and evidence-informed use of the arts within a therapeutic relationship that relies on experiential interventions, including the use of different art forms in a methodically targeted manner (de Witte et al., 2021). AT interventions aim to overcome linguistic and cultural barriers, as they encourage expression through art rather than words (Rowe et al., 2017). Other common therapeutic goals of AT are to regulate arousal, increase bodily awareness, contain and express emotions, externalize implicit memories, widen perspectives, and restructure cognition (Hinz, 2020).

Previous research on art therapy, resilience and forcibly displaced people

On resilience, recent research investigates whether and how AT interventions can help individuals to cope with adversity and develop coping mechanisms. Firstly, an RCT-study ($N = 28$) shows that engaging in artistic creation significantly improves neural interaction between brain regions, and that this is positively correlated with a better score on the resilience scale RS-11 by Bolwerk et al. (2014) and Wagnild and Young (1993). Then, several reasons are identified as to why AT can be effective in strengthening resilience factors. First, it enables physiological regulation, and co-regulation when used in groups (Abbing et al., 2018; Haeyen, 2024; Malchiodi, 2020), which is essential to learn remaining stable under stress and to facilitate mentalization (Czamanski-Cohen & Weihs, 2016). Second, AT provides an opportunity to experience positive emotions and flow (Wilkinson & Chilton, 2013) which can undo the effect of stress at physiological level (Fredrickson et al., 2003) and to confront negative emotional experience in a safe environment, thereby increasing emotional awareness and acceptance (Czamanski-Cohen & Weihs, 2016). Third, AT offers a space for non-verbally expressing one's own stories, reflecting on them and reframing them (Akthar & Lowell, 2019; Feen-Calligan et al., 2020; Ugurlu et al., 2016; Zadeh & Jogia, 2023), introducing opportunity to experience mastery over the disruptive events, leading to enhanced resilience (Akthar & Lowell, 2019; Malchiodi, 2020). Next, when delivered in a group setting, AT enables positive peer support, social connection, a greater sense of belonging and mutual learning (Feen-Calligan et al., 2020; Malchiodi, 2020; Zadeh & Jogia, 2023), which are resilience factors (National Institute of Mental Health, 2020). Finally, AT can foster problem solving through creativity and imagination (Hass-Cohen et al., 2018), that can lead to more flexible thinking and functioning which is linked to resilience and coping (Kalmanowitz & Ho, 2016).

On FDP, most of the previous AT research focuses on the treatment of PTSD or trauma-related symptoms. The recent systematic review of Annous et al. (2022) on the use of AT with FDP with PTSD (8 studies

included) concluded that AT, although considered a promising therapeutic approach, currently lacks sufficient evidence to demonstrate effectiveness. Only two studies used a controlled clinical trial design, one on dance therapy and the other on AT. The latter involves a 12-week AT intervention with children ($N = 15$) aimed at reducing stress and the severity of trauma-related psychopathology (Feen-Calligan et al., 2020). The theoretical orientation is based on providing a safe and supportive environment for children to express their traumatic experiences, with an emphasis on improving coping skills. The study showed that group experiences, kinesthetic and sensory exploration, narrative activities, and rituals were beneficial in reducing separation anxiety symptoms. Feen-Calligan et al. (2020) also observed an improvement in participants' coping skills as evidenced by interaction with the media, problem-solving, self-initiated coping strategies and social support. Another AT study conducted by Schouten et al. (2019) developed an adult group intervention protocol consisting of 11 sessions focusing on complex PTSD. They adopted a three-phase approach, namely (1) stabilization, reducing stress and arousal, increasing sense of control, progressive exposure; (2) trauma-focused; and (3) integration and meaning-making. In their pre-post study with no control group ($N = 12$) was shown that the AT intervention promoted relaxation, emotional control, greater insight, self-esteem, and a sense of empowerment. Another study by Luzzatto et al. (2022), involving four trauma survivors including one refugee, described a six-session AT intervention based on a sequential approach in three phases: (1) self-strengthening; (2) dealing with the trauma; and (3) present life. Their findings suggest that the use of symbols in the creative process enables patients to regulate their self-disclosure at a level they consider safe, and that the sense of group cohesion eases the healing process as patients feel listened to and acknowledged. To explore the use of AT with refugee children through the lens of art therapists, Akthar and Lowell (2019) conducted a qualitative study. The art therapists interviewed ($N = 3$) indicated that AT appears to be a useful therapeutic intervention for this group as it can offer children a safe space to heal and give them a voice to be heard. The study highlights also a limitation, namely that culturally different perceptions of art and therapy make it difficult to convey the aims of the intervention with the participants and their parents.

On preventive interventions with FDP focusing on building resilience and personal strengths, AT research is limited. Kalmanowitz and Ho (2016) conceptualized the inhabited studio that includes both AT and mindfulness. The approach consists in introducing art material and fostering self-expression, no directive is given. It is a short approach as the AT and mindfulness group workshops take place over two days separated by a week, between which creative exercises and meditation to be done autonomously are proposed. The intervention is not published with a detailed description. Inhabited studio's objective is to help people develop safety strategies, support their resilience, and manage multiple losses, after adverse experiences. This study indicated that a mindfulness-based short-term group AT intervention has the potential to help participants regulate their physiological responses so that they become more open to new information and experience and can expand their repertoire of responses (Kalmanowitz & Ho, 2016).

Change process research in art therapy

Change process research (CPR) is the study of the processes by which change occurs in therapy, and several genres of CPR exist in the literature (Elliott, 2010). A comprehensive understanding of the change process theory requires the definition of several key concepts. First, change can be seen as the outcome of an intervention (Kazdin, 2007) and may or may not be beneficial. The change may be temporary or lasting and affect the internal structure (inner change) (Holmqvist et al., 2017), and can happen at different levels (physiological, emotional, cognitive, or behavioral) and in different sphere of influence (individual, interpersonal, community) (de Witte et al., 2021). Second, therapeutic factors (TF) are defined as active elements or components of the therapy

that affect change (Cuijpers et al., 2019). A distinction can be made between intervention factors and external factors. Within the intervention factors, a distinction is also made between factors common to all interventions (e.g., the therapeutic alliance, active client participation) and factors specifically related to the theoretical model and techniques of the chosen intervention, such as art therapy (Cuijpers et al., 2019). Finally, in this article, change mechanisms (CM) were defined as the related processes or sequences of events, that are likely to be responsible for the observed changes (Kazdin, 2007). Fig. 1 outlines how we defined the change process and its components in the current study.

In AT, there is still very little systematic description of the change process. The Expressive Therapy Continuum (ETC), which is a theoretical layered model widely used in AT, associates each layer with therapeutic functions (Hinz, 2020), which could be considered therapeutic factors (TF). In addition, several studies address the concept of TF or CM. First, the scoping review of de Witte et al. (2021) aiming to identify therapeutic factors from literature specific to CAT, showed in their findings a detailed framework of 19 domains of TF classified by their CAT specific or more common nature. Three domains were composed solely of TF unique to the CAT: “embodiment”, “concretization”, and “symbolism and metaphors”. They also identified several specific TF of AT such as the tactile quality of art materials, the transference to the artistic product, seeing own emotions in artwork and self-awareness through artwork. Second, Gabel and Robb (2017) lists five TF in group settings, namely symbolic expression, embodiment, pleasure/play, aesthetic relationship, and ritual. Third, a study on using opposites in art therapy as CM suggests that it could lead to more insight, self-exploration and self-awareness and could facilitate emotional confrontation and acceptance (Haeyen et al., 2022). Finally, Czamanski-Cohen and Weihs (2016) defines the bodymind model and theorizes four CM in AT practice, namely the triangular relationship, self-engagement, embodied self-expression through transition from implicit to explicit processing, and meta cognitive processes. The authors recommend a continued need to translate theoretical research into clear CM.

In short, the change process in AT is still exploratory, notably regarding CM, which are not systematically described, and there is no consensus yet on a common list of potentially operative CM.

The present study

Most FDP can benefit from preventive interventions aimed at strengthening their resilience factors to prevent them from developing serious mental health problems. Prior to undertaking more comprehensive effectiveness studies on AT interventions, gaining a deeper understanding of the process of change is needed. Adopting FDP's

perspective is essential, as it allows for cultural worldviews to be considered. Therefore, the aim of this study is to establish the perspective of adult FDP on the process of therapeutic change after an eight-week art therapy intervention aimed at building resilience, i.e. to identify the positive changes they experience, the TF and the CM they believe to be responsible for these changes.

Method

An exploratory qualitative study by thematic analysis (Braun & Clarke, 2013; Nowell et al., 2017) supplemented with descriptive quantitative data was carried out. It is assumed that the qualitative data will provide a deep and comprehensive insight into the research question and that the quantitative data will provide additional information to inform the design process of a future measurement tool questioning the effectiveness of AT interventions for this population.

Participants

The participants in this study were adult FDP (> 18 years) residing in the Spanish Red Cross reception centers in Malaga, Spain, who received an eight-week AT intervention aimed at building resilience. Exclusion criteria for participation were attending language or vocational training when the intervention took place, not able to express themselves, to some extent, in one of the languages spoken by the art therapist (Spanish, English, French, Portuguese, Russian), not being able to read in their mother tongue, and leaving the center within 12 weeks. There was no prior diagnosis of anxiety disorders, depression, or PTSD.

Procedure and ethics

The AT intervention took place from February to April 2023 and was part of a three-year collaboration between two humanitarian organizations: The Red Pencil (www.redpencil.org) and the Spanish Red Cross (www2.cruzroja.es). Participation was on a voluntary basis. Residents from the centers were informed through posters placed at the entrance of the centers and through oral communication by the Red Cross staff. Three groups were formed (total $N = 28$), and the allocation was made based on language spoken. Research participants were recruited among the three groups two weeks before the end of the intervention. They attended an information session and received a research participant information sheet and informed consent form in their native language (Arabic, Russian, French, or English) and get one week reflection time to confirm their participation. Data were pseudonymized right after collection and stored on a secured drive to ensure confidentiality during processing.

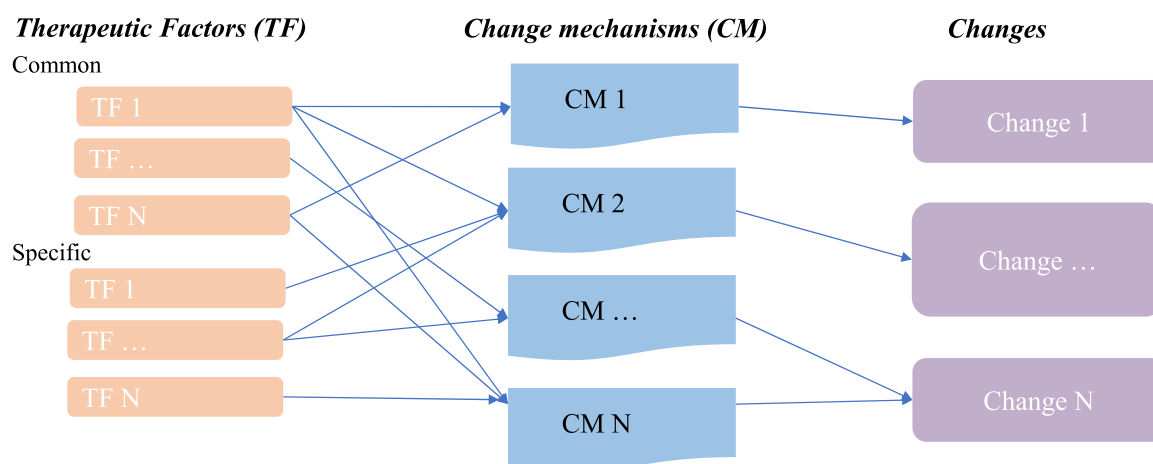


Fig. 1. A conceptualization of the change process in art therapy: therapeutic factors, change mechanisms and changes.

Intervention

The same art therapist delivered the eight AT sessions to all three groups. Each weekly session lasted two hours. The intervention aimed to build resilience and was modelled in stage according to research recommendation (Gerge & Pedersen, 2017): 1) safety, 2) emotional regulation, and 3) coping skills (Fig. 2) which is consistent with previous research (Luzzatto et al., 2022; Schouten et al., 2019). The model illustrates the importance of interaction with the art therapist, the group, and the artwork, as well as adopting a culturally sensitive approach. Working in group setting enables peer support and mutual learning (Malchiodi, 2020) and to normalize behavior and expression (Kalmanowitz & Ho, 2016), which are resilience factors (National Institute of Mental Health, 2020).

The three first art therapy sessions (Table 1) focused on creating a sense of safety and trust in the group to enable participants to (co) regulate their alertness, which is in line with previous AT research with resilience (Haeyen, 2024; Malchiodi, 2020) and FDP (Feen-Calligan et al., 2020; Schouten et al., 2019; Akthar & Lowell, 2019). Anchoring, breathing and mindfulness exercises were offered, in line with prior research too (Feen-Calligan et al., 2020; Kalmanowitz & Ho, 2016; Luzzatto et al., 2022; Usiskin & Lloyd, 2020) to help participants to physiologically regulate. Creative directives and art material were chosen to get to know the group and the creative process. Session 4 and 5 focused on enabling the participants to explore their inner selves and connect with their emotions and their internal resources and providing a space to tell their own stories, which is in line with prior research (Akthar & Lowell, 2019; Czamanski-Cohen & Weihs, 2016; Feen-Calligan et al., 2020; Ugurlu et al., 2016). The next sessions aimed to promote mastery and empowerment, by offering space for further exploration (Malchiodi, 2020). The closing session provided an opportunity to reflect on the creative journey, personal strengths and instilled a sense of hope.

During the intervention, positive experiences were encouraged as they can undo at a physiological level the effect of difficult emotions such as anger, anxiety, sadness and despair (Fredrickson et al., 2003). By activating regulation, positive emotions expand attention, perceptions, thinking patterns and behavioral responses as the frontal cortex is more effective. The result is flexible, creative, and integrative thinking, and therefore greater adaptability. When positive experiences are recurrent, they encourage, over time, the development of habitual and broad-minded coping modes that become lasting internal resources and help to strengthen resilience (Fredrickson et al., 2003). However, confronting and processing emotions such as anger or anxiety may be

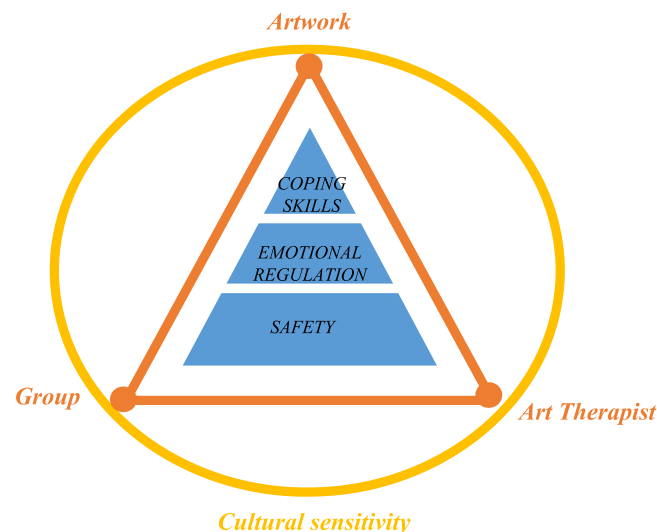


Fig. 2. Resilience-building art therapy intervention model.

Table 1		
AT group intervention aiming at building resilience: Eight-session plan.		
Session	Objectives	Art therapy activity
1	– Introduce Art Therapy – Presentation and getting to know one another – Connect to self-identity (culture, country of origin)	"<u>Symbol of self</u>" - collage – Warmup: choose an image to introduce yourself – Create a collage artwork that represents yourself – Present in the group and reflect on similarities & differences
2	– Promote safety	"<u>My safe place</u>" - recycled 3D material (box, fabric, wool, string, paper,...) – Warmup: breathing, grounding & visualisation of a safe place – Create a safe place (real or imaginary) where you can go when you need to
3	– Foster group cohesion – Experience positive emotions in a group	– Reflect on what it is like to be safe "<u>We are connected</u>" - painting – Warmup: group movement-activities on music selected by the participants – Create group mandala on large sheets – Reflect on what it is like to be in a group
4	– Introduction to emotions and emotions regulation – Body awareness – Emotions regulation	"<u>Where do I feel my emotions?</u>" - pastels – Warmup: breathing & body scan – In pairs: ask your partner to draw a life-size outline of your body. Make a map of your emotions inside. On the outside bring in things that will make you feel good – Reflect on emotions
5	– Highlight internal resources of the participant – Highlight support circle – Allow reconnection with loved ones – Allow a place for absence/deaths – Express gratitude (positive emotion)	"<u>My loved ones, my pillars</u>" -pastels – Warmup: relaxation – Create a piece of work honoring those people who are/have been significant in your life – Present in duo – Reflect on what does it feel to honor loved ones
6	– Body awareness – Letting go – Connect to implicit knowledge	"<u>On the way to the unknown</u>" - clay – Warmup: grounding, exploring clay with your eyes closed, and create 5 mini artworks – Choose the one that touches you most and further develop. Create an environment around that makes you feel good
7	– Free expression – Promote self-agency	– Share in the group "<u>Free expression</u>" - choice of material – Warmup: body scan – No directive – Reflect on what does the artwork tells about you
8	– Prepare to leave – Reinforce self-confidence and empowerment – Give perspective, instil hope, help to project in the future	"<u>My amulet</u>" - recycled 3D material (cardboard, fabric, wool, string, paper, ...) – Warmup: body scan – Create an object that embody positive aspects learned throughout

(continued on next page)

Table 1 (continued)

Session	Objectives	Art therapy activity
		the sessions that will help you in the future
		– Reflect on personal strengths and future

necessary before fully experiencing positive emotions (Rubin, 2016). Resilient people experience negative emotions, but they mix them with positive emotions, and the latter end up compensating for the former. Positive emotions fuel an upward spiral towards greater well-being and growth.

Each AT session followed the same structure to establish safety by means of a predictive routine: 1) welcome, presentation of the theme of the session, warm up; 2) creative process; 3) sharing and reflection; 4) closure. The warmup aimed to prepare the participant for the creative process and to promote connection and safety. It allowed for a transition from the external world to the space of the session, enabling connection with the group and oneself, and fostering exploration of the art media without judgment. Sharing allows everyone to be seen and heard, to see and listen, and so to create a deeper bond, a sense of belonging and normality (Kalmanowitz & Ho, 2016). During the sharing, the art therapist asked questions to foster reflection.

Data collection techniques & tools

Demographic data. Research participant information on country of origin, gender, and age was collected by the Red Cross coordinator.

Qualitative data. Feedback from research participants was collected by the art therapist one week after the end of the intervention through an art-based semi-structured interview which was audio-image recorded. The process was based on the Audio-Image Recording and Reflect Interview protocol (Springham & Brooker, 2013). Questions used to lead the interviews were formulated to develop the themes of change and its mechanisms, and what in the intervention enables change:

- 1) Choose two significant artworks of your own and tell something about it.
- 2) How have the sessions helped you?
- 3) What have you learned about yourself?
- 4) If there is a difference between how you feel now and how you felt when you first started the sessions, what is it?
- 5) What was it like to work with art in a group?
- 6) What were the things that were most useful to you in the sessions?
- 7) What would you like to convey to other people about the sessions?

The interviews were conducted in the week following session eight and took place in groups. Each participant was asked to choose two significant artworks and was interviewed in turn. The selected artworks were photographed, and the audio recordings were transcribed and translated into English using appropriate software or a translator. For each group, the interview process lasted one hour in total and about 10 minutes per participant.

Quantitative data. A survey consisting of 29 items (statements) divided into four sections—general satisfaction, changes, safety factors and CM—was created using a five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). The statements were identified by cross-referencing the literature (Czamanski-Cohen & Weihs, 2016; Feen-Calligan et al., 2020; Gabel & Robb, 2017; Hinz, 2020; Wilkinson & Chilton, 2013) with the research objectives and by consulting existing measurement tools such as the RS-14 resilience scale (Wagnild, 2009). The survey was available in the participant’s language (Arabic, Russian, French, and English) and administered to all participants just before the semi-structured interviews. The art therapist went through every

question with participants and then gave them time to answer. Attendance lists were used to record the presence of participants per session.

Data analysis

Qualitative data. The transcripts of the interview recordings were analyzed using the six-step approach to thematic analysis (Braun & Clarke, 2013; Nowell et al., 2017). For this analysis, ATLAS.ti tool was used. The first step was to become familiar with the data. Then, an initial coding was carried out by identifying interesting segments and labelling them with codes. The third step was to organize the codes by merging those that were similar and starting to group them into categories. At this stage, it was decided to use the therapeutic factors framework as defined by de Witte et al. (2021) and, where applicable, to group the codes by therapeutic domain. The main themes were then identified and organized to address the research questions. Finally, for each theme, the changes and TF involved were listed and the CM, i.e. the combinations of TF, identified. The codes and themes were reviewed by the art therapist and the Red Cross coordinator, who is an art therapist and psychologist.

Quantitative data. Descriptive statistics were used to process the demographic data and the survey data. For each survey statement, the mean, median (most representative value), mode (most repeated value) and standard deviation (which give a sense of the homogeneity of the responses) were calculated for the whole population. For each section of the survey and for each research participant, an average score was calculated, called the satisfaction score, the safety score, the change score and the CM score respectively. Attendance statistics included the average number of sessions attended for the population. All analyses were performed using Excel functions.

Results

Of the 28 participants, eleven gave their consent to participate in the study and being interviewed and completed the survey. Table 2 summarizes the demographics of the population.

Qualitative results

Overall framework. Thematic analysis revealed 59 codes which were then grouped into three categories; therapeutic factors (43) classified by domain according to de Witte et al. (2021), changes (8) perceived by participants (Tables 3 and 4 respectively) and challenges & enablers (8). Consequently, four core themes were identified: “somatic safety regulation”, “emotional regulation”, “reinforcing & empowerment”, and “challenges & enablers”. The three first themes are developed by highlighting the change process, i.e. the positive change, the TF and the possible CM. Table 5 summarizes the CM.

Theme 1: somatic safety regulation. Almost all the participants

Table 2
Demographic characteristics of the participants.

Sample Characteristic	N	%
Gender		
Men	8	73 %
Women	3	27 %
Age (yrs)		
[18–24]	5	45 %
[25–34]	4	36 %
[35–50]	1	9 %
> 50	1	9 %
Country of origin		
Ukraine	3	27 %
Russia	1	9 %
Mali	3	27 %
Morocco	3	27 %
Ivory Coast	1	9 %

Note: (N = 11).

Table 3

Therapeutic factors perceived by participants (using TF framework of de Witte et al., 2021) - qualitative results.

Domain of TF	Therapeutic Factor within the domain	Example of quotation
Concretization	TF - Portraying the future	"For me, this image is my future."
	TF - Portraying the past	"This is the flag of my country, Morocco. I lived there with my whole family."
	TF - Creating something visible (tangible)	"Looking at the artwork, ..."
	TF - Verbal reflection	"I could see myself in the artworks (...). I could tell what was inside me."
Symbolism & metaphor	TF - Artwork as anchor/reminder/ressource	"When I see the drawing again, ..."
	TF - Using visual symbols & metaphor eases expression	"Because I was a bit frustrated, (...), I had drawn in black, a black anger."
	TF - Projection in artwork of unconscious material	"It's like here it's shown that I'm going on such a path, unknown to myself, and I'm returning to a more conscious world, understanding what's happening."
	TF - Shifting between symbolic and realm	"I remember being very focused on the specific colour that I wanted to pick."
Agency	TF - Experiencing control and choice	"It's a good image, the future that I would like to have. I hope I will have all that. One day it will come."
	TF - Motivational force	"It gave me courage to be able to talk about what is inside me."
	TF - Empowering experiences	"I was proud of myself."
	TF - Developing sense of achievement	"When we made the drawing, everyone did what they wanted and we ended up with a result as if we had talked before making it. But we didn't talk."
Interaction through the arts	TF - Non-verbal attunement	"I had never in my life done clay works, painting and so this is something that I discovered."
Developing skills	TF - Developing and practicing artistic skills	"I learned to talk about myself through drawing."
	TF - Developing verbal and non-verbal skills	"I learned about feelings, I learned to express my feelings in drawing."
	TF - Developing emotional skills	"When you are curious it leads you to discover many things."
Active engagement	TF - Client attitude & involvement	"The amount of materials, colors and paints probably provided an opportunity to better understand that everything can be combined."
Creativity	TF - Opportunity to explore	"It made me happy to do this artwork."
Artistic pleasure/Positive affects	TF - Experiencing positive affects/emotions	"I put on the colours I like (...) I feel good because it's very nice and it was well done."
	TF - Experiencing artistic pleasure	"I immerse myself, and all the bad things go away, distracted from all thoughts."
Modulating time & space	TF - Distracting from stressful thoughts	"You focus only on one thing, on such images that you want."
	TF - Focusing on the present moment	"When you are doing art, you don't keep track of time at all."
	TF - Being immersed / experiencing flow	"When we are together, it's too good, it's like in a family. I was very, very happy to be in a group."
Group processes	TF - Group facilitating co-regulation	"When we work in a group, we collaborate, live together, understand each other well."
	TF - Experiencing of togetherness and bonding	"There were very interesting people."
	TF - Group facilitates (inter)personal learning	

Table 3 (continued)

Domain of TF	Therapeutic Factor within the domain	Example of quotation
Non-verbal expression	TF - Non-verbal expression of inner experience	"I was able to express what is inside me, but not in words, but in art."
	TF - Expression of emotion	"All you do is what you feel in your heart, what you feel inside you, that's what you're going to bring up"
Connection with self	TF - Portraying self-image	"I like this painting that I drew of myself."
	TF - Acceptance of artwork	"When you finally understand the situation, you accept it."
Remembering	TF - Reconnect with key moments	"When I looked at the color blue, I felt good. My mother gave me blue-colored clothes."
Therapeutic alliance	TF - Therapist-client bond	"You and I already know each other. (...) This artwork I made it thanks to you. (...) I say thank you."
	TF - Evocation of emotions	"When you draw yourself with wings, you feel lightness, (...) joy and peace."
Emotional elicitation & processing	TF - Confronting oneself with own emotions/actions	"It gave me courage to be able to face my anger and my difficult situation."
	TF - Transforming emotions	"I focused on the dark emotions. So the painting is dark, but I wanted to make it beautiful."
	TF - Regulation of emotions	"Drawing feels good, makes you feel better. It changes your mood."
	TF - Releasing & providing relief	"The important thing is that when we come to the painting and color workshop, we feel calmer."
Understanding	TF - Broaden - and - build via positive emotions	"I am working on something (...). I just need to do the walking through the process."
	TF - Sitting back and reflecting	"What was useful for me is talking after doing the artwork, because that gave me more understanding."
	TF - Knowing oneself better	"AT helped me to know who I really was and what I really wanted to do in my life later."
	TF - Gaining emotional insight	"I wasn't as aware of my emotions and how to deal with them as I am right now."
	TF - Positive cognitive reframing	"You try to think more about the good things."
	TF - Mentalization	"Everyone observes their own thinking. I was able to see the way human beings are in life."

Note:

- the first column lists the domains of therapeutic factors identified by the participants;
- the second column gives the individual therapeutic factors identified by domain;
- the last column gives an example of a quote from a participant to illustrate each therapeutic factor.

reported an improvement in their inner state of arousal by attending the AT sessions (change-felt calmer). They use terms such as feeling calm, less tense, lighter, or no longer having headaches to characterize. However, their perception of the TF and CM behind this regulatory process differs.

CM-regulation through attention. For example, one participant emphasized that engaging in artistic activity (TF-being immersed / experiencing flow) provided a distraction from ruminating thoughts (TF-distracting from stressful thoughts) and helped to relax: "I immerse myself, and all the bad things go away, distracted from all thoughts. Only good remains. Silence. Peace."

CM-regulation through artwork. While others pointed out the importance of the interaction with the artwork. Being able to externalize an inner feeling in a tangible artwork (TF-non-verbal expression of inner experience, TF-creating something visible) and being able to see it and

Table 4
Changes perceived by participants - qualitative results.

Change	Description	Example of quotation from participant
Felt calmer/appeased	Feeling less tense at somatic and/or cognitive level	<i>"In the workshops, you relieve stress, you take a lot of weight off your shoulders, you stop thinking so much about good or bad things."</i>
Felt better	Feeling happy, proud, grateful, satisfied, joyful, hopeful for the future during the sessions	<i>"I was happy, calm, my mind was at ease, I was proud of myself."</i>
Strengthened emotion regulation skills	Experienced emotion regulation process	<i>"I wasn't as aware of my emotions and how to deal with them as I am right now."</i>
Reinforced self	Learned new things/skills, knowing self better, more confident/self-esteem, reunified self	<i>"I learned that I have force within me."</i>
Increased connectedness	Feeling more connected to others	<i>"Working in a group is good. Tomorrow I can pass someone, and I can say to myself I know him."</i>
Over time	Notion of duration (long term or ephemeral), process, repetition, associated with change	<i>"At first I didn't have much courage. Little by little, it calmed me down. In the end, I really calmed down."</i>
Able to see the benefit of AT	Recognizing the benefit of AT for self or others	<i>"I don't see any harm in it. I only see the positive (...) it's good for life, for everyday life especially."</i>
Attitude towards art (making)	Change in attitude towards art (making)	<i>"After these classes, a desire arose, perhaps to continue these activities for myself."</i>

verbally reflect on it (TF-verbal reflection) was providing relief: “I could see myself in the artworks, I was at peace. I could tell what was inside me.”

CM-regulation through the group. Others stressed the importance of the group in the regulation process (TF-group facilitating co-regulation, TF-experiencing of togetherness and bonding): “After we talk in the workshops, I feel calmer and stop thinking.” “When I work with the group, I’m calm, and I feel good.”

CM-regulation through positive emotions. Often, participants associated better with calmer. Most participants reported feeling better after having experienced a positive emotion during the session (TF-experiencing positive affects, TF-experiencing artistic pleasure). For example, a participant expressed pleasure after producing a self-image (TF-experiencing artistic pleasure) with the colors of his country: “I really like the colors. The drawing is also good. I feel good because it’s very beautiful and well done. Especially the colors of the paints, the yellow, the red, the green, and also the color black.”

CM-taking time. For some participants, this takes time and repetition: “Little by little, it calmed me down. In the end, I really calmed down.” “After the lessons, the day still has this state of peace. And then, again, the hustle and bustle returns, and it’s forgotten. And then it’s the same thing all over again. Well, in general, the negativity does go away, and you get more satisfaction from everything.” Although [de Witte et al. \(2021\)](#) framework does not propose any TF that can be associated with this notion of processes evolving over time, as we wanted to stay as close to the data of the current study as possible, we did report it here as a change factor.

Theme 2: emotional regulation. Most participants reported some change in their emotion regulation skills (change-strengthened emotion regulation skills). For example, one participant says: “I wasn’t as aware of my emotions and how to deal with them as I am right now.”

CM-emotional awareness. A participant stresses the importance of having time to focus on emotions and gain insight (TF-focusing on the present moment, TF-gaining emotional insight, TF-mentalization): “It

helped me stay focused on the emotions. I had to draw emotions. I had the time to think of them. And that’s something that I’ve never done before. It was useful for me just to pay attention. And I could do that because of art therapy. (...) I wasn’t as aware of my emotions and how to deal with them as I am right now.”

CM-processing and positive reframing. Another participant explained the process of confronting difficult emotions, processing them using opposing colors, verbalizing them, reflecting on them and reframing them. The following factors, TF-confronting oneself with own emotions/actions, TF-transforming emotions, TF-sitting back and reflecting and TF-positive reframing combine to facilitate the emotional regulation mechanism ([Fig. 3](#)):

Because I was a bit frustrated, (...) I had drawn in black, a black anger. On the left side, there is the heart: all the time the heart is beating. I didn’t darken the black color. I left white color which means peace. Even if you are angry, at some point there is peace behind the anger. Even if you are frustrated, at some point, you will calm down. That’s what I drew. I see myself in this drawing (...) Art making gave me courage to be able to talk about what is inside me, and to be able to face my anger and my difficult situation.

In addition to non-verbal expression and concretization, the TF-domains that most contribute to the emotion regulation process are modulating time and space, emotional elicitation and processing, and understanding. They described this by referring to the artwork created during session four, when they were invited to draw their silhouette and map the emotions in their body.

CM-taking time. Building emotional skills is seen by a participant as a process that develops over time: “It’s still a working process, but it’s something that I’m working on, and I find it interesting. I don’t know what the result is going to be. I think it’s early to say something yet. Something that art therapy gave me, something that I actually work on now.”

Theme 3: reinforcing & empowerment. All participants (except one) acknowledged that taking part in the intervention has strengthened them in one way or another (change- reinforced self). Participants identified several CM generating reinforcement.

CM-learning to verbalize inner experience. Firstly, another participant expressed that they learned to externalize experiences through art making that were not easy to verbalize: “I learned to talk about myself through drawing. I like to draw. Talking about myself allows me to have more confidence.” (TF-non-verbal expression of inner experience, TF-developing verbal and non-verbal skills).

CM-connecting and interpersonal learning. Secondly, a participant emphasized that the group enabled mutual learning and reinforcement (TF-group facilitates (inter)personal learning): “Working in a group is an advantage: there is strength in numbers. It’s beneficial because we get to know the person who also gets to know us better. I was able to see the way human beings are in life. It is something extraordinary. Everything we do in life, we do together. It gives us courage to be together.” Others reported that the group enabled increased connectedness (TF-experiencing of togetherness and bonding): “Working in group is good. Tomorrow I can pass someone, and I can say to myself I know him.”

CM-revealing implicit knowledge. Furthermore, one participant said that the metaphorical artworks he produced in art therapy gave him motivation and a better understanding of himself (TF-using visual symbols & metaphor eases expression; TF-projection in artwork of unconscious material; TF-knowing oneself better; TF-motivational force): “I learned that I am really someone who wants to be a militant. I had that feeling before. But it reinforced a lot. Art therapy helped me to open my eyes, to know who I really was and what I wanted to do in my life later.” Continuing: “Within us there are things we know about ourselves and things we don’t know.”

This revealing mechanism is also clearly perceived by the following participant: “Looking at the first picture ([Fig. 4](#)), I’d say that I learned

Table 5

Change mechanisms by participants after a short resilience-building AT group intervention - qualitative results.

Theme	CM	TF Domain	TF	Change
Somatic regulation	<i>Regulation through attention</i> When I immerse in the art making process, I get distracted from stress inducing thoughts, then I relax and feel calmer.	Modulating time & space	TF - Being immersed / experiencing flow TF - Distracting from stressful thoughts	Felt calmer/appeased
	<i>Regulation through artwork</i> When I express an inner experience on a tangible artwork, I can see it and reflect on it, I feel calmer	Non-verbal expression Concretization	TF - Non-verbal expression TF - Creating something visible TF - Verbal reflection	Felt calmer/appeased
	<i>Regulation through the group</i> When I work with the group, when I talk in the group, I feel good	Group processes	TF - Experiencing of togetherness and bonding TF - Co-regulation with the group	Felt calmer/appeased
	<i>Regulation through positive emotions</i> When I look at my artwork, I find it good/beautiful and I experience positive emotions and I feel better and calmer	Concretization Experience positive affects/aesthetic pleasure	TF - Creating something visible TF - Experience positive affects/emotions	Felt better Felt calmer/appeased
	<i>Taking time</i> When I'm making art in art therapy, I'm feeling calmer. It takes time and repetition to really calm down. <i>Emotional awareness</i>			Felt calmer/appeased Over time
Emotional regulation	When I work on my emotions in art making, I have the time to focus and confront myself with them, and I become more aware of them	Concretization Modulating time & space Emotional elicitation & processing Understanding	TF - Portraying self-image TF- Focusing on the present moment TF - Confronting oneself with own emotions/actions TF - Gaining emotional insight TF - Mentalization	Strengthened emotion regulation skills
	<i>Processing and positive reframing</i> In the sessions, I feel safe enough to explore my emotions, confront and process them. I can then verbalize and positively reframe them.	Concretization Emotional elicitation & processing Understanding	TF - Portraying self-image TF - Confronting oneself with own emotions/actions TF - Transforming emotions TF - Sitting back and reflecting TF - Positive reframing	Strengthened emotion regulation skills
	<i>Taking time</i> The art therapy sessions trigger in me a process that is ongoing and will further develop overtime			Strengthened emotion regulation skills Over time
Reinforcing and empowerment	<i>Learning to verbalize inner experience</i>			
	In the sessions, I learned to talk about my artworks, and I feel more confident	Non-verbal expression Developing skills	TF - Non-verbal expression of inner experience TF - Developing verbal skills	Reinforced self
	<i>Connecting and interpersonal learning</i> In the sessions, I get to know the others and they get to know me. We learn from each other. We feel connected and stronger.	Group processes	TF - Group facilitates (inter) personal learning) TF - Experiencing of togetherness and bonding	Increased connectedness Reinforced self
	<i>Revealing implicit knowledge</i> When I use symbols & metaphor in art making, I sometimes project unconscious material and seeing it, reflecting on it allows me to gain self-insight in my potential which is motivating	Symbolism & metaphor Concretization Understanding Agency	TF - Using visual symbols & metaphor eases expression TF - Projection in artwork of unconscious material TF - Knowing oneself better TF - Motivational force	Reinforced self
	<i>Empowering symbolic experience</i> When I use symbols & metaphor in art making, I can live empowering symbolic experiences, sit back and reflect and feel stronger.	Symbolism & metaphor Concretization Agency	TF - Using visual symbols & metaphor eases expression TF - Shifting between symbolic and realm TF - Sitting back and reflect TF - Empowering experiences	Reinforced self
	<i>Lasting over time</i> When I look back at my artworks again, I feel reinforced, motivated and I've the desire to continue.	Concretization Agency	TF - Artwork as anchor/reminder/ressource TF - Motivational force	Reinforced self

Note:

- the first column lists the themes identified during the qualitative analysis;
- the second column gives the change mechanisms identified by participants for each theme;
- the third and fourth column list the domains of therapeutic factors and the individual TF involved in the change mechanism;
- the last column gives the change generated by the mechanism.

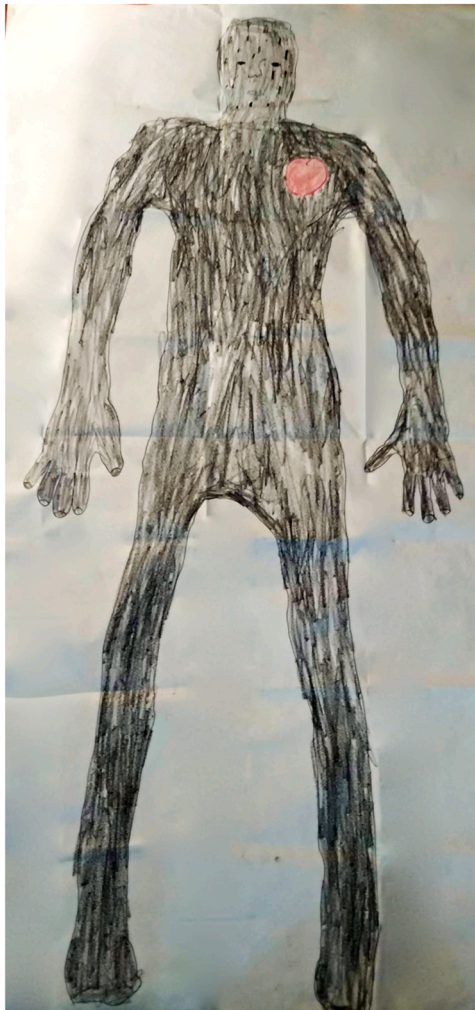


Fig. 3. Session 4 – Body mapping of emotions (life-size) – pastels “Confronting anger”.

that I have force within me. I thought it was going to be a very dark picture, but surprisingly to me, it's not dark. And I drew a lot of force that I now do believe that I have within me. I didn't know that before. So that's something new that I can use to work on myself and to bring more happiness in my life.”

CM-empowering symbolic experience. Finally, one participant said that he had a reinforcing experience when he saw himself in the place of the character in his drawing. His work (produced during session 5) depicts a metaphorical obstacle course in which the character bounces back after each obstacle and has a happy ending:

Basically, this is the obstacles of life. You know that in life, we are not always lucky. You sometimes find yourself in difficult situations. That's what I drew, in a way. It's a person who has a goal. To reach his goal, there are obstacles to overcome. You can't avoid the obstacles; you have to face them. That's what I drew. Do you see this? There, that's an obstacle. The person overcame the first obstacle. He overcame the second obstacle. And here is the last one. After, he



Fig. 4. Session 4 – Body mapping of emotions (life-size) – pastels “I've force within me”.

looks up and sees that he has almost reached his goal. Once he has cleared the final obstacle, I drew a cup to tell that he has reached his goal. The cup is there, he will lift it. That's kind of what I drew. I felt good because I saw myself in the drawing. I see myself there. I drew a person, but I see myself there. (Fig. 5)

The TF involved in this CM are TF-using visual symbols & metaphors eases expression, TF-shifting between symbolic and realm, TF-sitting back and reflect and TF-empowering experiences.

CM-lasting over time. Some participants testify to the significance of the artworks and their lasting meaning and impact: “It's a beautiful work. When I see the drawing again, I'm proud of myself, I've learned a lot, and it gives me courage.” Others express the desire to continue the process in art therapy: “After these classes, a desire arose... perhaps, in some way, to continue these activities for myself, in order to start realizing that there is more that can be done on a larger scale than what is being done now.”



Fig. 5. Session 5 – Representing strengths and pillars – pastels « Symbolic resilience journey ».

Theme 4: challenges & enablers. The participants identified several obstacles linked to the creation process. Firstly, a few participants said that before starting the sessions, the possible benefits were not clear and one of them mentioned having other priorities: “I didn’t understand what awaited me and how it could help or not help me. (...) I have to do all sorts of things that I don’t want to do, but have to do to survive in this world, study, look for a job, earn money, just to not die.”

Art making is perceived as difficult by several participants. Because they don’t have the technical skills or experience: “Drawing like this is not easy, I’m not used to drawing. Imagining in your head is easy, but drawing it is not easy.” Or because the internal judge acts as a brake: “Well, I was always afraid to do it cheaply.”

The participants also perceive a few catalysts. First, the fact that the art therapist was giving a creative directive was stimulating: “And when I’m asked to do something, it leads me to think and that activates my creative side.” Secondly, the availability and diversity of artistic material was highlighted as a facilitating element by a participant: “The number of materials and the number of colors and paints probably provided an opportunity to better understand that everything can be combined.”

The relation with the art therapist is seen as a facilitating factor (TF-therapist-client bond): “This drawing I made thanks to you. Before I didn’t know anything and thanks to you, yes and I say thank you thank you thank you.”

The group is also seen by almost all participants as a positive factor: “I liked working together. I liked that there were very interesting people. I liked the teacher, very interesting, very interesting topics that we covered. I like that in this, you express yourself and become yourself in this creativity. It’s interesting to work in a group and to be able to

express oneself.” A participant implicitly emphasized the importance of non-judgement in the group: “What is important, is to be together, to talk about the things that are talked about in this workshop, without feeling ashamed.”

The attitude of the participant is perceived by the vast majority as being a key factor (TF-client attitude & involvement). They mention amongst other 1) the curiosity to explore and experiment - “When you are curious it leads you to discover many things”; 2) the courage to confront yourself - “I crossed over this boundary of fear or discomfort and was able to show what I think and what’s inside me”; 3) the involvement in the process - “this one also had a lot of work put into it.”

Fig. 6 shows a summary of the change process as perceived by the population studied, and Fig. 7 focuses on the change process of one participant.

Quantitative results

The results of the descriptive analysis of the survey data are presented in Tables 6 and 7. Participants attended an average of 5.73 (SD = 1.74) out of the eight sessions.

Participants indicated feeling more relaxed (Table 6, item B.1), being more aware of their emotions and more able to express them (Table 6, items B.2, B.4), and that they feel stronger, reinforced, in one way or another, after the intervention (Table 6, items B3, [B5-B10]).

Discussion

The purpose of this study was to provide more insight into the perspective of adult FDP on their process of change during a short art therapy intervention aimed at building resilience. This was done by identifying related TF and CM they believe to be responsible for these changes. The findings identified three main changes – “felt calmer”, “strengthened emotional skills” and “reinforced self”.

Participants consistently reported feeling calmer, more relax, in line with previous AT research on FDP and resilience (Feen-Calligan et al., 2020; Kalmanowitz & Ho, 2016; Schouten et al., 2019). Various authors (Haeyen, 2024; Hinz, 2020; Malchiodi, 2020) underline that one of the AT benefits is to regulate arousal. Participants identified five CM through which they felt safely regulated and calmer. First, CM-regulation through attention, participants found that when they immersed in the creative process, they were able to distract their attention from stress-inducing thoughts and felt calmer. This CM calls on TF in domain modulating time and space: art making and imagination allow to transcend the limits of time and space, and act as temporary

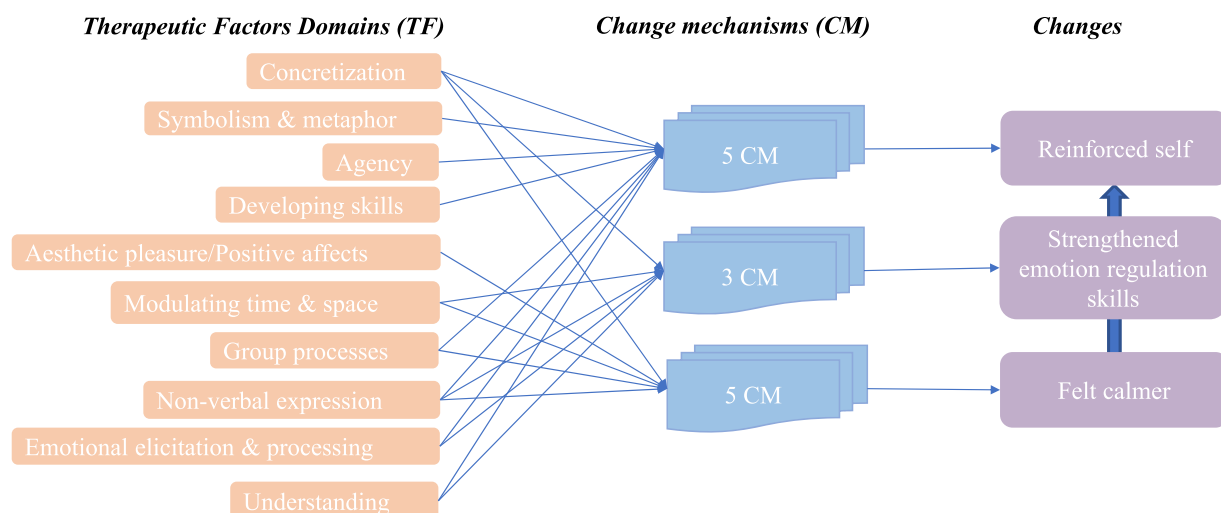


Fig. 6. The change process by participants after a short resilience-building AT group intervention - qualitative results.

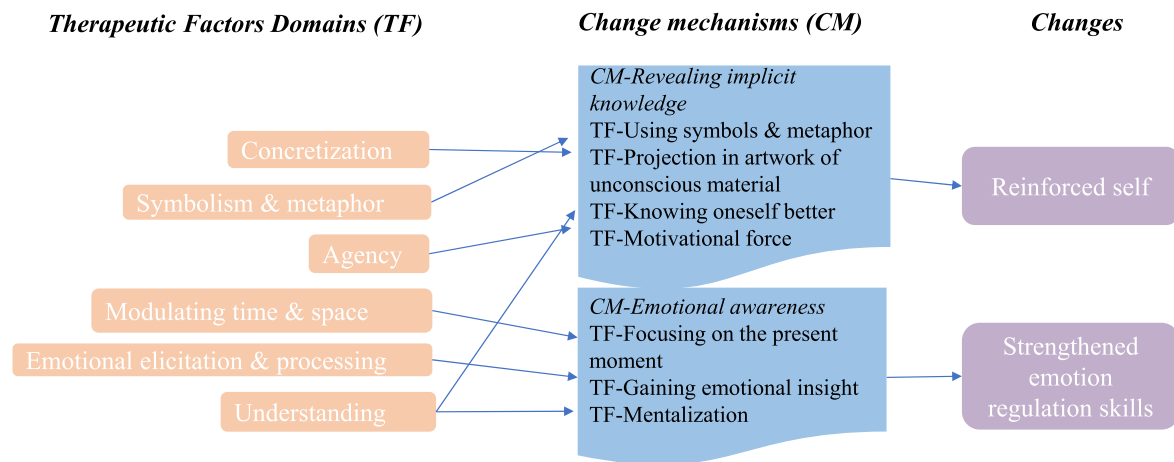


Fig. 7. The change process for a specific participant - qualitative results

Quotes from participant illustrating the 2 CM

CM-Emotional awareness: “It helped me stay focused on the emotions. I had to draw emotions. I had the time to think of them. And that’s something that I’ve never done before. It was useful for me just to pay attention. And I could do that because of art therapy.(...) I wasn’t as aware of my emotions and how to deal with them as I am right now.

CM-Revealing implicit knowledge: “Looking at the artwork, I’d say that I learned that I have force within me. I thought it was going to be a very dark picture, but surprisingly to me, it it’s not dark. And I drew a lot of force that I now do believe that I have within me. I didn’t know that before. So that’s something new that I can use to work on myself and to bring more happiness in my life.”.

Table 6

Survey results.

Sections/Statements	N	Mean	Median	Mode	Std Deviation	Sum
SECTION A - GENERAL SATISFACTION						
A.1 I’m satisfied with the workshops	10	5.00	5	5	0.00	50
A.2 I will recommend the workshops to others	10	4.90	5	5	0.32	49
SECTION B - CHANGES						
B.1 I feel more relax.	11	4.64	5	5	0.67	51
B.2 I’m more aware of my emotions in my body.	10	4.30	5	5	1.25	43
B.3 I’ve learned how to relax.	10	4.70	5	5	0.67	47
B.4 I’m more able to express what I feel.	11	4.36	4	4	0.53	48
B.5 I’m more confident that I can do things well.	10	4.20	5	5	1.23	42
B.6 I’ve learned to take care of myself.	10	4.20	5	5	1.40	42
B.7 I’ve learned new things about myself.	10	4.80	5	5	0.42	48
B.8 I feel more connected to others.	10	4.00	4	4	1.25	40
B.9 I feel more supported.	10	4.40	5	5	0.84	44
B.10 I’m more hopeful about the future.	10	4.40	5	5	1.07	44
SECTION C - SAFETY FACTORS						
C.1 I had trust in the art therapist, and I felt supported to create.	10	4.90	5	5	0.32	49
C.2 I had trust in the group.	11	4.73	5	5	0.65	52
C.3 I felt that I could express myself without being judged.	10	5.00	5	5	0.00	50
C.4 I could express myself through art and not talk if I wanted to.	11	5.00	5	5	0.00	55
C.5 I was able to express difficult things while remaining in control.	11	4.73	5	5	0.47	52
C.6 I experienced pleasant feelings.	11	5.00	5	5	0.00	55
C.7 I felt I could express my culture and faith freely.	11	4.73	5	5	0.65	52
C.8 I was given the freedom to explore many art materials.	11	4.73	5	5	0.65	52
C.9 The workshops all had a similar structure.	11	4.09	5	5	1.38	45
SECTION D - CHANGE MECHANISMS						
D.1 When I’m creating with art materials (painting, clay, pastels), then I connect to emotions/memories, and I can express them in my artwork which help me to understand them better.	10	4.90	5	5	1.51	49
D.2 When I have expressed emotions/memories in an artwork, then I can look at them from a distance and it is easier for me to speak about them.	11	4.82	5	5	0.40	53
D.3 When I’m creating/playing with art materials (painting, clay, pastels), then I most of the time experience pleasure and joy and it helps me to relax.	11	5.00	5	5	0.00	55
D.4 When sharing in the group, I felt seen, heard and understood and it helped to me to feel normal. Looking at the artworks of others in the group and listening to them, helps me to realize that we experience similar things.	11	4.64	5	5	0.67	51
D.5 When I create, I stop thinking about the same things over and over again and new ideas, new memories, new thoughts arise in my mind and broaden my perspective.	11	4.73	5	5	0.47	52
D.6 When I work with the art material, I feel pleasure and it help me to tolerate better difficult emotions and to dare explore them further.	11	4.82	5	5	0.40	53
D.7 During the workshops I was a bit out of my comfort zone, but I managed it and was very satisfied.	11	4.55	5	5	1.04	50
D.8 When I feel tense, engaging with my body (movement, touch) in the art making helps me to release the tension.	11	4.91	5	5	0.30	54

1) In case of multiple responses or no response, response was not considered for the calculation.

Table 7

Attendance and survey section score per participant.

Participant	Nbr of attended sessions (#/8)	Satisfaction score [A1-A2]	Change score [B1-B10]	Safety score [C1-C9]	CM Score [D1-D8]
P1	5	-	4.0	5.0	5.0
P2	5	4.5	4.8	5.0	5.0
P3	6	5.0	5.0	5.0	5.0
P4	6	5.0	4.0	4.1	4.4
P5	8	5.0	5.0	5.0	5.0
P6	2	5.0	4.7	4.6	4.9
P7	6	5.0	5.0	4.9	5.0
P8	8	5.0	4.3	5.0	4.6
P9	7	5.0	4.3	4.6	4.0
P10	4	5.0	4.3	4.9	5.0
P11	6	5.0	2.7	4.4	4.9

distraction (de Witte et al., 2021). Kalmanowitz and Ho (2016) also highlight the importance of time and argue that engaging in art activities can help to focus on the present moment and restore a sense of time inside. These authors, who include mindfulness in their intervention, emphasize focusing attention on thoughts, feelings and physical sensations to increase emotional and cognitive flexibility, rather than distraction. However, they also mention that engaging in distracting activities can generate optimism and lead to more flexibility. Distraction is recognized as being a healthy coping mechanism (Vaugh et al., 2020). Second, the CM-regulation through the artwork: when participants can express an inner experience on a tangible artwork, they can see it and reflect on it, and they feel appeased. The TF-domains non-verbal expression and concretization are involved in this CM. Concretization is specific to creative arts therapy (de Witte et al., 2021). The process of giving form to an abstract inner experience in a tangible artwork that can be physically perceived and reflected upon is described by many AT authors and is central to the AT approach (Malchiodi, 2020; de Witte et al., 2021; Zadeh & Jogia, 2023). It is not labeled as a CM as such and not directly identified as generating appeasement. Feen-Calligan et al. (2020) found that it is rather the kinesthetic exploration of media, particularly sensory media, which, by allowing energy to be discharged, generates appeasement. The third CM is CM-regulation through the group: participants found that being in a group helps them feeling calmer. The TF involved in this CM belong to the TF-domain group processes and emphasize the role of the group in developing individual safety by providing support and a sense of belonging. Researchers Zadeh and Jogia (2023) described a similar process named rebuilding trust, which they classified as a benefit of group interventions. Feen-Calligan et al. (2020) observed that engaging in group art making activities contributes to creating safety, which they found essential to therapeutic outcomes. The fourth CM is the CM-regulation through positive emotions: when participants look at their artwork and experience positive emotions, then they feel appeased. In AT, positive emotions are generally associated with exploring art material, playing, kinesthetic and sensory experience and aesthetic pleasure (Czamanski-Cohen & Weihs, 2016; Hinz, 2020). de Witte et al. (2021) group all these TF under the TF-domain artistic pleasure. The CM is not described in current AT change process research although positive experiences are found to regulate the autonomic nervous system (Fredrickson et al., 2003). Finally, the fifth CM-taking time emphasizes that for some participants lasting change may require time and repetition of the process on several occasions. de Witte et al. (2021) framework does not propose any TF that can be associated with this notion of processes evolving over time, perhaps because they see it as part of the therapeutic change process.

Most participants also reported being more able to regulate their emotions somehow, which is in line with previous AT research on FDP (Kalmanowitz & Ho, 2016; Ugurlu et al., 2016; Schouten et al., 2019). Emotion regulation is recognized as a benefit of art therapy (Abbing et al., 2018; Hinz, 2020; Malchiodi, 2020). Three CM describe aspects of

the emotion regulation process, as perceived by participants. First, CM-emotional awareness includes the ability to express emotions in art making, and then to take the time to focus on and confront them, and thus to become more aware of them. This sequence involves the TF-domain concretization and modulating time and space. Kalmanowitz and Ho (2016) describe a similar process claiming that art therapy can facilitate the expression and then the acknowledgement of emotions simply by staying with them and allowing them to be, which ultimately increase emotional awareness. Zadeh and Jogia (2023) also mention that art therapy interventions help FDP to face painful experiences through drawing or other mediums, which enables them to acknowledge and become aware of their emotions. Schouten et al. (2019) report that FDP participants could express emotions that they never shared before, without any word. Next, the CM-processing and positive reframing describes a longer sequence in which participants express, confront, transform, then verbalize and reframe their emotions in a positive way, which involve in addition the TF-domain emotional elicitation and processing and understanding. Zadeh and Jogia (2023) find that AT enables FDP to transform their narratives through art and adopt a new perspective by reflecting on their experience. Artwork is seen as capable of depicting emotional experiences and serving as a tangible support that facilitates perspective-taking, self-reflection and understanding (Abbing et al., 2018; Bosgraaf et al., 2020; Czamanski-Cohen & Weihs, 2016). Finally, CM-taking time refers to the participants' perception that the art therapy sessions have triggered a process of change that needs more time to develop. Schouten et al. (2019) report the case of a participant whose mourning process took time to set up and develop.

Most participants acknowledged that taking part in the intervention has strengthened them: they learned new things about themselves and the others, felt more confident, motivated and empowered. Increased self-knowledge (Akthar & Lowell, 2019; Kalmanowitz & Ho, 2016), increased sense of control and mastery (Kalmanowitz & Ho, 2016; Malchiodi, 2020; Ugurlu et al., 2016), increased sense of accomplishment (de Witte et al., 2021) are positive changes attributed to AT interventions. Participants described several CM leading to a feeling of reinforcement. First, learning to verbalize inner experience by talking about their artwork was identified by some participants as a confidence booster. In AT the artwork is seen as a tangible agent that facilitates self-reflection and promotes understanding (Abbing et al., 2018; Bosgraaf et al., 2020), which can increase self-confidence. Secondly, participants reported that during the sessions, they got to know others and learn from them, which made them feel stronger. Interpersonal learning is identified as a therapeutic factor in group settings (Gabel & Robb, 2017; de Witte et al., 2021). The group enables individuals not only to talk about themselves and be heard, but also to listen to others, discuss and exchange points of view (Kalmanowitz & Ho, 2016). As a third CM, participants reported that they sometimes projected unconscious symbolic and metaphorical elements into their artwork, and that seeing and reflecting on them gave them a better sense of their potential, which was motivating. This sequence involves the TF-domains symbolism & metaphor, concretization and understanding, the first two domains being specific to the creative art therapies (de Witte et al., 2021). In AT research on FDP, the use of artistic materials is rather seen as a way to encourage exploration of unconscious sensations, emotions and memories associated with trauma, which can then be revealed through the artwork and made explicit (Akthar & Lowell, 2019; Czamanski-Cohen & Weihs, 2016; Kalmanowitz & Ho, 2016; Zadeh & Jogia, 2023). As next CM, participants explained that using metaphors in art making allows them to live symbolic and rewarding experiences, and that they felt stronger when they could step back and reflect on them. Artworks are seen as transitional objects that allow to project ideas and navigate between known and unknown realms (de Witte et al., 2021). The same piece of art can hold the past as well as the present and a hope for the future, it can represent the concrete and imaginative, and hence fosters flexibility (Kalmanowitz & Ho, 2016).

Participants also identified some obstacles and enablers which are

consistent with previous research in art therapy with FDP. Understanding art therapy is seen as a factor that limits the access to art therapy for FDP (Akthar & Lowell, 2019). Bolstering retention is also identified as a challenge, especially when art therapy is competing with other activities (Feen-Calligan et al., 2020). The non-judgement attitude and the role of the therapist are factors common to all therapeutic approaches (de Witte et al., 2021).

Limitations and recommendations

This exploratory study establishes an initial perspective on the process of change from the point of view of forcibly displaced adults after an AT intervention aimed at building resilience. To this end, the authors systematically used the framework of therapeutic factors developed by de Witte et al. (2021) and proposed to define a CM as a sequence of TF that leads to change. Most of the CM identified could be related to previous art therapy research, although the latter does not describe them as CM as such, but rather as benefits, features, elements or factors. There is currently no consensus either on a definition or list of potential CM, and the authors call for a systematic description of these CM in AT research.

The first limitation of the present study is the number of participants. Only 11 participants took part in this study, which is not enough to reach saturation, and some CM are not very elaborate and contain just a single TF. As a result, these findings only provide a first glimpse. Secondly, participants being recruited on a voluntary basis at the end of the intervention showed a great adherence to the process (selection bias). Furthermore, the survey is not a validated tool, and the sample was too small to confirm its reliability and validity, and responses to the survey may have been influenced by the participant's desire to provide a socially desirable answer (response bias). On the other hand, one of the strengths of this study is that it systematically explored the process of change from the participants' point of view, which is pioneering given that little research has been carried out in this area to date, paving the way for further research.

It is recommended that institutions caring for adult FDP include preventive AT interventions that recognize their individual and collective strengths and aim to strengthen their resilience factors to better cope with psychological challenges and adversity. For future research, first, it is recommended to replicate the present study to confirm and enrich the list of CM from the FDP's perspective, to triangulate them with the view of the art therapists and staff and to better identify the AT modalities that are operative in order to improve the intervention. Then, it is proposed to use an art-based assessment method such as ArTA (Pénzes, 2024) in a longitudinal design to measure the effectiveness of the intervention in building resilience. Finally, it is suggested to investigate whether the results could be generalized in individual settings.

CRedit authorship contribution statement

Evelien Joosten: Writing – review & editing, Supervision. **Liliana Montoya De La Cruz:** Writing – review & editing, Validation, Investigation. **Natacha Pirotte:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Martina de Witte:** Writing – review & editing. **Viviana Rodriguez:** Writing – review & editing, Validation, Resources.

Institutional Review Board Statement

The study was conducted as per the Declaration of Helsinki and approved by the Ethical Research Committee of the HAN University of Applied Sciences (ECO-435.02/23).

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Declaration of Competing Interest

The authors declare no conflicts of interest.

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Data availability

Data will be made available on request.

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Move freely! – A theoretical overview of the mechanism of movement improvisation

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ABSTRACT

In recent years, psychological research has increasingly explored interventions that integrate art forms, including movement improvisation. However, research on movement improvisation lacks a unified empirical groundwork and the findings in the field of movement are inconsistent due to several different reasons. This paper presents an integrative overview of movement improvisation research, identifying 18 processes that might account for changes in mental health outcomes and moderator and mediator variables that can influence the effects of such intervention. We propose that different movement forms engage these processes to varying degrees, resulting in contradictory outcomes in mental health. Our review highlights the need for a unified theoretical framework and standardized research methodologies to improve the comparability of studies on dance and movement. Future research should focus on meta-analyses and control studies to deepen the understanding of the effects of movement improvisation and its broader therapeutic applications.

Introduction

In recent years, psychology research has increasingly focused on interventions that incorporate various art forms. Movement improvisation aligns with this trend and is a key component of dance/movement therapy (DMT). In DMT therapists use body movement as an assessment tool and a mode of intervention ([American Dance Therapy Association](#)). In contrast, when movement improvisation is used in a non-therapeutic context, it primarily serves as a tool for the non-verbal communication of thoughts and emotions, as defined by [Blom and Chaplin \(1988\)](#). While the role of recreational movement improvisation is fundamentally different from that of movement improvisation in dance/movement therapy (DMT), the processes and mechanisms through which it exerts its effects may overlap significantly.

Numerous empirical studies have demonstrated the reliability and effectiveness of DMT, making it a relevant topic for scientific research (see [Cruz & Sabers, 1998](#); [Meekums et al., 2012](#); [Koch et al., 2013](#)). However, there is limited empirical research on movement improvisation itself, leaving much unknown about its psychological effects and potential for broader therapeutic application outside DMT. Due to the limited number of studies on movement improvisation, it is necessary to rely on research from the broader fields of movement and dance.

However, a meta-analysis on the effects of DMT and dance interventions on health-related psychological outcomes describes important limitations in this field such as inconsistent results – mainly due to methodological differences –, a limited number of meta-analyses and primary studies, aligning with our view ([Koch et al., 2014](#)). This lack of consistency is unsurprising, given the absence of standardized protocols for how an intervention should be conducted. Movement and dance classes can take various forms even within the same genre (e.g., hatha yoga, rumba, hip hop), resulting in each study essentially using a slightly different intervention. Thus, one possible explanation for the inconsistency in results is that not all forms of movement have the same effects (see for no improvement in depression: [Baptista et al., 2012](#); [Eyigor et al., 2009](#); see for improvement in depression: [Finn et al., 2023](#); [Pinniger et al., 2012](#); see for more detailed description: section “*Effects of Moderators*”). It is also difficult to compare results due to inconsistency in methodology and variable operationalization. Christensen and colleagues (2021) and [Koch et al. \(2014\)](#) also state that much of the inconsistency in results stems from the lack of unified definitions and how mental health is operationalized. These variations makes it challenging to compare and interpret the findings across studies and meta-analyses. While some meta-analyses provide valuable insights into the general effects of certain types of movement, these results must be

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interpreted cautiously due to the diversity of methodologies used – a limitation frequently mentioned by authors (see: Liu et al., 2023; Koch et al., 2014; Fleming & Herring, 2018).

For these reasons, we believe it is crucial to establish an integrated and unified theoretical framework that can serve as a foundation for researching movement improvisation. This would benefit the field of psychology related to dance and movement for three reasons: (1) This is necessary to enable the development of well-designed, comparable studies on the relationship between movement improvisation and mental health, whose results can be properly interpreted. (2) Such efforts would deepen our understanding of movement improvisation and enhance its practical application outside of DMT by harnessing its positive effects. (3) Last, but not least, understanding the independent effects of movement improvisation would bring us closer to understanding the specific (outside the independent effects of movement improvisation) and non-specific (the independent effects of movement improvisation) factors in DMT.

Our goal is not to create a new therapeutic method or examine the effects of DMT but rather to lay the groundwork for more precise examinations into movement improvisation and its potential non-therapeutic applications. The purpose of this integrative review is to summarize possible underlying processes of movement improvisation and provide a foundation for future research and interventions on movement improvisation – and potentially other dance and movement forms – in relation to mental health.

Defining the conceptual framework

Improvisation can be interpreted as a part of dance; however, the definition of dance is just as complex as that of improvisation. From an anthropological perspective, "dance is a cultural form that results from creative processes which manipulate human bodies in time and space" (Kaeppeler, 1978, p. 32). As Martha Graham famously said, "Dance is the hidden language of the soul, of the body" (Martha Graham Reflects on Her Art and a Life in Dance, 1985). Mackrell (2024) describes dance as "the movement of the body in a rhythmic way, usually to music and within a given space, for the purpose of expressing an idea or emotion, releasing energy, or simply taking delight in the movement itself" (Encyclopaedia Britannica). This definition aligns with Bakare's (2000) concept of dance as "a rhythmic movement of the human body in time and space to make statements" (Aluede & Eregare, 2006). However, (Jacqueline Smith 1989, In Aluede & Eregare, 2006) defines dance as an exposition of movements, notably omitting the rhythmic component. In Nigeria, some groups practice dancing without music, which highlights the independence of dance from rhythm (Aluede & Eregare, 2006). In addition to these broad definitions of dance, oversimplified descriptions can also be found, as Fitch and Barnstaple (2024) argue, such as "moving to music" or "moving to music with others." They define dance as mindful movement, referring to skilled, intentional movements that can be performed with or without others and with or without music.

Gueugnon and colleagues (2016) define improvisation in psychology as a creative process in which individuals produce something new without relying on pre-existing material (Gueugnon et al., 2016 In Coste et al., 2019). In contrast, Chelariu and colleagues (2002) conceptualize improvisation as the unique combination of pre-existing elements (in this case, specific movements) to reflect the present moment (Coste et al., 2019). (Steinsholt and Sommero 2006, In Bjorbaekmo & Engelsrud, 2011) offer another perspective, emphasizing that improvisation is a reflective practice where the body, movement, and environment exist in dynamic interaction. Sheets-Johnstone describes improvisation in dance as a way of thinking in movement, a seamless fusion of thought and action (Ravn & Høffding, 2021).

These diverse perspectives of dance and improvisation highlight the multifaceted nature of these concepts, each emphasizing different aspects of their essence. While these definitions effectively capture their complexity, the lack of a clear methodological framework makes it

challenging to define the boundaries of these concepts. This ambivalence complicates efforts to categorize the content of movement-based interventions, which is crucial for assessing the distinct effects of different components of movement improvisation.

Drawing on these, a significant challenge in the field of movement research is the precise interpretation of key concepts. The various definitions of movement, dance, and improvisation lead to less comparable results, as detailed descriptions of the interventions used are often lacking. Additionally, as we can see, these concepts can mean many different things. Think about the influence of hip-hop dance on mental health, as this genre can take many different forms (e.g., freestyle, choreography, background dance, theatrical dance) as well as the other types of movement. Similarly, ballroom dancing encompasses various distinct dance styles. Therefore, the impact of a movement intervention can only be accurately interpreted when the intervention itself is precisely described – something that is often lacking. Additionally, there are forms of movement such as dance aerobics, synchronized swimming, acrobatic rock and roll, and yoga, which occupy borderline areas in the traditional understanding of dance. From a research perspective, it is essential to establish a standardized definition of fundamental concepts, as this would also provide a clear framework for determining the types of tasks and movements to be included in interventions. We defined three basic concepts – movement, dance, and improvisation – based on the various approaches presented.

Movement and dance

Movement, is a broader term referring to any physical change in the position of the body relative to a fixed point. This encompasses activities such as dancing and running, as well as a wide range of other actions (e.g., walking, boxing, brushing teeth).

Dance is a form of physical movement that combines artistic elements, typically performed to music – although movement without music can also be considered dance – featuring defined and/or spontaneous mindful motions. It can involve one or more body parts, with movements that are either coordinated or disorganized, aestheticized or not, often utilizing specific rhythms to structure the motion. Dance can also be seen as a form of language, inherently communicative, though it lacks a universally identifiable, rule-based logic in the linguistic sense (Lynne-Hanna, 1979). Moreover, dance encompasses social, cultural, emotional, and cognitive dimensions, influencing an individual's psychological, physical, and biological states (Murcia et al., 2010; Christensen et al., 2021). This definition of dance is based on the works of Kaeppeler (1978), Aluede and Eregare (2006), Mackrell (2024), and Fitch and Barnstaple (2024).

For instance, running would not be classified as dance under this definition, as it lacks artistic components and communicative intent. However, synchronized swimming, certain forms of yoga, and acrobatic rock and roll do fall under the concept of dance – though this might seem unconventional – since in this context, dance is considered a theoretical concept rather than interpreted in its typical sense.

Improvisation

Movement improvisation falls within the broader concept of dance. It is a spontaneous form of motion in which a person shapes the sequence of movements based on momentary associations (Lovatt, 2018). This may include pre-existing, previously learned dance elements (e.g., turning combinations, basic hip-hop steps). However, during improvisation, the individual does not know what their next movement will be (Merritt 2015, as cited in Ravn & Høffding, 2022). In contrast, a dance routine or choreography involves a predetermined sequence of movements according to Oxford Languages Dictionary. Movement improvisation also incorporates everyday, natural, and specific movements, which are creatively used to express the present moment or process (Azzara & Grunow, 2010 In Coste et al., 2019). As a result, anyone can engage in this form of movement, adapting the intervention to their own abilities by incorporating their unique movements. For instance,

walking can be considered movement improvisation if the individual mindfully shapes the form, pace, and style of the walk to express a specific thought, feeling, or moment.

Movement improvisation can be divided into two categories. The first is goal-oriented improvisation (Wiedenhofer & Koch, 2017). In this case, movement arises from spontaneous associations but is guided by a specific concept (e.g., “Move as if you were a leaf blown by the wind!”). Therefore, it cannot be considered entirely free improvisation, as the movements must always connect to the given concept in some way. Here, movement becomes a manifestation of thought, with the improvisation continually linked to the mental representation of the idea. Unlike purely physical movements devoid of conscious thought, this form requires ongoing connection to the conceptual framework (Ravn & Høffding, 2022). The second category is non-goal-oriented improvisation (Wiedenhofer & Koch, 2017). Blom and Chaplin (1988), pp. x) describe dance improvisation as a process that “fuses creation with execution [...], it is thus creative movement of the moment [...] [where] the kinesthetic self is free to partner with the imagination impulsively, without preparation or preconception.” This form of improvisation is not tied to a specific thought or idea, but instead is characterized by mindfulness or flow, where movement is free from external direction.

Movement improvisation and mental health

Movement improvisation is not considered an independent genre; rather, it is present in various dance styles (e.g., contemporary dance, breakdance, ballroom dance, Hungarian folk dance), certain martial arts (e.g., qigong, tai chi), and other forms of movement (e.g., yoga). Despite the widespread application of DMT, the definition of movement improvisation varies as we presented above. This lack of unified definition presents a challenge for improvisation-related research. Where should one begin in terms of literature? DMT involve multiple factors that can alter the effects of movement, either amplifying or shifting them in a different direction. As a result, research outcomes typically reflect the impact of the overall therapeutic method rather than the specific effects of movement improvisation. Conversely, basing research on improvisation within a specific dance genre may limit generalizability, as the unique characteristics of that genre can skew findings. Additionally, there is limited research specifically focused on movement improvisation alone, and the studies available can differ significantly in terms of the intervention used due to a lack of unified definition and method. Thus, it is important to consider findings from research on different dance genres, movement forms, and sports to distinguish the effects of the underlying processes of movement. In the following paragraphs, we present articles whose interventions align with the definition of movement improvisation and dance provided above.

The field of dance psychology research has experienced significant growth in recent years. However, the empirical investigation of dance or movement improvisation in relation to mental health remains a relatively developing area. Kim and Kim (2007) examined the effects of hip-hop improvisation on well-being. They found that after one session, participants in the hip-hop improvisation and aerobic groups experienced improvements in well-being, whereas no such improvements were observed in the body conditioning or ice-skating groups. The lack of detailed descriptions of the interventions in this case limits the ability to draw conclusions about why only hip-hop improvisation and aerobics yielded these positive outcomes, leaving us with questions regarding the underlying processes of these forms of movement.

Wiedenhofer and Koch (2017) conducted a pivotal study comparing the effects of goal-oriented and non-goal-oriented dance improvisation on perceived stress, general self-efficacy, body self-efficacy, and well-being. They found that all variables improved in both groups after a single session, with the exception of body self-efficacy, which did not improve in the goal-oriented group. A notable strength of this study is the authors' detailed description of the intervention. However, integrating the results into a broader theoretical framework would help

interpret why body self-efficacy did not improve when participants were presented with concepts to connect to during improvisation.

Dame and colleagues (2022) investigated the effects of an Emotional Availability (EA)-based dance intervention designed for pregnant women. This pilot study included two 90-minute online dance improvisation sessions, either alone or combined with psychoeducation, alongside a control group. Results indicated that anxiety and prenatal emotional availability improved in the intervention groups. Furthermore, depressive symptoms improved more significantly in the dance improvisation group compared to the control group. The detailed explanation of the intervention and the use of control groups provide valuable insights into the mechanisms underlying these outcomes. Additionally, the online delivery format of this study is noteworthy, as it removed the social component typically associated with such interventions. However, the lack of deeper interpretation of the differences between the groups raises further questions.

Bracco et al. (2023) explored the effects of tango therapy on well-being and quality of life, as well as intervention attendance, physical abilities, walking performance, and functional capacities in older adults (aged 78 years or older) with cognitive impairments. After 12 weeks and 24 sessions of dance intervention, they observed a significant improvement in quality of life. The detailed description of the intervention is a strength of this study, as it could help us better understand the mechanisms of movement improvisation. However, the same issue arises as before.

Research on movement improvisation and mental health is diverse in terms of sample characteristics, intervention content, and study duration. Despite this variability, the findings are promising, suggesting that this form of dance can be beneficial for mental health across different stages and aspects of life. However, without a unified theoretical framework, a deeper interpretation of the results is challenging.

How do dance and movement exert their effects?

Describing the underlying mechanisms of dance and movement is not new in this research field. As Merényi (2004) summarizes, DMT is grounded in the connection between body and mind, supported by neuroscientific research on implicit memory. It integrates psychoanalytic theories, particularly modern self-psychology, alongside experiences from contemporary dance and body-awareness systems. Psychoanalytic theories highlight the importance of infancy in shaping future relationships. Stern posits that infants' self-experience is bodily rather than verbal, which influences behavior unconsciously later in life (Stern, 2003 In Merényi, 2004). Movement in DMT allows participants to access unconscious memories, repressed conflicts, or early experiences that are difficult to verbalize. In infancy, explicit memory systems are underdeveloped, so early relational and emotional experiences are stored in implicit memory. These unconscious experiences can be reshaped through practice and experience. DMT thus facilitates reflection on behaviors and also addresses implicit experiences that cannot be articulated through words.

We can find other models as well explaining how dance and movement exert their effects. The Mental Health Through Sport Model (Eather et al., 2023) was developed with a purpose similar to the present work, outlining the processes of sport in relation to physical activity and social relationships. Another relevant framework is the Dance Motivation Inventory (DMI), created by Maraz and colleagues (2015), which captures the motivational aspects of dance. In developing our theoretical model, we took both of these frameworks into account. Moreover, beyond understanding why people move and how movement impacts mental health, the nature of the movement itself warrants deeper exploration. Laban Movement Analysis breaks down the process into its core elements and can be used to explore the specific characteristics of an individual's movement. Additionally, Giurchescu (2001) and Butterworth (2012) identified nine levels of movement analysis, referred to as the semiotic levels of dance, which provide a detailed framework for

examining the communicative aspects of dance.

The theories and ideas introduced above are very useful for understanding how dance and movement exert their effects. However, none of them are suitable for describing the mechanism of movement improvisation in a way that would facilitate the conduction of comparable and generalizable research in this field. To explain the inconsistencies in the findings mentioned in the section "Effects of Moderators" and to lay the groundwork for a deeper interpretation of the results and future research, we began to sketch out a theory capable of addressing these issues.

Our own experiences as hip-hop and modern dance instructors partially explain this phenomenon. Dancers may experience a range of emotions after classes – feeling delighted, stress-relieved, and confident after one session, yet sad, emotionally unsettled, or frustrated after another. They might also feel ambivalent, experiencing both positive and negative emotions simultaneously. This experience drew our attention to the importance of the components of the intervention (e.g., the music used, level of difficulty) and other influential factors (e.g., dancers' preferences, their psychological state). When researching therapy, an important question is which factors and processes lead to the desired outcomes. Yalom identifies 11 common therapeutic factors that contribute to the effects of therapy (Yalom, 1995 In Witte et al., 2021). Imus and Young (2023) describe nine fundamental mechanisms in creative arts therapies. The concept that interventions contain various factors, components, or mechanism is not new. However, there is no comprehensive description of these processes in movement improvisation. We believe that this form of movement also involves distinct processes through which the intervention exerts its effects. To empirically examine this theoretical idea, we reviewed the literature on movement and dance, focusing on the processes identified by researchers and participants that they believe contributed to changes, or by ourselves by the interpretation of results in mental health outcomes. To empirically examine this theoretical idea, we reviewed the literature on movement and dance, focusing on the processes identified by researchers and participants, as well as the processes we concluded from our interpretation of the results.

Research question

From a broad perspective, this review examines the processes, moderators and mediators underlying movement interventions to explain the mechanism of the effect of movement improvisation and establish a unified theoretical and methodological foundation for future movement research. Specifically, we explore how movement improvisation exerts its effects in non-therapeutic settings and the factors influencing these effects. In summary, our research question is: What are the potential underlying processes, moderators and mediators through which movement improvisation exerts its effects?

Methods

As discussed in the introduction, due to the limited number of studies specifically focused on movement improvisation and mental health, we reviewed literature on various forms of movement. These include dance improvisation across genres (e.g., hip hop, contemporary, ballroom), music improvisation with parallels to movement improvisation, and individual or team sports (e.g., basketball, Pilates, yoga) that share common features. To identify processes potentially underlying movement improvisation, we considered diverse movement domains, guided by the definitions of core concepts provided earlier. These definitions helped identify components associated with other movement forms relevant to movement improvisation, highlighting shared features across various types of movement.

Search strategy

For this article, we conducted an integrative literature review. Relevant articles published between 1995 and 2023 were identified using Google Scholar. In addition, we performed a manual search of reference lists from these articles and key journals related to dance and movement in psychology, including "The Arts in Psychotherapy", "American Journal of Dance Therapy", and "Arts & Health". The following keywords were used in order to find eligible results: "dance", "dance intervention", "hip hop dance", "modern dance", "contemporary dance", "movement improvisation", "improvisation" with additional search terms "and mental health". Only studies that met the following criteria were included:

- The article examines the connection between mental health and improvisation, dance, or movement.
- The article discusses or the results suggest potential underlying processes of the researched movement.

Defining processes and mechanism

In creative arts therapies a set of 'common factors' are understood to promote change through therapy (Ahessy, 2013 In Dunphy et al., 2019). These factors are common to all types of psychotherapy, they are not approach-specific (Kazdin, 2009 In De Witte et al., 2021). However it is difficult to interpret these factors to a non-therapeutic setting. In line with this definition, we define factors that may be common to all movement interventions as "processes." In our implementation, a process refers to a construct (e.g., flow, self-expression), a variable (e.g., physiological indicators, psychological states), or a method (e.g., mindfulness, journaling) that has a distinct, measurable effect contributing to overall changes in the studied variables and is a part of the movement intervention.

De Witte et al. (2021) define mechanism of change in the topic of therapy as „A theory-driven causal chain or sequence of events or processes (or mediating variables) that explain, in greater detail than factors or mediators alone, how or why therapeutic change occurs" (De Witte et al., 2021, pp. 4). To understand the underlying mechanism of movement improvisation, we first need to understand the relationship between the described processes.

A moderator in De Witte et al. (2021) definition is „a variable external to the treatment that influences the direction or magnitude of the statistical relationship between the treatment and outcome, such that a moderator may strengthen, weaken, diminish, or reverse the relationship between X and Y" (De Witte et al., 2021, pp. 4).

A mediator in their definition is „an intervening variable that is theorized to account for the statistical causal relationship between two variables, such that X causes M which in turn causes Y. A mediator clarifies how or why therapy leads to change and is a term usually used in the context of quantitative statistical analysis" (De Witte et al., 2021, pp. 4). We interpreted mediators as characteristics of the intervention that influence which processes may prevail. Specifically, in our case, a mediator is a variable theorized to account for the relationship between movement improvisation and mental health, such that if movement improvisation incorporates the mediator, it enables a specific effect of a process to emerge.

Data and content extraction

After screening the titles and abstracts, two researchers independently assessed the full-text articles for relevance. Disagreements were resolved through discussion. Relevant data and content were extracted from the selected articles, and a table was created to summarize key characteristics, including research design, measures, results and the possible underlying processes, moderators and mediators discussed (see Table 1).

Table 1
Reviewed articles.

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
Adam et al., (2016)	intervention study, RCT, longitudinal design (assessment points: baseline and after 3 and 6 weeks), $n_{\text{int}} = 44$ $n_{\text{cont}} = 40$ age 60 or older, mild to moderate cognitive impairment	poco-poco dance and relaxation total of 12 sessions, 2 sessions (60 minutes/ session) per week for 6 weeks Intervention group: 10-minute warm-up, 20 minutes of poco-poco dancing (stepping movements with progressively more intense arm and leg movements), 10-minute cool-down, 30-minute relaxation Control group: 40-minute relaxation (relaxing music, deep breathing, visualizing, progressive muscle relaxation 3-times) team sports	Mini-Mental State Examination Hospital Anxiety and Depression Scale (HADS) Quality of Life in Alzheimer's Disease (QOL-AD) questionnaire	Anxiety, depression, cognitive impairment and QoL significantly improved in the intervention group. The intervention group was more effective than the control group. Anxiety and depression increased, QoL decreased in the control group.	Based on study: (1) relaxation combined with dance, (2) coping, (3) cognitive and physical improvements, (4) music Based on our model: stress management methods (1), coping and emotion-regulation (2), general psychological changes/physiological changes (3), music (4)	Based on study: (5) age Based on our model: demographics (5), music (4)
Andersen et al., (2018)	integrative literature review 17 studies			Participation in team sport is associated with improved social and psychological health independent of the type of team sport, age, or somatic or mental health problems. Team sport could be more efficient in promoting health and ensuring adherence than individual sport, because it offers a social setting, playfulness, structure in everyday life and enjoyment.	Based on study: (1) adherence, (2) social setting (inclusivity, play, social interaction), (3) enjoyment, (4) meaningfulness/ structure in everyday life Based on our model: general psychological changes (1, 3, 4), social environment and relationships (2)	Based on study: (5) initial psychological state, (6) motivation, (7) social context Based on our model: initial psychological state (5), level of involvement and motivation (6), social context (7)
Bräuninger, (2014)	intervention study, RCT, longitudinal (assessment points: mental health measures at pre- and post-test and at six months follow-up, intervention checklists after each session) $n_{\text{therapists}} = 11$ $n_{\text{int}} = 97$ $n_{\text{cont}} = 65$ participants suffered from stress	DMT total of 10 sessions, 1 session (90 minutes/ session) per week for 10 weeks (each of 11 DMT therapists led 10 group sessions in distinct groups) Intervention group: DMT, where the therapists could choose eclectically from four DMT approaches and 10 DMT interventions Control group: wait-list	Intervention Checklist 1 (individual interventions used by therapists) Intervention Checklist 2 (group approaches used by therapists) Brief symptom inventory (BSI) Coping and stress questionnaire (SVF 120) World Health Organization QOL questionnaire (WHOQOL-100) Munich life dimension list (MLDL)	Dance Improvisation, Spatial Synchrony, Synchrony in Effort and Focusing are important individual DMT interventions that enhance clients' Daily Life and decrease Somatization symptoms. Different interventions and approaches result in different outcomes in mental health.	Based on study: Chace approach, Psychodynamic Oriented Dance Therapy, Authentic Movement, Integrative Dance Therapy, (1) dance techniques (improvisation, choreography, composition, stage presence), (2) DMT techniques (expression, metaphors, synchrony), (3) focusing, (4) imaginative techniques, (5) leadership styles, (6) non-DMT techniques (painting, writing, theater), (7) relaxation techniques, (8) session structuring Based on our model: self-expression/ synchrony with each other (2), stress management methods (7), other psychological methods (3, 4), non-movement techniques (6)	Based on study: - Based on our model: intervention characteristics (1, 5, 8)
Christensen et al., (2017)	integrative literature review	dance (neuroscientific and biobehavioral evidence)		Dance is beneficial and important for the stability of human social, cognitive, and	Dance is beneficial and important for the stability of human social, cognitive, and	Based on study: (7) goal- and non goal-oriented movement Based on our model:

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Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
				neurobiological systems. Six functions of human dance have been proposed: focus attention, induced flow, basic emotional experiences, imagery, communication, self-intimiation and social cohesion.	(3) imagery, (4) communication, (5) self-intimiation, (6) social cohesion, (7) observing others while moving Based on our model: altered states of consciousness (1), general psychological changes (2, 5), other psychological methods (3), self-expression/ social environment and relationships (4), social environment and relationships (6), observing others while moving (7)	social context (4), characteristics of intervention (7)
Duberg et al., (2016)	intervention study, RCT $n_{int} = 59$ $n_{cont} = 53$ $n_{interview} = 24$ adolescent girls with internalizing problems	dance total of 64 sessions, 2 sessions (75 minutes/ session) per week for 32 weeks Intervention: 15 minutes warmup, 40 minutes dance practice (choreography, improvisation), 15 minutes of relaxation (including a light massage in pairs) and 5 minutes reflection. The participants had the opportunity to choose music and dance styles. Optionally participants were offered to journal their experiences during the intervention. The diary would neither be collected nor read by anyone. Control group: not mentioned	Semi-structured interview (35–90 minutes) The interviews were based on open-ended questions from an interview guide.	The first category An Oasis from Stress was described as a fundamental basis for participation, together with Supportive Togetherness, that represents the important group setting. As this was ensured, the girls could engage in the immediate effect of the dance, Enjoyment and Empowerment, and experience the outcome, Finding Acceptance and Trust in Own Ability, and, moreover, the ability to use Dance as Emotional Expression. These experiences gave rise to the main category, Finding Embodied Self- Trust That Opens New Doors.	Based on study: (1) An Oasis from Stress, (2) Supportive Togetherness, (3) Enjoyment and Empowerment, (4) Finding Acceptance and Trust in Own Ability, (5) Dance as Emotional Expression Based on our model: stress management methods (1), social environment and relationships (2), general psychological changes (3, 4), self-expression (5)	Based on study: (6) social context Based on our model: social context (6)
Eather et al., (2023)	systematic review 29 studies	sports		Participation in sport (community and elite) is related to better mental health (e.g., higher self-esteem, life satisfaction, reduced levels of depression, anxiety, and stress), and improved social outcomes (e.g., improved self-control, prosocial behavior, interpersonal communication). Participating in team sport had more favorable health outcomes than those participating in individual sport. Adults in elite sport may experience higher levels of psychological distress.	Based on study: (1) neurobiological mechanisms, (2) psychosocial mechanisms, (3) behavioural mechanisms, (4) social connections and support (social support, belonging and companionship, self-control or mastery, social influence and comparison, behavioural guidance, purpose and meaning, social control, self-esteem) Based on our model: physiological changes (1), general psychological changes (2), behavioural processes (3), social environment and relationships (4)	Based on study: (5) level of competition, (6) social context, (7) age, (8) sport type, (9) sport context, (10) intensity, (11) frequency, (12) duration, Based on our model: level of involvement and motivation (5), social context (6), demographics (7), intervention characteristics (8, 9, 10, 11, 12)
García-Díaz, (2018)	intervention study, RCT, pre- and post-test	authentic movement 1 session (7 minutes/ session)	Positive and Negative Affect Schedule (PANAS)	Intervention group: Anxiety and happiness decreased statistically	Based on study: (1) awareness of inhibited emotions, (2) body	Based on study: (4) previous experience, (5) trait affect

(continued on next page)

Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
	$n_{\text{int}} = 28$ $n_{\text{cont}} = 29$	Intervention group: The subject was placed standing barefoot on a parquet surface, eyes closed. The following instructions were given: "When you hear the sound of a bell, you should focus on the physical sensations that you are experiencing. Then, you must enable these physical sensations to be transformed into motion, following in this way the momentum arising from the body. Speaking is not allowed, although making sounds is allowed (e.g. screaming, laughing, etc.). There is no need to remember or memorize the movements being made". Control group: Same conditions but the participants had to memorize what they were doing. Movement was followed by a 30 minutes long debrief. The researcher was always present as a witness.	Mood Evaluation Scale (Escala de Valoración del Estado de Ánimo, EVEA)	significantly. Melancholy and sadness increased (not statistically significant). Reductions were observed in nervousness, tension, and restlessness. Trait affect influenced results. Control group: There were no significant changes at the subscale level. A statistically significant increase in irritation, annoyance, and sadness was noted.	awareness, (3) reducing perceived control Based on our model: general psychological changes (1, 2, 3)	Based on our model: experience (4), trait characteristics (5)
Han et al., 2018	literature review sample not mentioned	music familiarity and preference		Familiar music is effective in creating a safe environment and elicit past memories. Preferred music is used to encourage participation and improve mood. A client preferred genre is more effective than preferred specific songs.	Based on study: (1) music Based on our model: music (1)	Based on study: (1) music Based on our model: music (1)
Haynes et al., (2023)	intervention study, realist evaluation approach $n_{\text{dance}} = 77$ $n_{\text{survey}} = 62$ $n_{\text{interview}} = 51$	dance Participants completed six RIPE dance classes, than a part of them completed a survey to evaluate the RIPE Dance program and a part of this smaller group completed an interview for the same purpose.	survey (developed by authors to evaluate the RIPE dance program) semi-structured interview (to evaluate the RIPE dance program)	Researchers found the following factors that contribute to long-term attendance at dance classes: trusting that the intervention is "right for me", belief/experience of health benefits, self-efficacy, pride in achievement, psychological safety, defying expectations, feeling valued, social connection, mutual support, rapport with the teacher, raised spirits, fun, synchrony and musical reactivity.	Based on study: (1) trusting that the intervention is "right for me", (2) belief/experience of health benefits, (3) self-efficacy, (4) pride in achievement, (5) psychological safety, (6) defying expectations, (7) feeling valued, (8) social connection, (9) mutual support, (10) rapport with the teacher, (11) raised spirits, (12) fun, (13) synchrony, (14) musical reactivity Based on our model: general psychological changes (3, 4, 5, 6, 7, 8, 12), social environment and relationships (8, 9, 10), synchrony with	Based on study: - Based on our model: beliefs (1, 2)

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Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
Jeong et al. (2009)	intervention study, RCT, longitudinal (assessment points: pre- and post-intervention) $n_{\text{int}} = 20$ $n_{\text{cont}} = 20$ adolescents with mild depression	DMT Total of 36 sessions, 3 sessions (45 minutes/sessions) per week for 12 weeks Intervention group: DMT designed around four major themes: awareness of the body, the room, and the group; movement expressions and symbolic quality of movement; movement, feeling, images, and words; and differentiation and integration of feelings. Each of these themes included sub-themes. Control group: Did not participate in the intervention.	Symptom Check List–90-Revised (SCL–90-R) Plasma serotonin and dopamine concentrations	Intervention group: significant improvements in negative psychological symptoms (somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism), modulated serotonin and dopamine concentrations DMT has relaxation effects, stabilizes the sympathetic nervous system, and may be beneficial in improving the symptoms of mild depression.	each other/synchrony with music (13, 14) Based on study: (1) changes in concentration of stress hormones, (2) muscle relaxation Based on our model: physiological changes (1, 2)	Based on study: - Based on our model: -
Krantz & Pennebaker, (1995)	intervention study, RCT, longitudinal design (assessment points: pre-, during, post- and 10 weeks after intervention), $n = 64$	dance improvisation 3 sessions (10 minutes/session) Condition 1: move their bodies in order to express their feelings and thoughts about a personally significant issue or traumatic experience Condition 2: move to express their feelings and thoughts about a personally significant issue or traumatic experience and then write about what they expressed Control group:: execute a non-expressive exercise task Participants moved alone in a private room. Last session was videotaped.	Omran Digital Blood Pressure Monitor (blood pressure, heart rate) Judging subject's degree of expressiveness Number of illness visits in the Student Health Center Questionnaire about own performance Symptom checklist (developed by authors) Grade point average Long-Term Questionnaire (developed by authors)	Participants improved in expressing their thoughts and feelings through movement (condition 1 and 2). Participants in condition 1 and 2 reported that their movement was more personal, positive, valuable, and emotion-eliciting compared to condition 3. In condition 1 participants increased their rates of expressiveness in movement. Only participants in condition 2 showed significant improvement in GPA and physical health. The writing about the traumas appeared to completely overtake the importance of movement and self-expression in movement. 10 weeks after the intervention participants evaluated the experiment as difficult but beneficial, valuable and thought provoking.	Based on study: (1) self-expression, (2) emotion-eliciting, (3) evokes positive emotions, (4) writing Based on our model: self-expression and -intimation (1), general psychological changes (2, 3), non-movement techniques (4)	Based on study: - Based on our model: -
Dobay et al., (2019)	intervention study $n = 11$ secondary school students	dance improvisation total of 5 sessions, 1 session (45 minutes/session) per week for 5 weeks Intervention: Verbal opening circle, short body awareness work (improvisation), relationship work (improvisation) based on this and movement creation. At the end verbal processing. In addition, creative dance, dance and movement	interview (with group leaders and students)	The intervention offered as an opportunity for students to get to know themselves and each other. The level of cooperation and involvement is largely determined by attention and motivation for practice. If we move from concrete games and exercises to more abstract movement improvisations, it helps both involvement and reflective thinking and processing and thus will	Based on study: - Based on our model: -	Based on study: (1) attention and motivation, (2) structure of session Based on our model: initial psychological stat/level of involvement and motivation (1), intervention characteristics (2)

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Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
Lane & Lovejoy, (2001)	intervention study, RCT $n_{\text{int}} = 28$ $n_{\text{cont}} = 52$ intervention group: depressed mood control group: no-depression group experience in aerobic dance	improvisation, drama pedagogy and contact improvisation. aerobic exercise 1 session (60 minutes) Intervention: Warm-up (dance steps, walking, stretching), main session (stepping, lunges, knee lifts, bicep-curls, dance steps), and cool-down (stretching, breathing). In the session participants followed the moves of the instructor. The same music was used to accompany each aerobics session.	24-Item Profile of Mood States-Adolescents (POMS-A)	have a developmental impact on self-reflectivity and thus self-knowledge. Exercise influences mood positively regardless of depressed mood. The depressed mood group reported significantly greater mood changes. The depressed mood group reported significantly higher anger, confusion, fatigue, tension, with reduced vigor.	Based on study: (1) exercise Based on our model: physiological changes (1)	Based on study: (2) mood before the intervention Based on our model: initial psychological state (2)
MacDonald & Wilson, (2014)	literature review 177 studies	musical improvisation		Improvements were found in psychomotor impairments in patients recovering from neurological damage. Benefits for mental health included increase of vigour, reduction of tension, stress or anxiety, improving the symptoms of depressed patients (guilt, shame, despair) and enhanced self-esteem, self-confidence, self-awareness or emotional wellbeing. Those with low motivation are identified as more likely to benefit from different interventions. It can improve communication skills, joint attention, emotional communication, social interaction and self-expression. It can also improve emotional lability, psychosomatic symptoms, motor and timing skills.	Based on study: (1) self-expression, (2) unconscious expression, (3) creative expression, (4) creative social interaction, (5) emotional expression Based on our model: self-expression (1, 2, 5), social environment and relationships (4)	Based on study: (6) motivation Based on our model: level of involvement and motivation (6)
Maraz et al., (2015)	survey study, development of the Dance Motivation Inventory $n = 447$ recreational latin dancers	latin dance	systematic literature review self-report survey („I dance because...")	Categories of motivation to dance: fitness, mood enhancement, intimacy, socializing, trance, mastery, self-confidence, escapism	Based on study: (1) fitness, (2) mood enhancement, (3) intimacy, (4) socializing, (5) trance, (6) mastery, (7) self-confidence, (8) escapism Based on our model: physiological changes (1), general psychological changes (2, 6), intimacy (3), social environment and relationships (4), altered states of consciousness (5), coping and emotion-regulation (8)	Based on study: - Based on our model: -
Murrock et al., (2009)	intervention study, RCT, longitudinal (assessment points: pre- and post-intervention)	dance choreography total of 24 sessions, 2 sessions (60 minutes/session) per week for 12 weeks	interview (focus group) diabetes outcomes (A1C, weight, body fat, BP)	There were positive significant changes in the intervention group in systolic BP and body fat.	Based on study: (1) changes in BP and body fat, (2) attendance, (3) peer support Based on our model:	Based on study: - Based on our model: adherence and attendance (2)

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Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
	n _{int} = 34 n _{cont} = 36 type 2 diabetes mellitus African American women	Intervention group: Sessions consisted of 5 minutes of warm-up, 45 minutes of dance, and 10 minutes of cool-down. The instructor choreographed to gospel music selected by the women. The dance steps were easy to learn and master and the same gospel music and dance routines were used at each dance class. The instructor used self-limiting progressive intensity. Control group: usual care		Dancing may be an effective strategy to help those with diabetes to become more physically active and improve diabetes outcomes and overall health through adherence. Peer support was experienced as camaraderie, enjoyment, and laughter, which fostered attendance.	physiological changes (1), social environment and relationships (3)	
Sensui et al., (2016)	intervention study, RCT, longitudinal (assessment points: pre- and post-test) n = 22 intervention group = 11 control group = 11	hip hop dance total of 9 classes, 3 sessions (60 minutes/session) for 3 weeks Intervention group: hip-hop dance Control group: no intervention	event-related fMRI Mood Check List (MCL-S.2)	Intervention increased brain activity in the posterior parietal and occipital cortices, for both the pleasant and unpleasant emotional stimuli. Increased activity was observed in the temporoparietal junction (TPJ) and insula specifically for pleasant emotional stimuli. Through movement, empathic ability can increase, and the recognition of physical emotion expression and attention to emotionally salient stimuli can develop.	Based on study: (1) enhanced visual attention, (2) empathy and emotional understanding, (3) mirror systems activation, (4) bodily emotion processing, (5) regulation of emotional states Based on our model: physiological changes (1), social environment and relationships (2, 4), coping and emotion-regulation (5), physiological changes (3)	Based on study: - Based on our model: -
Pereira et al., (2021)	Systematic review 58 studies	recreational running		Intrinsic motives for running: health orientation, personal goal achievement, self-esteem, life coping, and life meaning, coping mechanism Extrinsic motives for running: contact with nature, adventure, competition, goal achievement, recognition, social motives Motives, pride, gain, flow and vigor predict running participation. Age influences running participation. Ability, beliefs, attitudes, norms, perceived behavior control, self-efficacy, previous behavior, action planning, action control and intention positively predicted running participation. Failing to translate physical activity into behaviour can be explained by explicit trait self-control, implicit executive functions, and their interactions. Running has significant	Based on study: (1) self-efficacy, (2) thermogenic effect, (3) hormonal response, (4) neurobiological changes, (5) natural environment, (6) participation, (22) psychological benefits Based on our model: general psychological changes (1, 17, 22), physiological changes/PNI changes (3, 4), environment (5), altered states of consciousness (16)	Based on study: (7) motivation, (8) age, (9) gender, (10) experience, (11) self-regulation, (12) environment, (13) social support, (14) frequency and duration, (15) pride, (16) flow, (17) vigor, (18) ability and perceived control, (19) beliefs, attitudes and norms, (20) trait self control, (21) executive functions Based on our model: level of involvement and motivation (7), demographics (8, 9), experience (10), initial psychological state (11, 15, 18, 21), physical characteristics (18), other moderators (12), intervention characteristics (14), social context (13), beliefs (19), trait characteristics (20), adherence and attendance (6)

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Table 1 (continued)

Author	Design and sample	Subject and intervention	Measures	Results	Possible processes*	Possible moderators and mediators*
Pinniger et al., (2012)	intervention study, RCT, longitudinal (assessment points: pre- and post-intervention) tango dance: n = 33 meditation: n = 33 waiting-list control: n = 31	tango and meditation total of 6 sessions, 1 session (90 minutes/ session) per week for 6 weeks 10 minutes: placing the emphasis on enjoying the experience 10 minutes: low-intensity stretching 1 hour class 10 minutes: wrap-up (sharing experience) Tango group: argentinean close-embrace tradition, focused on different aspects of the dance (consciousness of walking, awareness of one's own and partner's body, resistance and transference of weight, close embrace) Meditation group: mindfulness exercises (breathing, eating, body scan, walking meditation, music meditation) Control group: wait-list	Demographic survey (engagement in physical activity over the past month and how often) DASS–21 Scale Satisfaction with Life Scale Rosenberg Self Esteem Scale Mindful Attention Awareness Scale	psychological benefits, including improved mood, reduced depression, anxiety, stress, and fatigue, and increased vigor and well-being. Tango and meditation participants did show greater reductions in levels of depression compared to controls. Meditation was just as effective in decreasing depression as tango dance. Tango participants reported significant reductions in stress levels compared to meditation and wait-list controls. Dynamic physical activities may be more effective in reducing psychological stress than static activities such as mindfulness meditation. Tango and meditation was not effective in improving anxiety. It is possible that, receiving attention and correspondence during the program, as well as the prospective free lessons afterwards, may have positively influenced the responses of the control group, since their anxiety decreased. The tango group reported greater increase in mindfulness at post-test.	Based on study: (1) mindfulness, (2) physical activity, (3) attention and correspondance, (4) music Based on our model: stress management methods (1), physiological changes (2), music	Based on study: - Based on our model: initial psychological state (3)
Wookey, (2023)	systematic review 20 studies	movement-oriented mind-body interventions (yoga, trauma-sensitive yoga, qi gong, tai chi, and dance movement therapy): Interventions involving physical activity as the core emphasis, characterized by their use of movement activities with a focus on bodily experiences.		14 of the 20 included studies reported significant results in objective physiological PNI measures after the interventions. Reducing inflammation (i.e., IL–6, CRP, TNF-alpha), stress hormones (i.e., cortisol), and improving immune function (i.e., natural killer t cells) lead to improvements in overall physical and mental health, and reduction of infectious disease. Mind-body interventions reduced inflammation in participants after the interventions of yoga, qigong, and tai chi.	Based on study: (1) reducing inflammation (i.e., IL–6, CRP, TNF-alpha), stress hormones (i.e., cortisol), and improving immune function Based on our model: PNI changes (1)	Based on study: - Based on our model: -

Note. *Possible processes = based on study (processes explained or examined in the study through which movement/improvisation can exert its effects) and based on our model (how we incorporated these processes into our model), *possible moderators and mediators = based on study (moderator and mediator variables explained or examined in the study which influence the effects of movement/improvisation) and based on our model (how we incorporated these moderators and mediators into our model), DMT = Dance/Movement Therapy, PNI = psychoneuroimmunological, BP = blood pressure.

Results

Out of all 114 publications, we identified 20 articles explaining possible underlying processes, moderators and mediators relevant to movement improvisation. The main reasons for the exclusion of studies from this integrative review were the lack of description of possible underlying factors and the inability to interpret results in relation to them.

In this review, 12 intervention studies, seven review articles, and one questionnaire development study were included. Across these articles, the authors identified 91 processes and 34 moderators and mediators, which were categorized into 18 process and 10 moderator and mediator categories. An additional process and 3 moderators were supplemented, resulting in 19 process, 7 moderator and 3 mediator categories with further specified elements. The articles varied in their conceptualization of processes – some referred to them as mechanisms or factors, while others described them as possible explanations without explicitly naming them as underlying processes. Furthermore, there was some overlap in the identified concepts (e.g., music as an underlying mechanism appeared in three articles: [Pinniger et al., 2012](#); [Han, 2018](#); [Adam et al., 2016](#)).

The studies employed diverse methodologies, with both quantitative and qualitative approaches included. Seven quantitative intervention studies were all randomized controlled trials. Among the other five intervention studies, three used qualitative interview techniques, and two employed a mixed-methods approach. This methodological diversity is beneficial for exploring the complexity of underlying processes, moderator and mediator variables, as distinct approaches are needed to fully understand these factors. While review articles provided important thematic implications, some authors noted that

methodological diversity within a subject posed challenges for interpreting results. One study specifically aimed to develop a questionnaire to examine motivations for dancing.

Aligning with our aims we reviewed studies on dance and movement to gather already researched and described processes, moderators and mediators relevant to movement improvisation (see [Table 1](#)). These factors were found as results of qualitative and quantitative studies supplemented with with factors based on our practical experiences. Firstly, we summarize the processes, moderators and mediators identified (see section *Processes, Moderators and Mediators of Movement Improvisation*), and then elaborate on the empirical evidence supporting the importance and relevance of these variables in movement research (see section *Empirical Evidence Supporting the Theory's Components*). Finally, we summarize our findings and propose a hypothetical model to describe the mechanism of movement improvisation.

Processes, moderators and mediators of movement improvisation

The scientific examination of interventions is always a challenging task, as it involves drawing general conclusions about the simultaneous and interacting effects of multiple factors. Movement interventions are no exception, with numerous variables influencing their outcomes. Even if we conduct a dance session with the same participants at two different times, following an identical protocol, individual characteristics – such as mood and physical condition – can still alter the results. While it may not be possible to control all variables within a single study, it is essential to account for as many relevant aspects as possible during the design, keeping the research question and hypotheses in mind.

As we mentioned earlier, the idea that an intervention has multiple factors, mechanisms, mediators, and moderators underlying its effects is not new in the field of therapy research. [Greenberg \(1986\)](#) describes change process research, a method developed to understand the process of change in psychotherapy. According to Greenberg, therapy operates through several different mechanisms to exert its effects and emphasizes that client behaviors also contribute to the effects of therapy. Thus, different interventions may be effective for different client states and contexts. This aligns with our practical experiences mentioned in the introduction and could provide a possible explanation for the inconsistency in results within movement research. We applied this perspective to a non-therapeutic setting, gathering processes and moderator variables underlying the effects of movement on mental health relevant to movement improvisation.

The foundation of our theoretical model is depicted in [Fig. 2](#), which illustrates the fundamental relationship between the processes, moderators and mediators of movement and mental health. The core of our theory posits that movement influences mental health through specific processes based on [Greenberg's \(1986\)](#) idea. These effects can be influenced by additional factors, called moderators and mediators. This creates a multifactorial system – a mechanism – in which the various processes of movement interact and influence one another, collectively shaping mental health outcomes. We propose that different forms of movement (e.g., movement improvisation, Latin dance, yoga) engage these processes to varying degrees, resulting in observable differences in outcomes. Mediators partially determine which processes can prevail during intervention. Furthermore, the impact on mental health may be moderated by moderators. For instance, individuals who reported higher stress levels prior to engaging in basketball or dance exhibited a more significant reduction in depression symptoms following the intervention ([Andersen et al., 2018](#)). This observation aligns with our own findings as well ([Horváth & Vécsey, 2023](#)).

Processes interpreted in the model

[Fig. 3](#) illustrates the processes through which – based on our review – movement improvisation may impact mental health. Not all of these processes can be definitively linked to mental health outcomes, as some of them were described as a result of an interview or self-report survey

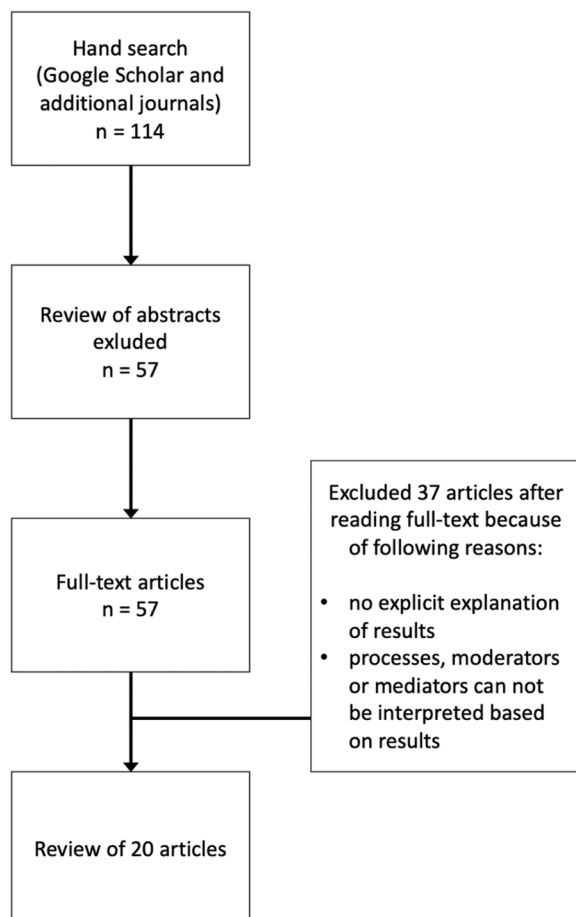


Fig. 1. Search strategy.

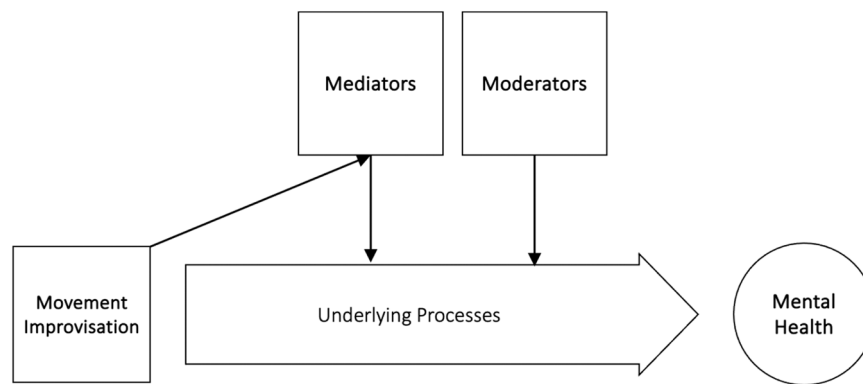


Fig. 2. The connection between movement improvisation and mental health Note. PNI = psychoneuroimmunological.

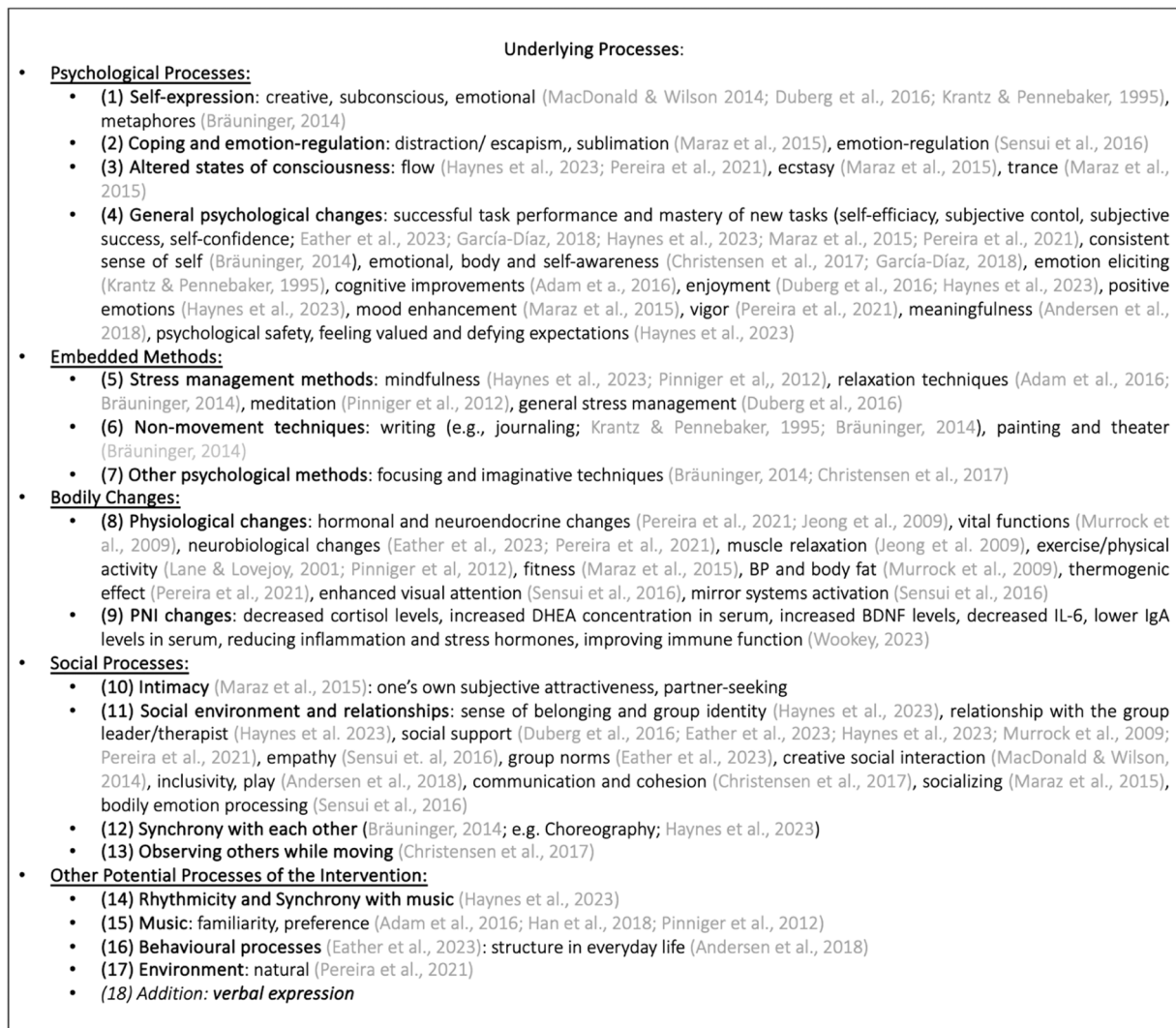


Fig. 3. Underlying processes of movement improvisation Note. PNI = psychoneuroimmunological.

not based on a controlled experiment. The variability in results from different movement studies supports the notion that the intervention's effects depend on certain processes involved. For example, a study found that contemporary dance led to a reduction in depression levels, whereas ballroom dancing did not produce the same effect (Finn et al., 2023; Haboush et al., 2006; see section "Effects of Moderators" for more detail). This indicates that contemporary and ballroom dance likely

engage different processes during the session, which is why we cannot expect identical outcomes when measuring output variables of slightly different interventions. Determining the variance in results within a specific form of movement (e.g., dance style, sport) remains difficult due to the lack of extensive research in the field. Even in more frequently studied areas – such as yoga and Latin dance – significant differences emerge between interventions, particularly in how sessions are

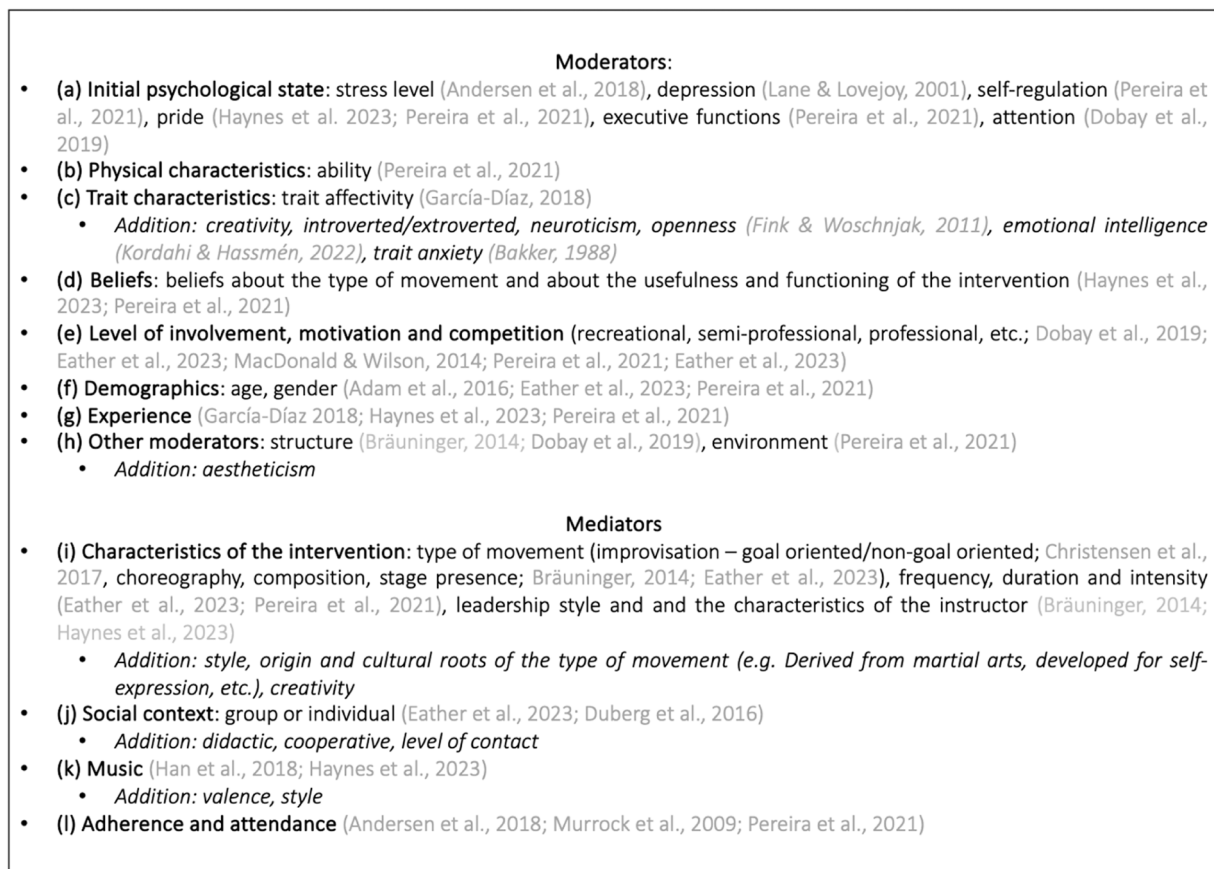


Fig. 4. Moderators and mediators influencing the effects of movement improvisation.

structured and thus outcomes they produce.

Moderators and mediators interpreted in the model

Fig. 3 illustrates the moderators that can influence the effects of the aforementioned processes. These factors can amplify, mask, or modify the expected outcomes. Consequently, the intervention does not solely induce a change in mental health through the mentioned processes; we must consider the influence of moderators as well when designing experiments or interpreting results.

Moderators include individual characteristics, such as initial psychological state, physical characteristics, personality traits, beliefs, degree and quality of motivation and level of involvement, demographic and experience. Mediators consist of contextual factors, which determine which processes are activated by the intervention. For instance, the social context of the intervention influences the potential for synchronization among participants. If it is an individual intervention where the instructor or examiner does not engage in the tasks, this processes will not prevail. In other words, the social context itself is not the processes that drives changes in mental health; rather, it dictates which process can manifest. Mediators include intervention characteristics, social context, and music. Based on our own practical experiences, we have supplemented these factors with several additional variables, as indicated in Fig. 4.

Based on the literature reviewed, the factors illustrated in Figs. 3 and 4 related to movement, dance, and improvisation provide a solid foundation for research utilizing movement improvisation interventions. Our theory does not exclude the possibility of additional processes or moderators.

Discussion: empirical evidence supporting the theory's components

In the introduction, we outlined the challenges in movement improvisation research. We conducted an integrative review on the connection between mental health, dance, movement, and improvisation which, in line with our objectives, provided an overview of the processes, moderators and mediators associated with movement improvisation. The included articles also offered empirical evidence for the effects of most of these components (see sections "Effects of Processes" and "Effects of Moderators and Mediators") on mental health. However, in many cases, the relevance of these variables in the context of movement improvisation interventions remains speculative (see section "Areas Needing Further Examination"). Our work thus also highlighted processes and variables whose effects lack empirical examination, suggesting directions for future research. The processes, moderators and mediators were derived from qualitative and quantitative research, reviews, cross-study comparisons of various movement forms from our integrative review. In the next sections, we present the empirical findings supporting the effects of components listed in Figs. 3 and 4.

Effects of processes

Self-expression (1)

Determining which sports and dance styles allow participants to express themselves through movement is challenging. Presumably, modern, contemporary, and improvisational dances are strongly associated with self-expression, as this is a fundamental element of these styles. They were developed specifically for this purpose (Merényi, 2004), with improvisation allowing a person's thoughts and associations

to manifest through movement (Blom & Chaplin, 1988). Consequently, in relation to self-expression, we reviewed literature that focuses on contemporary and modern dance, improvisation, or authentic movement.

During their eight-week online contemporary dance intervention, Finn et al. (2023) found a statistically significant improvement in participants' well-being after four weeks, along with an increase in self-efficacy after eight weeks. Similarly, Wiedenhofer and Koch (2017) reported similar results in a much shorter intervention, finding that approximately 12 minutes of movement improvisation significantly enhanced participants' well-being and both general and physical self-efficacy. Additionally, Kim and Kim (2007) identified significantly higher levels of well-being among those engaging in improvisational hip-hop dance. This suggests that self-expression may be closely linked to both self-efficacy and well-being (Finn et al., 2023; Wiedenhofer & Koch, 2017; Kim & Kim, 2007). However, the findings regarding other aspects of mental health are inconsistent and incomplete (see: Finn et al., 2023; Park et al., 2020). As a result, we cannot draw firm conclusions about the quality of life, social health, depression, stress, anxiety, and affectivity associated with these forms of exercise.

In their review, Van Lith et al. (2013) mention that art-based practices support psychological recovery, particularly through self-expression. They explain that self-expression allows individuals to release tension and address unresolved feelings, leading to improved mental health outcomes. This expression can happen through "movement metaphors" as Meekums (2008) describes. Although there are ideas about how self-expression manifests in movement and its specific effects on mental health, accurately measuring it remains challenging. Future quantitative and qualitative research is needed to explore how participants express themselves through movement and how this impacts mental health.

Coping and emotion-regulation (2)

Among the psychological processes, several types of *coping and emotion-regulation* (2) can prevail during movement. In the case of distraction or escapism, an individual shifts their focus to another activity, perhaps movement improvisation, which provides a more enjoyable experience. Consequently, this can lead to a reduction in negative emotions, an increase in positive affects, and an enhanced sense of control (Kindler, 2010). Sublimation allows individuals to relieve internal tension and stress by expressing these feelings in a constructive way, which can occur through movement improvisation. Similarly, elaboration involves transforming psychological tension into adaptive, positive actions, making this form of movement also suitable for that purpose (László, 2004).

Based on the work of Sensui and colleagues (2016) hip hop dance induces brain activity related emotion-regulation. Adaptive emotion-regulation (e.g., positive reappraisal, acceptance, problem-solving) promotes mental health (see for well-being: Kraiss et al., 2020, see for affectivity: Van Beveren et al., 2018), while maladaptive strategies (e.g., rumination, catastrophizing, self-blame) are connected to mental disorder symptoms (see for depressive symptoms: Kökönyei et al., 2024; for anxiety: Suveg & Zeman, 2004).

Altered states of consciousness (3)

In the context of *altered states of consciousness* (3), Csikszentmihályi's theory posits that flow enhances positive emotions, well-being, self-efficacy, and control while reducing stress (Csikszentmihályi, 1988; 1996). The experience of flow has been documented in relation to various forms of movement, including yoga and dance improvisation (Łuczniak & May, 2021; Hsu & Liu, 2020). The term *trance* and *ecstasy* refers to a modified state of consciousness and is related to harnessing resilience and coping mechanisms (Gosseries et al., 2024).

General psychological changes (4)

Movement improvisation can induce various *psychological changes*

(4) as well. Engaging in movement enhances *self-efficacy*, *feeling of success*, and *subjective control* through successful performance and the acquisition of new exercises (Haynes et al., 2023; Eather et al., 2023; García-Díaz, 2018; Maraz et al., 2015; Pereira et al., 2021), which can lead to self-confidence (MacDonald & Wilson, 2014; Maraz et al., 2015) and more effective coping with stress (Schönfeld et al., 2016).

Bräuninger (2014) posits that *freely experiencing emotions* results in a more consistent sense of self, which can manifest as changes in affectivity. García-Díaz (2018) found similar results in his research; despite a decrease in positive affectivity and an increase in negative affectivity following authentic movement (AM), participants reported the intervention as enjoyable. According to García-Díaz, authentic movement fosters eudaimonic well-being by allowing individuals to express their inner world through movement. This aligns with the previously mentioned concepts of elaboration and sublimation. From a psychodynamic perspective, certain forms of movement provide individuals with the space to express inner tension and repressed feelings or to transform them into positive action. Consequently, this can enhance a person's eudaimonic well-being while reducing internal tension.

García-Díaz (2018) and Christensen et al. (2017) argue that dance enhances *body and emotional awareness*. Twiner et al. (2022), along with San-Huan-Ferrer and Hípola (2019), examined the effects of dance on emotions, and their findings support Christensen and colleagues' idea. However, there is a limited number of studies examining the relationship between body and emotional awareness and dance improvisation, highlighting future areas for research.

Krantz and Pennebaker (1995) describe the *emotion-eliciting* nature of creative movement. In movement improvisation, participants focus more on their bodily signals, and by expressing these sensations, feelings, and thoughts in a creative and spontaneous way, they enhance the connection between emotions and bodily sensations (Morris, 2021). This process fosters greater body and emotional awareness, eliciting emotions that contribute to a more consistent sense of self. These emotions can be both negative and positive.

Dance and movement tend to enhance *positive emotions*, *enjoyment*, and *vigor*, which contribute to higher attendance and adherence (Murrock et al., 2009; Andersen et al., 2018; Duberg et al., 2016). Researchers do not describe this in detail, but the authors of this study believe that music, the mastery of new tasks, and the social setting are important processes contributing to this change. Emotional awareness and positive affectivity are both important in preserving and restoring mental health (Schutte et al., 2002).

Adam et al. (2016) found that dance *improved cognitive symptoms* in individuals with mild to moderate cognitive impairment. They describe this improvement as contributing to better mental health by enhancing coping with symptoms and fostering a sense of independence.

Andersen et al. (2018) found that in sports by creating a *psychological safe space* and *defying expectations* participants can *feel valued* and have a sense of control. This leads to *meaningfulness* in their participation in sport which can be connected to adherence and positive emotions.

Stress management methods (5)

Among the *stress management methods* (5), mindfulness has been shown to reduce depressive and anxiety symptoms while improving quality of life (Khouri et al., 2015, cited in Urbán, 2022). Progressive muscle relaxation can also be applied to alleviate anxiety (Manzoni et al., 2008, cited in Urbán, 2022), as can focusing meditations, which have proven effective in reducing depression and the physiological response to stress (Carrington 2007, cited in Urbán, 2022; Nidich et al., 2009, cited in Urbán, 2022). These methods along with other relaxation techniques can be integrated into movement improvisation, either at the beginning and end of the session or in conjunction with specific movement tasks.

Non-movement techniques (6)

In Krantz and Pennebaker's (1995) study, *expressive writing*

positively impacted participants across a broader spectrum. The subjects were tasked with expressing their traumatic experiences through movement. Following this, one group described their thoughts and feelings about the intervention. While both groups reported feeling happier and healthier, the group that also engaged in journaling exhibited improvements in several objective variables, including academic performance and physical health status.

Bräuninger (2014) mentions that *painting* and *theater* are non-DMT techniques often incorporated into DMT sessions. These techniques can also be applied in movement improvisation. Since they are already used to promote mental health in Expressive Arts Therapy and Drama Therapy, their integration into movement improvisation can similarly benefit mental health.

Physiological changes (8)

Among the category of bodily changes, *physiological changes* (8) refer to a wide range of changes in *hormonal, neuroendocrine, neural systems and vital functions*. The increased production of endorphins during exercise have a beneficial impact on mental health. In addition to fostering a sense of well-being, endorphins have a muscle-relaxing effect that effectively reduces stress levels (Pfau & Kanyó, 2020). Furthermore, exercise reduces the activity of the hypothalamic-pituitary-adrenal (HPA) axis, contributing to a reduction in stress (Nyhuis et al., 2010). Movement also has beneficial effects on blood pressure and body fat, enhances visual attention, activates mirror systems, and has a thermogenic effect (Murrock et al., 2009; Pereira et al., 2021; Sensui et al., 2016).

Psychoneuroimmunological changes (9)

Psychoneuroimmunological changes (9), particularly changes in cortisol and immunoglobulin A levels, are also associated with reduced stress levels. These changes have already been demonstrated in the case of yoga (Wookey, 2023).

Social environment and relationships (11)

Sensui et al. (2016) found that movement can enhance *empathic skills*, improve *recognition of bodily emotional expressions*, and increase attention to emotionally salient stimuli. These changes were observed using fMRI after three weeks of hip-hop dancing.

Eather et al. (2023) found in their meta-analysis that participating in group sports yields greater benefits for mental health indicators compared to individual sports, regardless of whether the class is cooperative (e.g., basketball) or if participants work individually (e.g., yoga). Therefore, it is reasonable to conclude that the social environment plays a significant role in enhancing the positive effects of exercise on mental health. Engaging in movement or dance within a group has also been shown to reduce feelings of loneliness (Finn et al., 2023).

Eather and colleagues (2023) say the social environment exerts its effects through *social support, group norms, belonging and companionship, social influence and comparison, behavioural guidance and social control*. Duberg and colleagues (2016), Haynes and colleagues (2023), Murrock and colleagues (2009) and Pereira and colleagues (2021) also highlight the importance of social support in the effects of movement. Next to sense of belonging Haynes et al. (2023) described group identity as an important part of this process. They further mention the importance of the relationship with the group leader and their characteristics in the effects of movement. Other authors highlight the role of creative social interaction (MacDonald & Wilson, 2014), inclusivity and play (Andersen et al., 2018), communication and cohesion (Christensen et al., 2017) and socializing (Maraz et al., 2015) in the context of movement sessions.

Synchrony with each other (12)

Bräuninger examined the effects of spatial synchrony and synchrony in effort – individual DMT interventions – on mental health outcomes and found that they were important processes in promoting well-being and decreasing somatization symptoms. Synchronized movement in

social interactions is important (Ramseyer, 2013). Greater movement synchronization was associated with better relationship quality and improved interactional outcomes in Ramseyer, (2013) research. Less synchronized body and facial movements during interviews were indicators of depression (Altmann et al., 2021). Thus, movement synchrony appears to be an important factor in human relationships. However, its role in movement improvisation remains empirically unexplored.

Observing others while moving (13)

Observing others while moving can elicit affective reactions in individuals. Juslin and Västfjäll (2008) proposed a theoretical framework explaining how a visual stimulus can provoke an emotional response. While most research in this area focuses on art and music, Christensen et al. (2017) expanded the field to include the observation of dance. Their findings indicate that watching dance can evoke emotions by activating autobiographical memories, with round positions eliciting more positive emotions in participants compared to square or non-round postures. Beyond the impact of observing dance on affectivity, it would be valuable to investigate whether it induces changes in other aspects of mental health.

Music (15)

Music can also influence the effects of the intervention. Han (2018) compares the effects of *familiar and preferred music*, noting that familiar music can evoke memories and create a safe environment, while preferred music enhances adherence and improves mood. The style of music is also significant, depending on individual preferences and familiarity. Lesté and Rust (1990), along with Koch et al. (2007), implemented musical interventions with groups of dancers and athletes. As a result of listening to music compared to two groups participating in dance and sports interventions, they found a positive change only in positive affectivity. Furthermore, Starcke et al. (2021) researched the effect of music valence on emotions and discovered that listening to happy music could induce a more positive mood in participants.

Behavioural processes (16)

Eather et al. (2023) describes that sports participation leads to changes in behaviour which contributes to better mental health. Regular attendance at movement classes creates *structure in everyday life*, which contributes to the preservation of mental health (Li et al., 2022).

Environment (17)

In terms of *environment*, comparative studies have shown that outdoor exercise sessions lead to greater positive changes in mental health compared to indoor sessions (Bramwell et al., 2023; Byrka & Ryczko, 2018). In this context, various locations (e.g., school, laboratory, dance hall) may also have influencing effects, which still await further investigation.

Effects of moderators and mediators

Moderators

Initial psychological state (a). Among the studies mentioning the influence of moderators and mediators, research by Andersen et al. (2018), and Lane and Lovejoy (2001) indicates that an individual's initial psychological state significantly affects changes in mental health following interventions in team sports and aerobic dance. Specifically, individuals exhibiting higher levels of *stress* and *depression* at the onset of a movement session tend to experience greater improvements. Our previous research also supports this finding (Horváth & Vécsey, 2023). *Executive functions, self-regulation* and *pride* also seem to play important roles in attendance through action planning and action control (Pereira et al., 2021). Dobay et al. (2019) describe the importance of *attention* in a

dance class for involvement and motivation, which further influence the effects of these processes.

Physical characteristics (b). One's *ability* appears to influence participation through motivation, as Bell and Stephenson (2014) found differences in why people run based on their ability (Bell & Stephenson, 2014, in Pereira et al., 2021).

Trait characteristics (c). Results can also be influenced by trait characteristics. This is demonstrated by the research of García-Díaz (2018) on authentic movement, which found that positive affectivity decreased among individuals with high positive *trait affectivity*, while remaining stable in those with low positive trait affectivity. Conversely, individuals with high negative trait affectivity exhibited a greater increase in negative affectivity after exercise compared to those with low negative trait affectivity. Our previous findings also support this trend (Horváth & Vécsey, 2023).

According to trait theories, personality is viewed as a constant feature that remains unchanged as a result of engaging in sports or dance; however, notable differences exist between the personalities of dancers and non-dancers (Eysenck et al., 1982). Professional dancers – whether in ballet, contemporary, or jazz/musical genres – tend to be more *creative* and *introverted* than non-dancers, often scoring high on the scales of *neuroticism* and *openness to experience* (Fink & Woschnjak, 2011). Research by Kordahi and Hassmén (2022) revealed that dancers of various styles exhibit significantly higher ability-based *emotional intelligence* scores compared to non-dancers. This heightened emotional awareness is linked to the physical nature of dance, where dancers become more aware of their movements and can ascribe meaning to the emotions they experience (Fernández et al., 2020). Dance fosters the development of observation, perception, awareness, and the physical expression of emotions, all of which contribute to enhancing emotional intelligence (Atamtürk & Dincdolek, 2021). Bakker, (1988) research indicated that individuals participating in classical ballet and modern dance classes for 15 hours a week were more prone to anxiety. In general, dancers exhibit lower emotional stability, scoring higher on measures of *emotionality* and anxiety (Bakker, 1988). Furthermore, dancers with high levels of *trait anxiety* have been found to employ more maladaptive coping strategies compared to those with lower levels of trait anxiety (Bakker, 1988; Estanol et al., 2013). It is plausible that high trait anxiety is prevalent among dancers because the expressive nature of dance offers a means to cope with their struggles.

Level of involvement, motivation and competition (e). The level of *competition* is also significant; research shows that professional athletes experience higher anxiety levels compared to recreational athletes, even though playing sports is beneficial for both groups (Eather et al., 2023). Furthermore, Zajenkowski, Jankowski, and Kolata (2014) found that competitive ballroom dancers did not experience an increase in joy after their dance class or competition, while hobby dancers did. Additionally, fatigue levels in competitors did not decrease after either the dance class or the competition.

As mentioned above, some factors can influence the *motivation* to participate in movement (Pereira et al., 2021). Motivation directly affects participation and adherence, and it may also influence the effects of processes. For example, if someone is motivated to attend movement improvisation for its physical and health benefits, they might be more physically active than those who attend for other reasons. Hypothetically, this could allow the processes of bodily change to prevail to a greater extent

Demographics (f). Three studies mentioned the influence of age on mental health outcomes in relation to movement (Adam et al., 2016; Eather et al., 2023; Pereira et al., 2021). Age may affect these outcomes through factors such as ability, motivation, physical characteristics, and

initial psychological state, which vary across age groups.

Experience (g). García-Díaz (2018) demonstrated the importance of prior experience on the effects of an authentic movement intervention. Participants with such experience showed greater improvements. According to García-Díaz (2018), this suggests that training in authentic movement can enhance its effects. Hypothetically, prior experience may also alter beliefs and perceived benefits, which can influence motivation, attendance, and adherence, as noted by the authors of the present study.

Other moderators (h). The *structure* of a dance intervention is crucial for motivation, attendance, and involvement (Bräuninger, 2014; Dobay et al., 2019). Haynes and colleagues (2023) in addition to the importance of the instructor's characteristics emphasized that the content of each dance class plays a significant role in participants' motivation and attendance. Dobay et al. (2019) described how starting with concrete exercises and gradually progressing to more abstract movement and tasks promotes involvement and reflective thinking, further facilitating the effects of the session.

The *environment* in which we exercise can function as a process, as it has distinct effects on mental health, as mentioned earlier. On the other hand, it can also serve as a mediator, influencing which processes prevail. For example it can act as a motivating factor, thereby promoting attendance. Pereira and colleagues (2021) researched the effects of running on mental health. In their review, they found that both extrinsic and intrinsic motives are important for running participation. Participants mentioned connecting with nature while running as a significant factor in their exercise attendance.

Mediators

Characteristics of the intervention (i). The *type of movement* itself is a significant feature of the intervention. Research indicates that non-goal oriented improvisation is more beneficial than goal-oriented improvisation concerning perceived stress and self-efficacy (Wiedenhofer & Koch, 2017).

Frequency, duration and intensity seems to influence the effects of an intervention (Eather et al., 2023; Pereira et al., 2021). It refers to how long, how often and at what intervals participants engage in a given form of movement. Research indicates that in some cases, the effects of the intervention are only valid in the long term (Finn et al., 2023; Adam et al., 2016), and not all effects are maintained over time (Cheung et al., 2016). It may be important to investigate further to determine how long it takes for a specific effect to manifest.

Leadership style (directive, verbal, or a combination) promotes mental health when chosen based on the client's needs, rather than the therapist's preferences (Bräuninger, 2014). Haynes and colleagues (2023) found that the *instructor's characteristics* (e.g., enthusiastic, interactive, positive, empathic) contributed to creating a safe environment and enhancing positive emotions in participants related to the dance class.

Social context (j). *Social context* encompasses various factors through which this process exerts its distinct effects. On the other hand, it can also serve as a mediator variable, as it provides the foundation for these social processes. For example, participants can move alone, with the instructor, with other people simultaneously, or alone while others observe. The social context, therefore, determines which processes can prevail.

Music (k). The involvement of *music* can take many forms. Some types of movement improvisation exclude it altogether (e.g., authentic movement), while others incorporate instrumental pieces, vocal elements, or sounds from various genres with different tempos (bpm) and emotional

tones. Participants might also be invited to create sounds using tools or their own bodies. These variations significantly shape the nature of the intervention.

Adherence and attendance (l). In dance groups, high levels of *adherence (k)* contribute to the lasting effects of interventions, allowing short-term benefits to persist over time (Andersen et al., 2018; Murrock et al., 2009; Pereira et al., 2021).

Areas needing further examination

Among the processes, moderators and mediators listed in our theory, some have not yet been investigated regarding their impact on mental health in relation to movement. These include other psychological methods, intimacy, social environment and relationships, rhythmicity and verbal expression, level of involvement, motivation and competition, characteristics of the intervention. We have expanded the list based on the literature with concepts such as verbal expression, style, the origin and cultural roots of the type of movement, the pursuit of aestheticization, creativity, dyadic nature, cooperation, the level of contact, and the valence and style of the music used. Although, to the best of the authors' knowledge, there are no empirical studies aimed at these areas in the field of movement, we will present literature that highlights the importance of these factors in mental health (e.g., depression, stress, anxiety, affectivity, well-being, quality of life, self-efficacy, and social health).

Other psychological methods (7). *Focusing on a specific topic* while dancing has been identified as one function of dance (Christensen et al., 2017). Focusing on a specific topic while moving is a technique commonly used in DMT (Bräuninger, 2014). However, the authors of this study are not aware of any research investigating its distinct effects on mental health in a non-therapeutic setting. Imaginative techniques (e.g., guided imagery) are often used in psychotherapy, and their beneficial effects on mental health are well-documented (Utay & Miller, 2006). Furthermore, dancers frequently engage in imagery while dancing; however, empirical research on its distinct effects on mental health in the context of dancing is lacking (Pavlik & Nordin-Bates, 2016).

Intimacy (10). Maraz et al. (2015) developed the Dance Motivation Inventory, a tool designed to examine the motives behind dancing. One of the factors in the questionnaire is intimacy, which refers to the enjoyment people derive from wearing attractive clothes while dancing, the opportunity to find sexual partners and form other relationships, and the chance to physically connect with others. However, we have not found any empirical research on how the intimacy experienced during movement affects a person's mental health, leaving this question unanswered for now.

Social environment and relationships (11). Haynes and colleagues (2023) described the importance of instructor characteristics in eliciting positive emotions in participants. However, we did not find any research that specifically investigates how specific characteristics of the session leader influence the outcomes of movement interventions in a controlled trial. Furthermore, while the instructor's role and level of involvement are clear during the teaching of choreography, this is not always the case with improvisation. In the latter, the leader may either not get involved in the movement throughout the session, except for giving instructions, or they may actively participate in the tasks alongside the participants. In some cases, the leader may even initiate contact improvisation, which fosters a deeper level of connection. Furthermore, movement improvisation sessions can take place individually or in groups and may also involve cooperative, or contact tasks. We found a lack of empirical evidence regarding the specific effects of these different social configurations on mental health.

Rhythmicity and synchrony with music (14). Haynes and colleagues (2023) found in a qualitative study that dancing to music is an important factor for participants' attendance in dance classes, as it makes movement enjoyable. However, we found no empirical studies comparing dancing in synchrony with music to dancing independently of music.

Thus, in the case of synchrony with music, we considered studies in which participants performed choreographed movements (aerobics, choreography, ballroom dancing, Turkish folk dance, belly dance, hip hop, African dance, modern, and contemporary dance). Based on these studies, it seems that synchronization with music can enhance self-efficacy, increase well-being, and reduce stress levels (Finn et al., 2023; Kim & Kim, 2007; Tuncgenç et al., 2023; Liu et al., 2023). A significant result regarding stress was obtained by Zajenkowski, Jan-kowski, and Kołata (2014) while studying ballroom dancers. In their research, the level of relaxation significantly depended on the nature of the dance class (competition or training). This serves as another example of how processes and moderators can interact regarding the expressed effects (in this case, the characteristics of the intervention and the impact of synchronization with music), as both instances involved choreographed movement, yet different results were obtained concerning relaxation.

Verbal expression (18). We supplemented the processes identified in the literature with verbal expression, which was incorporated in some of the included studies (see Duberg et al., 2016; García-Díaz, 2018; Dobay et al., 2019) and, based on our practical experience as well, can be an important factor in the effectiveness of the intervention. Verbality can be incorporated at the beginning, end, or even during the session, embedded within the tasks. By including verbal expression, we provide a new platform for improvisation, allowing participants to vocalize their immediate thoughts and impulses (Gueugnon et al., 2016 In Coste et al., 2019). It can also be used for reflecting on personal experiences and thoughts, or as a means of dialogue between participants. Additionally, participants can offer feedback on each other's performances or on the experiences shared by the speaker. However, we found no studies comparing movement improvisation sessions that include verbal elements with those that exclude them.

Beliefs (d). Haynes and colleagues (2023) found in their qualitative research that a person's opinion about the form of movement and their thoughts on its potential processes and effects on mental health are significant in understanding the impact of dance. The research by Ajzen and Driver (1991) supports the idea that beliefs about a leisure activity influence attendance. García-Díaz (2018), using authentic movement, discovered that those with prior experience in this type of movement showed significant changes in levels of happiness and anxiety compared to those who were trying it for the first time. Although García-Díaz does not discuss the reasons for this change, we have often observed in practice that after just one or two sessions of movement improvisation, participants develop a significantly more positive attitude towards the activity. Thus, it is conceivable that prior experience influences the effectiveness of the intervention through a person's beliefs; however, this assumption requires further validation.

Other moderators (h). Furthermore, the pursuit of aestheticization – based on our practical experiences – can create anxiety-inducing situations, especially for beginners. If a participant is not yet confident in their movement and the instructor asks them to move aesthetically, they may experience distress. We believe it would be worthwhile to conduct qualitative studies on the participants' experiences.

Characteristics of the intervention (i). Type of movement

It is difficult to definitively establish the differences between various forms of movement and dance styles. We discuss differences between the effects of different types of movement and dance styles on mental health.

Yoga has proven to be a widely researched topic, with numerous meta-analyses emerging in recent years. According to the work of [Park and Slattery \(2021\)](#), this form of movement can reduce stress levels and shift the balance of the autonomic nervous system towards parasympathetic activation. The authors suggest that it can be an effective complementary method for individuals diagnosed with anxiety, depression, and other mental illnesses. In line with this, [Kelley and Kelley \(2020\)](#) also supported the benefits of yoga in relation to mental health. Yoga significantly improved the quality of life and mental well-being among older adults. [Chobe et al. \(2020\)](#), in their examination of research involving older populations, found that yoga has a beneficial effect on depression levels; however, they did not find significant associations with anxiety, stress, or mood. In their meta-analysis, [Brinsley and colleagues \(2021\)](#) found a decrease in depressive symptoms as a result of yoga among individuals with various mental disorders (depression, PTSD, schizophrenia, anxiety, alcohol dependence, bipolar disorder). Movement improvisation and yoga share many similarities. Both employ relaxation techniques, may involve connecting movement with breathing, incorporate stretching movements, and can lead to an increase in heart rate.

In the case of Pilates, aerobics, and various sports, we found contradictory results once again (see, for example, aerobics: [Bisbe et al., 2020](#); [Kim & Kim, 2007](#)). We summarized the research findings related to different sports collectively, as the processes of physical activity may serve as a common moderator in both these areas and movement improvisation. In this context, we consistently observed positive changes only in social health (positive relationships with others, loneliness, social isolation, sense of belonging, and perceived social support; [Oswald et al., 2020](#); [Andersen et al., 2018](#)).

There is very little research concerning contemporary, modern, African, belly dance, and authentic movement, which makes it difficult to draw clear conclusions regarding these forms of movement. Overall, we can observe that hip hop dance may be effective in reducing stress and anxiety while enhancing positive affectivity, well-being, and social health ([Kim & Kim, 2007](#); [Sensui et al., 2016](#); [Tuncgenc et al., 2023](#)). In contrast, ballroom dancing may help reduce levels of depression, stress, and anxiety, while also improving quality of life and social health ([Moratelli et al., 2023](#); [Pinniger et al., 2012](#); [Akandere & Demir, 2011](#); [Liu et al., 2023](#)).

Differences exist in the effects of various dance styles and movement types. We demonstrate through four studies how differences arise between dance styles, for example, in terms of changes in depression levels.

[Baptista et al. \(2012\)](#) examined the effects of a 16-week (2x/week, 60-minute sessions) belly dance program on 40 adults aged 18–65. Belly dance, characterized by movements of the abdomen and hips, was performed by participants diagnosed with fibromyalgia, who collectively learned a dance routine during the longitudinal intervention. The intervention did not significantly reduce depression levels. This outcome may be attributed to the characteristics of the dance style, the clinical nature of the sample, or the limited bodily involvement during the sessions. Importantly, fibromyalgia, which causes widespread pain and distress, likely hindered participants' full engagement compared to healthy individuals.

[Finn et al. \(2023\)](#) conducted an 8-week (1x/week, 90-minute sessions) online contemporary dance program with 27 young adults aged 16–24 living with anxiety. This intervention significantly reduced depression levels. The general benefits of physical activity likely played a limited role in these results, since this process is also present in other dance styles. Processes such as ones connected to social environment may have been less pronounced due to the online format. Instead, the participants' initial mental state, physical condition (in contrast to fibromyalgia patients), and the content of the dance sessions (e.g., choreography, improvisation) likely contributed more to the observed improvements.

[Eygör et al. \(2009\)](#) investigated the effects of an 8-week (3x/week,

60-minute sessions) Turkish folk dance program on 40 women aged 65 and older. Depression levels did not change following the intervention. Moderators influencing these results may include beyond what was previously mentioned, the advanced age of the participants.

[Pinniger et al. \(2012\)](#) studied a 6-week (1x/week, 90-minute sessions) tango dance intervention with 66 adults aged 18–80. Depression levels significantly decreased by the end of the intervention. In addition to the dance style, the above mentioned factors could contribute to such results.

Overall, two studies demonstrated significant improvements in depression levels, while two found no changes. Both effective and ineffective interventions could involve underlying processes based on our theoretical concept, such as psychological processes, bodily changes, and social processes (except in the study conducted by Finn et al. due to the lack of direct contact). Factors such as initial psychological state, trait characteristics, level of involvement and motivation, music, social context, and intervention characteristics (e.g., dance style and session components) likely contributed to the observed effects, as proposed in our model. See the mentioned processes in more detail in [Figs. 2 and 3](#). The main focus of our study is to gather existing information on the possible processes of movement from empirical research relevant to movement improvisation. However, systematic reviews comparing the effects of different movement interventions on a specific variable would be very useful in the future to gain a deeper understanding of the effects of these processes and the complex mechanism.

Origin and cultural roots of movement types, aestheticization, and creativity

The origin of movement is another variable that is not highlighted in most studies but may be important for the interpretability of results. Modern and contemporary dance are genres that developed from the rejection of constraints and the pursuit of emotional expression. Within this genre, contact improvisation emerged, where two individuals move improvisationally in interaction with each other, attuning to one another. This is a fundamentally different quality of partner dance compared to what is typically seen in hip hop or ballroom dancing. Of course, it is also possible to dance in pairs in such a way that the emphasis is placed on attunement, but generally speaking, in hip hop, for example, the partners alternate dancing while observing each other in a battle situation. Therefore, it is worthwhile to understand the origins of each style, as there can be significant differences between certain dance types. Ideally, authors should provide detailed description of the nature and purpose of the intervention.

Creativity

Incorporating creativity into movement improvisation sessions raises similar questions to the pursuit of aestheticization. Based on our experiences, beginners often find it easier to enjoy and engage in the session if the movement improvisation is guided, particularly at the beginning of the class. It helps them blossom if we demonstrate specific movements, thereby losing some of the improvisational nature. Once the participants become familiar with their body's capabilities and can immerse themselves in the work of movement, they typically find it much easier to express their inner experiences through creative and improvisational tasks. On the other hand, providing participants with specific ideas can detract from their focus on their own creative expressions. Furthermore some processes rely on creativity (e.g., self-expression, emotional awareness, consistent sense of self).

Differences between choreography and improvisation

Research findings indicate that the effects of improvisational movement on self-efficacy and quality of life are consistently positive ([Wiedenhofer & Koch, 2017](#); [Bracco et al., 2023](#)). However, when examining other variables associated with mental health, the results remain contradictory, particularly in relation to depression (see, for example, [Park et al., 2020](#); [Branson Dame et al., 2024](#)). Conversely, interventions incorporating choreography demonstrate significant improvements in depression, anxiety, and both social and psychological well-being following participation ([Adam et al., 2016](#); [Ventura et al.,](#)

2016; Koch et al., 2007; Tuncgenc et al., 2023). It is crucial to acknowledge, however, that without the presence of replication studies and control groups, a definitive comparison of the effects of these two movement modalities cannot be established.

In summary, we cannot definitively conclude that movement improvisation has a significant and clearly beneficial overall effect on mental health variables (such as perceived stress, affectivity, social anxiety, and well-being); however, we also cannot assert that it has no effect at all. We have drawn important insights regarding how certain forms of movement influence specific mental health variables, while also highlighting characteristics whose role remain contentious. Furthermore, it is possible that other variables play a role in the observed effects of movement improvisation or that these processes could be categorized differently (for example, by combining those that yield similar outcomes).

Conclusion: theoretical model of the mechanism of movement improvisation

The variability in the results of the above mentioned intervention studies encouraged us to approach the mechanism of movement improvisation from an alternative perspective, which is discussed in our theoretical model below. This theoretical idea provides a solution to some of the problems mentioned repeatedly in the field of dance and

movement research. It serves as a groundwork for future research on movement improvisation and a framework for critical reviews of existing literature in the field of mental health, dance and movement.

Our theory on the mechanism of movement improvisation presents a component-specific perspective. Based on our literature review, we conceptualized movement improvisation and movement interventions as being composed of distinct components. Through our review, we identified mechanisms and influencing variables mentioned in empirical literature, categorizing them as processes and moderators and mediators. While some articles support the idea that each component independently impacts mental health, others describe components that lack empirical validation, warranting further investigation. Our theoretical model acknowledges the potential for interactions between components leading to combined effects, which also require future research.

Based on existing literature we have identified 18 processes of movement improvisation: (1) self-expression, (2) coping and emotion-regulation, (3) altered states of consciousness, (4) general psychological changes, (5) stress management methods, (6) non-movement techniques, (7) other psychological methods, (8) physiological changes, (9) psychoneuroimmunological changes, (10) intimacy, (11) social environment and relationships, (12) synchrony with each other, (13) observing others while moving, (14) rhythmicity and synchrony with music, (15) music, and (16) behavioural processes, (17) environment and (18) verbal expression. We enriched the existing list with

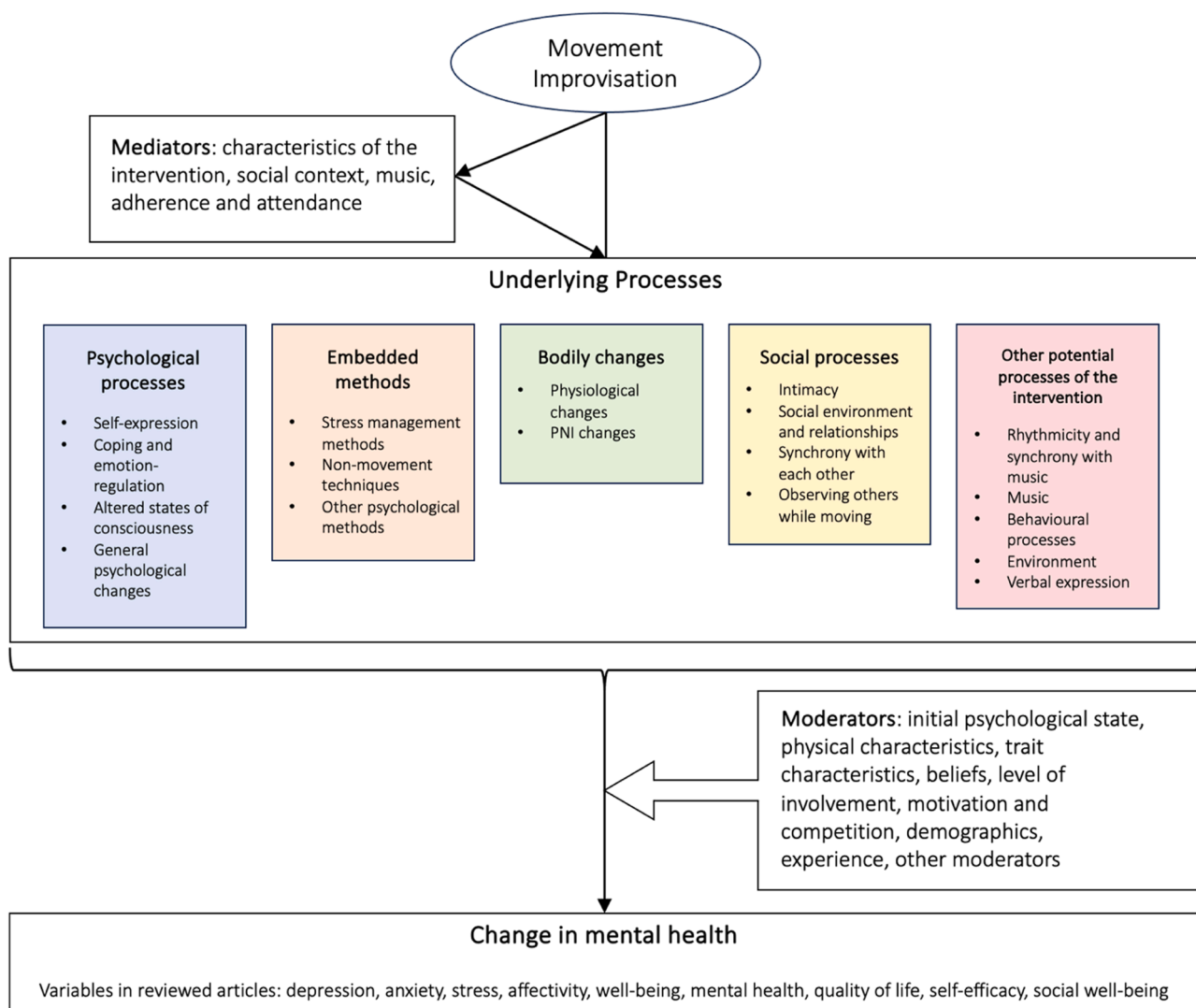


Fig. 5. Theoretical model of the mechanism of movement improvisation Note. PNI = psychoneuroimmunological.

components based on our experiences as instructors, adding important elements that are mentioned in empirical articles, but not fully elaborated on (e.g., verbal expression). While we are aware of the effects of some of these processes on mental health (e.g., relaxation, expressive writing, etc.), the roles of many and the way in which they may interact remain unclear. Changes in mental health occur depending on which processes are expressed in the intervention. One or more of these effects can concurrently be valid and may influence one another. Furthermore, these relationships may also be influenced by other variables, as depicted in Fig. 4. We categorized these factors into two groups: moderators (such as initial psychological state, physical characteristics, trait characteristics, beliefs, level of involvement, motivation and competition, demographics, experience and other moderators) and mediators (including characteristics of the intervention, social context, music and adherence and attendance). Fig. 5 illustrates the theoretical model of the mechanism underlying the effects of movement improvisation.

It is likely that the processes influence additional psychological variables beyond those we have listed, and that there is variability in the strength of each individual effect. Furthermore, it is crucial to acknowledge that the operationalization of the constructs being measured is vital for drawing more precise conclusions regarding the results, as the measurement and conceptualization of each variable can be diverse. This diversity further complicates the comparability of findings. To comprehensively identify all potential processes of movement improvisation, as well as to understand the functioning of the moderators and their specific impacts on various aspects of mental health, future research should include targeted meta-analyses and control group studies grounded in an integrated and unified theoretical framework.

The components of the model are interdependent and together they create different mechanisms. We demonstrated some of the connections between processes, mediators, and moderators. However, we found little empirical work exploring the relationships between these factors and variables. One of the most frequently mentioned mechanism was the mediating role of attendance and adherence. Some moderators (e.g., pride, ability, beliefs, experience, demographics) or processes (e.g., self-regulation, positive emotions, enjoyment as a result of movement, music, environment, defined expectations) are related to motivation to attend movement classes. Furthermore, regular attendance at movement sessions contributes to more impactful and prolonged effects of the processes involved. Another one was self-expression, which through body and emotional awareness can elicit emotions. Observing others while dancing, and music can have the same effects. Experiencing positive emotions as a result of movement also motivates participants to attend and engage further in classes. General psychological processes (e.g., freely experiencing emotions, self-efficacy through self-confidence) and altered states of consciousness are associated with more adaptive coping and emotion-regulation. Other possible mechanisms are not excluded from our theory; however, these were the primary connections described in existing research.

Our study presents a comprehensive summary of the theories and findings related to movement improvisation, which is a fundamental component of DMT. We have synthesized both qualitative and quantitative research results that are essential for a deeper understanding of the impact of this form of movement on mental health. Specifically, we have outlined the processes through which movement improvisation exerts its effects, identified the variables that may influence these processes, and explored how these factors may interact with one another creating the mechanisms of movement improvisation. Additionally, we have emphasized areas where the impact is potentially significant but remains understudied. To enhance the validity and comparability of findings, research on movement improvisation – as well as studies utilizing other forms of movement – should be systematically compiled and evaluated according to consistent criteria. This approach could help reduce contradictions, facilitate result comparisons, and support to perform meta-analyses on the field. Moreover, our summary highlights

pertinent research questions by showcasing the less investigated areas.

The effects of a movement improvisation intervention on mental health cannot be oversimplified to a singular explanation, such as, “participants feel better after the session because they expressed their inner feelings.” While certain processes may exert a more pronounced impact during movement improvisation, further research is necessary to gain a comprehensive understanding of these processes. Nonetheless, the above mentioned self-expression, the unrestricted experience of emotions, elaboration, sublimation, and synchrony are unique and integral elements of movement improvisation, dance, and other movement improvisational activities. It is plausible that the positive outcomes associated with these sessions can be largely attributed to these processes.

Practical implications

The present paper provides a solid foundation for research on movement improvisation, dance or other specific forms of movement. It facilitates more conscious intervention planning and careful consideration in interpreting results. It is crucial to consider what types of results can be anticipated in each examination and to design the intervention mindfully while controlling for variables that may distort the findings through preliminary questions and questionnaires. Additionally, this study offers guidance for conducting literature reviews and interpreting results in the field of movement improvisation. The proposed theory can assist in selecting appropriate components for interventions aimed at achieving desired outcomes for researchers. When considering various movement and DMT methods, this framework can also be beneficial in individual practice, as instructors might want to select different exercises for clients based on the specific changes they aim to achieve.

Limitations and future outlook

The limited comparability of results in this field, along with the lack of standardized forms in dance and most movement practices, as well as the variability in methods and measurement of constructs, posed significant challenges. Consequently, in many instances, we were unable to draw definitive conclusions and instead identified questions that require further investigation. Given the limited research directly addressing movement improvisation, our review included studies from a broader field, resulting in a heterogeneous selection. Thus our limitations must be taken into consideration when interpreting our conclusions.

The lack of unified definitions for key concepts, such as movement, dance, and improvisation, further complicates interpretation, as these terms may be understood differently. While our focus was on mental health, movement improvisation also impacts cognition and physiological indicators. Future research should explore these areas to expand upon our theory. Additionally, as noted by Koch et al. (2014), the field of dance research often relies on practical experience due to the scarcity of primary studies. This exploratory approach provides critical groundwork, generating hypotheses and addressing gaps in the literature to guide future investigations.

CRedit authorship contribution statement

Zuber Frida: Writing – original draft. **Varga Fanni:** Writing – review & editing, Project administration. **Vécsey Boglárka Kitti:** Writing – review & editing, Methodology. **Nagy Beáta Magda:** Supervision. **Gáspár Mihály:** Supervision. **Horváth Milla:** Writing – original draft, Methodology, Conceptualization.

Declaration of Competing Interest

The authors have no conflicts of interest to disclose.

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Data availability

Data is presented in Table 1.

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Glossary

- Movement:** Movement is any physical change in body position relative to a fixed point, encompassing a broad range of actions, from dancing to everyday activities like walking and brushing teeth.
- Dancewest:** Dance is a form of physical movement that combines artistic elements, often performed to music, characterized by either structured or spontaneous motions with communicative, social, and cultural dimensions, impacting both psychological and physical states.
- Movement improvisation:** Movement improvisation is a spontaneous form of movement involving moment-to-moment, unplanned motions shaped by immediate associations, which may include learned dance elements or natural movements, either aligned with a guiding concept or entirely free from specific intent.
- Mechanism:** A mechanism of change is a theory-driven sequence of processes or events that explains in detail how or why therapeutic change occurs.
- Moderator:** A moderator is an external variable that influences the strength or direction of the relationship between a treatment and its outcome, potentially strengthening, weakening, or reversing the effect.
- Mediator:** A mediator is an intervening variable that explains the causal relationship between two variables, illustrating how or why one leads to the other.



Music therapists' perspectives on nature-connecting methods and the integration of nature in music therapy: Results of a survey among German and Austrian music therapists

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ABSTRACT

Nature- and ecology-related topics are currently gaining increasing attention in healthcare and among healthcare professions. In music therapy, nature, nature-assisted approaches, and ecology have not yet been frequently discussed issues. Only few concepts and approaches have been developed and implemented so far. Therefore, we conducted a cross-sectional online survey to gain more knowledge about music therapists' perspectives concerning the implementation of nature and nature-connecting methods in music therapy. A total of $N = 84$ music therapists from Austria and Germany took part in our investigation. The survey included quantitative and qualitative items. For data analysis, we applied SPSS Statistics and qualitative content analysis. Results show that 75 % of the participating music therapists have never or rarely conducted music therapy in nature so far. However, almost 67 % of them estimated the potentials of integrating nature in music-therapy work to be (very) high. The more pronounced the nature connectedness and openness to experience, the higher the music therapists' assessments of the potentials of nature in music therapy. Music therapists judged music therapy in nature to enhance the therapists' diagnostic insights and listening to nature sounds to positively affect clients' well-being. As for potential risks, heightened distraction and confidentiality breaks were ranked highest. These findings offer preliminary insights into music therapists' attitudes and experiences concerning the integration of nature and nature-assisted methods in music therapy. Further studies are indicated to expand and deepen limited evidence.

Introduction

Eco-anxiety, ecological responsibility, pro-environmental behavior, and the consequences of climate change on mental health are prominent terms and topics in current discussions among healthcare professionals belonging to various disciplines (Brophy et al., 2023; Hogg et al., 2024; Mondal et al., 2024). In this context, nature-based or nature-inclusive approaches to patient care are a topical issue in current research (O'Brien, 2018; van der Salm, 2019). Such approaches have so far been marginally addressed in music-therapy theory, research, and practice (Pfeifer et al., 2020). However, a few publications are available that cover nature-related, environmental, and ecological contents.

Terms such as "environment", "pro-environmental behaviors", and "ecology" play a decisive role in this paper. Therefore, brief definitions shall be provided. Ecology can be defined as a branch of science that focuses on the interactions and relationships between organisms and the environment (Ahad & Ferdous, 2019; Raile, 2024). Environment relates to plants, animals, (natural) surroundings, and "all of the elements in an organism's surrounding that can influence its behavior or survival" (Ahad & Ferdous, 2019, p. 50). Pro-environmental behaviors refer to behaviors in which people are "not only caring for the environment but were also taking protective actions, contributing therefore to environmental sustainability" (Moula et al., 2022, p. 12.).

The "International Dictionary of Music Therapy" (Kirkland, 2013)

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contains relevant words and terminologies, such as ecology, ecological, environmental music therapy, but it does not provide information on, for example, nature-connecting methods, nature-assisted approaches, or nature in music therapy. The third edition of the “Lexikon Musiktherapie” (music therapy lexicon) (Decker-Voigt & Weymann, 2021) was the first edition to include a chapter on “nature and music therapy” (Pfeifer, 2021). Surprisingly, music-therapy students all around the world seem to gain more and more interest in nature-related topics in music therapy. Quite a few academic theses have been realized over the last years (e.g., Boch, 2023; Bogataj, 2015; Burgmayer, 2019; Goldberg, 2021; Ostertag, 2022; Pollock, 2021).

In his article on a conception of music for music therapy, Aigen (1991) points out that there is a strong link between the process of facilitating health through music and “a sense of communion with the various forms of life with which humans share the earth” (p. 91). Kern and colleagues (Kern & Aldridge, 2006; Kern & Wakeford, 2007; Kern & Wolery, 2002) highlight the potentials of combined music therapy and play in the outdoors (e.g., playground, sound path, music hut). Kenny (2006) describes music therapy as a part of an ecology and mentions traditional healing rituals and ancient traditions of the Native Americans in her writings. Recently, Seabrook (2020) has plead for the development of an “eco music therapy” as a new approach that interlinks music therapy and the climate crisis and addresses political, environmental, and cultural aspects within this thematic intersection. To a certain extent, nature and ecology can also be found as elements in the theoretical foundations of Community Music Therapy (CoMT) (Simon, 2013). Authors have used phrases such as “ecologically proactive” among others to outline the main approaches of CoMT (Stige & Aarø, 2011). The term ecology used in CoMT refers to systems theory rather than environmental issues. According to Stige (2002), CoMT is ecological in that individuals, groups, and communities function in systems.

A qualitative, exploratory study on nature imagery in Guided Imagery and Music (GIM) indicates that nature imagery is a common feature in GIM that has a positive impact on the therapeutic process (Bonde & Daniels Beck, 2019). As part of an (auto-)ethnographic investigation, Oddy (2023) introduces a practice called “environmental vocal exploration” (EVE) in which singing and vocal improvisation are used as a means of interacting with different environments and with each other. The results indicate that “through singing in place, people experienced increased listening awareness, which in turn created a relationship with place and the vocal self” (Oddy, 2023, p. 16). The results of a series of studies on the perception of silence in various settings show that 6:30 minutes of silence in a forest (Pfeifer et al., 2023), or in other nature environments (city garden), led by a qualified music therapist, significantly increase relaxation and decrease rumination in participants (Pfeifer et al., 2020; Pfeifer & Wittmann, 2020, 2022). The combination of a 6:30-minute silence in the natural setting of a city garden and Hypnomusotherapy/Depth Relaxation Music Therapy – a specific method of receptive music therapy (Decker-Voigt, 2007; Decker-Voigt & Pfeifer, 2021) – led to a significant increase in relaxation and altered perception of time among the study participants (Pfeifer et al., 2019). In her review study, Bogataj (2015) outlined three specific music-therapy approaches among which nature is considered an integral part. These approaches will be discussed in detail within the following section.

Specific nature-assisted approaches in music therapy

In his approach, music therapist and physiotherapist Wolfgang Fasser (Belucci, 2013) includes nature recordings or so-called “natural sound pictures” in the therapeutic work with clients. A preliminary study (Fasser, 2012), that contained an EEG spectral analysis, led to results that these nature recordings affect brain activity by triggering relaxation and emotional reactions. This is related to changes in brain activity in the frontal cortex, temporal lobe, and limbic system.

Klar (2019a, 2019b) combines music therapy, integrative (psycho-)

therapy and nature therapy in his approach. Based on bio-psycho-socio-ecological assumptions, he understands nature as a therapeutic space in music therapy. He is conducting music therapy in various natural environments and provides case examples and information on the benefits and potentials of nature settings and phenomena (e.g., water, mountain, forest) in his writings.

Outdoor Music Therapy (OdMT), as outlined by Pfeifer (2016, 2017, 2019a, 2019b) “may best be summarized as a generic or collective term describing a critical process of reflection and discussion concerning the application and acquisition of environmental, natural or outdoor settings and surroundings, materials and, therefore, altered therapeutic relationships in music therapy” (Pfeifer, 2017, pp. 180–181). Pfeifer (2017, 2019a, 2019b) lists four specific features of nature in OdMT: nature as a co-therapist, nature materials, nature settings, nature phenomena. First, OdMT understands nature as a co-therapist within the therapeutic relationship – or as an active fourth that contributes to the process. The dyadic relationship, consisting of therapist and client, expands to a triadic in music therapy (therapist – client – music/instrument) and to a tetradic in OdMT (therapist – client – music/instrument – nature). Second, nature supplies us with lots of materials that can become beneficial elements in music-therapy processes. For example, we can rely on (pre-)recorded nature sounds as part of receptive music-therapy methods or use pieces of wood and stones to create musical instruments. However, it is important to consider aspects of nature-ethics and ecological commitments in this context (e.g., when creating musical instruments, use tree branches found on the ground instead of breaking branches off trees). The use of nature materials shall not be preceded by behavior that is harmful to nature. Third, nature offers a huge variety of different outdoor locations, settings and environments in which music therapy can happen (e.g., in a forest, nearby a mountain, at a riverbed, in a clinic garden). Professionals need to consider that whatever setting might be chosen, it should be beneficial and supportive to the individual client’s therapeutic process. Fourth, in OdMT nature phenomena are mentioned as another feature of nature. The weather, as a nature phenomenon, can be a resonant cathartic metaphor, a sounding mirror of the therapeutic process (Pfeifer, 2012), but also of our lives: “The idea that you can’t control the weather mirrored the process that we cannot always control the emotional weather of our lives and relationships” (Jordan, 2015, p. 5). Other nature phenomena (e.g., the change of seasons, the shift from day to night or ebb and flow) may also contribute in other ways to music-therapy processes.

Regarding the given literature, there is a potential gap of knowledge and awareness for nature-inclusive approaches in music-therapy theory, practice, and research. Therefore, we conducted a study gathering data on the music therapists’ perspectives regarding the implementation of nature-based methods in music therapy.

The present study

For our study design, we considered previous investigations that focused on outdoor therapy, nature connectedness, and the assessment of therapist’s experiences and perspectives on outdoor therapy (Aigner et al., 2024; Cooley et al., 2020; Meyer et al., 2021; Pfeifer et al., 2024; Revell & McLeod, 2017; Wüster & Pfeifer, 2023). Doing so, we relied on measures and/or methodical approaches that had been used in these previous studies. Our main aim was to generate detailed insights into professional music therapists’ perspectives on including nature and nature-combining methods in music therapy. Another goal was to gather data on nature connectedness and personality traits and to check for relevant correlations in the context of our main topic.

Methods

Study design

A cross-sectional online survey was conducted among music therapists from Austria and Germany. The online questionnaire was administered via [LimeSurvey \(2024\)](#) and was accessible from September 18th to November 17th, 2023. A total of 61 items were included in the survey. The survey included quantitative and qualitative items.

The survey link was distributed via e-mail to all registered music therapists listed by the Austrian Federal Ministry of Social Affairs, Health, Care and Consumer Protection (502 music therapists registered as of September 2023), given they had provided a valid e-mail address (138 music therapists). The survey link was also disseminated to music therapists from Germany through the German Music Therapy Society (Deutsche Musiktherapeutische Gesellschaft – DMTG).

The study was reviewed and approved by the ethics committee of the Sigmund Freud University Vienna (protocol code: ACXVCPH@BWU-BOG90584). The participants provided electronic informed consent after reading the data protection declaration. Completion of the survey was voluntary and devoid of incentives.

At the start of the survey, the term “nature” was clarified (“In this study, nature refers to a largely unspoilt natural environment, such as forests, fields, meadows, lakes, mountains.”), recognizing its potential for varied interpretations. In this study, “nature-connecting methods” within music therapeutic treatments denote approaches that deliberately incorporate elements of nature, such as natural materials, nature-related metaphors, or natural settings (see, for example, [Pfeifer, 2017](#); [Pfeifer, 2019a](#); [Pfeifer, 2019b](#)). These methods may be implemented within enclosed spaces or in outdoor environments, where nature serves either as a passive backdrop or is actively integrated ([Pfeifer, 2012](#)). Outdoor therapy settings encompass a spectrum from man-made green spaces like parks or urban gardens to more remote wilderness areas such as forests, mountains, meadows, or bodies of water ([Cooley et al., 2020](#)). However, it is important to note that activities like walks or outdoor sessions primarily conducted for COVID-19 safety precautions, without a direct therapeutic intent, were not categorized as a “nature-integrating intervention” in this study.

Measures

Sociodemographic and work-related characteristics

Music therapists were asked about their country, gender, age, and year of licensure as a music therapist. Additionally, participants were queried regarding potential additional qualifications as psychotherapists, clinical psychologists, or medical doctors. They were also questioned about their workplace setting (private practice, outpatient facility, inpatient facility), the client population they work with (adults, children, and/or adolescents), their primary residence until the age of 18 (rural area, medium-sized city, metropolitan area), and the predominant location where they practice music therapy (rural area, medium-sized city, metropolitan area).

Connectedness to nature

Connectedness to nature was measured with the German version of the Nature Connection Index (NCI) ([Pfeifer et al., 2024](#); [Richardson et al., 2019](#)). This index encompasses six fundamental aspects of individual attitudes towards the relationship between humans and nature. The NCI utilizes a seven-point Likert scale, where participants rate their agreement with statements regarding nature from “completely disagree” to “completely agree”. The NCI has a high internal consistency (Cronbach’s $\alpha = 0.91$) and shows a high correlation with other inventories in this area ([Richardson et al., 2019](#)). In this sample, the internal consistency was $\alpha = 0.81$.

Personality traits

The assessment of personality traits among music therapists was based on the Big-Five-Inventory-SOEP (BFI-S) ([Schupp & Gerlitz, 2008](#)). This instrument comprises 15 self-assessment items. Each item is rated on a seven-point Likert scale, specifying responses from “strongly disagree” (1) to “strongly agree” (7). The BFI-S facilitates the examination of five personality dimensions: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. In this study’s sample, the internal consistencies for the subscales were as follows: $\alpha = 0.75$ for conscientiousness, $\alpha = 0.74$ for neuroticism, $\alpha = 0.70$ for extraversion, $\alpha = 0.58$ for openness to experience, and $\alpha = 0.56$ for agreeableness, which are comparable to previous validation studies ([Gerlitz & Schupp, 2005](#); [Hahn et al., 2012](#)).

Assessment of music-therapy practice with nature-connecting approaches

To evaluate music therapists’ experiences with integrating nature into music therapy, we devised two distinct survey questions. Initially, participants were queried about the frequency of conducting music-therapy sessions in natural settings. Subsequently, they were asked about the frequency of incorporating natural elements into their music-therapy practice. Responses for both inquiries were measured on a 5-point scale, ranging from “never” (0) to “always” (4).

Furthermore, therapists were asked to indicate the locations where they had previously conducted sessions with clients. The answer options were: forests, meadows, gardens, city parks, mountains, playgrounds, labyrinths, high ropes courses, farms, hiking trails, elsewhere in natural settings, or never outside of enclosed spaces. Multiple answers were possible. We also added an open-ended question asking participants whether they consider nature-connecting methods to be superfluous for music therapy. Answer categories were “yes” or “no” – with the addition that music therapists were asked to comment their answer.

Assessment of potential

Participants provided estimations regarding the potential effectiveness of nature-connecting methods in music-therapy treatments. Using the aforementioned nature definition, they rated their overall assessment on a 5-point scale, from 0 = “very low” to 4 = “very high,” in response to the question: “How do you evaluate the potential of nature-integrating methods for clients?”

To explore the estimated beneficial impact of nature-connecting methods in music therapy, participants were invited to indicate their agreement to several pre-defined statements in response to the question, “What potential aspects of nature-connecting methods do you believe can positively influence the music-therapy process for clients?”. The participants could choose between the following pre-defined statements, among others:

- Acknowledgment of the regularity of nature (e.g., change of seasons, day and night cycle), which fosters awareness of life regularity and aids in addressing grief and existential questions
- Facilitating access to the self and to one’s inner nature or foundation through direct bodily experiences in nature
- Recognition of the role of direct bodily experiences in nature, facilitating access to the self and rediscovery of inner nature or foundation
- Appreciation of the calming, relaxing, and rejuvenating effects of nature
- Consideration of addressing challenges and fears encountered in natural settings through on-site music therapy
- Recognition of improved focus, heightened attention
- Facilitation of self-efficacy
- Reflection on the potential for music therapists to gain insights from observing clients in nature, enhancing diagnostics
- Acknowledgment of the well-being benefits of simply hearing natural sounds

Furthermore, participants were encouraged to provide individual comments considering developmentally beneficial aspects of nature-connecting methods for clients.

Assessment of risks

Participants evaluated the perceived risks associated with conducting music-therapy sessions in natural environments outside of traditional office settings. They rated their perceived risk levels on a 5-point scale, ranging from 0 = “very low” to 4 = “very high,” concerning six self-defined risk factors. These factors were defined based on prior research (Cooley et al., 2020; Jordan, 2015; Knümann, 2019) and included: 1) potential loss of confidentiality due to possible encounters with acquaintances of the patient or therapist; 2) potential contraindications leading to worsening of mental health; 3) risk of accidents; 4) challenges in maintaining session timing outdoors; 5) potential for increased distractions compared to sessions in traditional office settings; and 6) increased vulnerability of the therapist due to a shift away from the established therapeutic environment.

Additionally, participants were invited to provide their insights on potential drawbacks/detrimental aspects of nature-connecting methods. They were asked to share their individual perspectives and comments in a provided free text field.

Statistical analyses

All statistical tests were performed in SPSS Statistics version 29.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were applied to calculated frequencies and means.

To analyze potential associations of the frequency of music-therapeutic work in natural environments, the integration of nature in music therapy, the estimated potential of nature-connecting methods, as well as the estimated risks of conducting music therapy in nature with the nature connection (NCI) and the personality traits (BFI-S), Pearson correlation coefficients (r) were calculated.

To evaluate whether music therapists estimate potential risks of conducting music therapy in natural surroundings differently, a repeated measures ANOVA (RM-ANOVA) with the “area of risk” as a within-subject factor, was conducted. The Greenhouse-Geisser corrected values are reported and post-hoc tests were Bonferroni-corrected.

All tests were two-tailed, and the significance value was set to $p < 0.05$.

Analysis of qualitative data

As mentioned above, our survey contained three open-ended questions. Study participants were asked to answer these questions by providing individual free text comments. The responses were gathered for each question and then analyzed using qualitative content analysis (Ghetti & Keith, 2016; Mayring, 2014). We applied the techniques of deductive (structuring) and inductive (summarizing) category formation specific to qualitative content analysis. The systematic approach was intended to ensure quality criteria such as intersubjective verifiability. In terms of “intra-coder agreement” (Mayring, 2014, p. 111), the material was analyzed several times in succession to set up, check, and modify the/a category system (summarized in detail in Suppl. Table 1).

Results

Study sample

A total of $N = 84$ music therapists took part in the online survey. The characteristics of the study sample are summarized in Table 1. The majority of participants (88.1 %, $n = 74$) were from Austria. Of the 138 music therapists contacted in Austria, 74 participated in the survey. This equates to a response rate of 53.6 %. Response rate for German music

Table 1

Study sample characteristics ($N = 84$).

Variable		
Country		
Austria, % (N)	88.1	(74)
Germany, % (N)	11.9	(10)
Gender		
Woman, % (N)	83.3	(70)
Man, % (N)	16.7	(14)
Age in years, M (SD)	44.63	(11.46)
Years in profession, M (SD)	10.34	(6.28)
Form of employment as music therapist		
Private practice, % (N)	64.3	(54)
Outpatient facility, % (N)	26.2	(22)
Inpatient facility, % (N)	53.6	(45)
Patient group		
Adults, % (N)	81.0	(68)
Children and adolescents, % (N)	59.5	(50)
Location during upbringing		
Countryside, % (N)	50.0	(42)
Medium-sized city, % (N)	21.4	(18)
Metropolitan area, % (N)	28.6	(24)
Workplace location		
Countryside, % (N)	26.2	(22)
Medium-sized city, % (N)	34.5	(29)
Metropolitan area, % (N)	39.3	(33)

Note: Information on years in profession was provided by $n = 79$ music therapists. The categorization of childhood and workplace locations was based on the following criteria: countryside: $< 10,000$ inhabitants, medium-sized city: $10,000 - 100,000$ inhabitants, metropolitan area: $> 100,000$ inhabitants;

therapists cannot be calculated due to the different recruitment strategy (i.e., uncertainty how many music therapists received the newsletter containing the survey link).

The average age of the music therapists was 44.63 ± 11.46 (Mean $\pm$ standard deviation) years, and their average years in the profession were 10.34 ± 6.28 . Most of the participants (83.3 %, $n = 70$) were women. Among the partaking music therapists, 13 were also licensed psychotherapists, one of whom was also a medical doctor. Another music therapist was a licensed clinical psychologist.

Most music therapists worked in private practice (64.3 %) or were employed in inpatient facilities (53.6 %). Although half of the participating music therapists resided in rural areas until the age of 18, only 26.2 % of them practiced their music therapy profession in the countryside.

Personality traits and connectedness with nature

Table 2 summarizes characteristics of personality traits and nature connectedness.

Frequency of music-therapeutic work in natural environments and integrating nature into music-therapeutic treatments

The following frequencies were observed for conducting music therapy in nature: 36.9 % ($n = 31$) never, 38.1 % ($n = 32$) rarely, 14.3 % ($n = 12$) occasionally, 9.5 % ($n = 8$) frequently, and 1.2 % ($n = 1$) very

Table 2

Big-Five-Personality traits and nature connectedness in music therapists from Austria and Germany ($N = 84$).

Variable	M	SD
Personality traits		
Conscientiousness	5.62	1.04
Neuroticism	3.64	1.19
Extraversion	5.12	0.96
Openness to experience	5.85	0.77
Agreeableness	5.77	0.86
Nature Connectedness	68.10	21.59

frequently (see Fig. 1).

The reported frequencies of music-therapeutic work in nature correlated neither with the nature connectedness as measured with the NCI ($r = 0.068$, $p = 0.541$), nor the assessed personality traits (r from -0.157 – 0.197 , $p > 0.05$). Detailed results of the correlation analyses are summarized in Table 3.

Music therapists reported primarily working with clients in meadows ($n = 37$, 44.0 %), gardens ($n = 37$, 44.0 %), and forests ($n = 24$, 28.6 %). A detailed depiction is shown in Fig. 2.

Among the 84 participating music therapists $n = 8$ (9.5 %) stated that they never integrate natural materials (examples for nature materials in music therapy: see section on specific nature-assisted approaches in music therapy) in music-therapeutic treatments (Fig. 1). Another 33.3 % ($n = 28$) said it was rare and 35.7 % ($n = 30$) said it was occasional. A total of $n = 17$ therapists (20.2 %) stated to integrate natural materials frequently, and one ($n = 1.2$ %) very frequently.

As summarized in Table 3, the frequency of integrating natural materials in therapeutic work was positively associated with extraversion ($r = 0.302$) and openness to experience ($r = 0.337$), while a significant negative association was observed for neuroticism ($r = -0.351$).

Estimated potential of integrating nature into music therapy

The following frequencies were observed for the estimated potential of integrating nature in music-therapeutic work: 22.6 % ($n = 19$) very high, 44.0 % ($n = 37$) high, 28.6 % ($n = 24$) moderate, 3.6 % ($n = 3$) low and 1.2 % ($n = 1$) very low.

The estimated potential of nature-connecting methods was positively associated with nature connectedness ($r = 0.442$) and openness to experience ($r = 0.265$; Table 3).

Participants were asked to provide their agreement to several potential benefits of integrating nature into music-therapeutic sessions. A total of $n = 56$ (66.7 %) music therapists acknowledged the potential of nature's regularity in fostering awareness of life's rhythm and addressing existential questions and grief. Additionally, a notable number of music therapists ($n = 64$, 76.2 %) recognized the role of direct bodily experiences in nature, facilitating self-discovery and reconnecting with one's inner nature. Music therapists generally appreciated the calming, relaxing, and rejuvenating effects of nature ($n = 73$, 86.9 %). Moreover, many saw potential in using natural settings to address challenges and fears encountered by clients ($n = 44$, 52.4 %). Some also recognized the potential for improved focus and heightened attention through nature integration ($n = 20$, 23.8 %). Furthermore, participants identified nature integration as conducive to fostering self-efficacy ($n = 36$, 42.9 %) and enhancing therapists' diagnostic insights by observing clients in natural environments ($n = 47$, 56.0 %). Finally, the majority agreed that even listening to natural sounds could contribute to clients' well-being ($n = 50$, 59.5 %).

A total of $n = 44$ (52.4 %) participating music therapists provided an

answer to the open-ended question regarding further potential developmental benefits of integrating nature into music-therapy sessions. Data analysis revealed one main ("Development-promoting aspects of nature-connecting methods in music therapy") and five subcategories. Subcategories were: C 3.1 "Sensory awareness" (anchor example: "Many senses are stimulated (seeing, hearing, smelling, touching)."), C 3.2 "Contact to the elements" (anchor example: "[...] the experience of experiencing authorship through dealing with natural elements (e.g., with water/sand/air)."), C 3.3 "Walking in nature" (anchor example: "Walking in nature/fresh air usually leads to defocusing and can strengthen the client's ability to self-regulate."), C 3.4 "Silence and mindfulness" (anchor example: "Dealing with silence, promoting mindfulness, feeling the breath and body, spiritual/meditative experience."), and C 3.5 "Nature as co-therapist" (anchor example: "[...] nature as an extension within the therapeutic relationship (nature is not a passive something, but an active element within the therapeutic relationship, i.e., a co-therapist).").

A total of $n = 18$ (21.4 %) replied to the open-ended question on whether the participants considered nature-connecting methods to be superfluous for music therapy. Almost all of the participants ticked "no" before the provided a free text comment – with one exception: The one participant who had previously ticked "yes" explained this by arguing that she would not use nature-connecting methods per se and only if it was an important topic for the client. Content analysis of the free text replies led to one main ("Positive aspects of nature-connecting methods in music therapy" with anchor example "Nature offers endless opportunities to expand, enrich, and deepen music-therapy work.") and three subcategories: C 1.1 "Connectedness to and oneness with nature" (anchor example: "I think that in music therapy in particular, nature and the connection to nature can be restored or strengthened [...]."), C 1.2 "Connection to oneself" (anchor example: "[...] they [the sounds of nature] bring me down and lead me to myself."), and C 1.3 "Cooperation with other professional groups" (anchor example: "Together with the nursing staff in our outpatient clinic, I have already held a unit on the subject of music and nature in the outdoors and I can well imagine doing something similar again.").

Estimated risk areas of practicing music therapy in natural environments

The estimated risks of conducting music therapy in natural environments are depicted in Fig. 3. The RM-ANOVA revealed a significant effect for risk area ($p < 0.001$). Heightened distraction and confidentiality breaches were considered to pose higher risks compared to challenging time management, potential accidents potential contraindication or the loss of the host role ($p < 0.05$). Bonferroni-corrected post-hoc tests are summarized in detail in Suppl. Table 2.

Associations of nature connectedness and personality traits with the extent different potential risk areas were evaluated by music therapists are summarized in Table 4. The estimated risks for potential

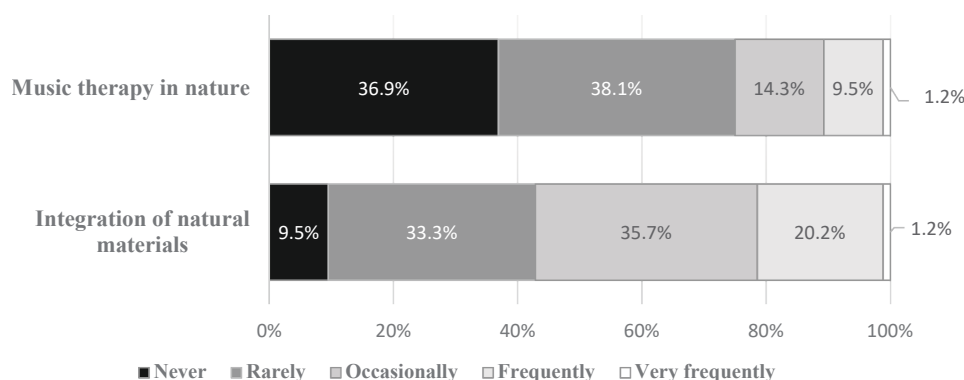


Fig. 1. Distribution of frequencies of conducting music therapy in nature and integrating natural materials in music therapy.

Table 3

Pearson correlation analyses investigating associations of the frequency of conducting music therapy in nature, integrating nature in music therapy, as well as the estimated potential of integrating nature in music therapy with nature connectedness and Big-Five-Personality traits in music therapists (N = 84).

	Nature Connectedness	Big-Five-Personality traits				
		N	E	O	A	C
Music therapy in nature	.068	-.104	.128	.197	-.157	-.050
Integrating nature materials	.137	-.351 **	.302 **	.337 **	-.080	-.030
Estimated potential of integrating nature	.442 **	-.024	.146	.265 *	.148	.059

Notes: *. The correlation is significant ($P < 0.05$). **. The correlation is significant ($P < 0.01$). Frequencies were reported on a 5-point Likert scale ranging from 0 'never' to 4 'very frequently'. The estimated potential was rated on a 5-point Likert scale ranging from 0 'very low' to 4 'very high'. Abbreviations: NCI, nature connection index; N, neuroticism; E, extraversion; O, openness to experience; A, Agreeableness; C, conscientiousness;

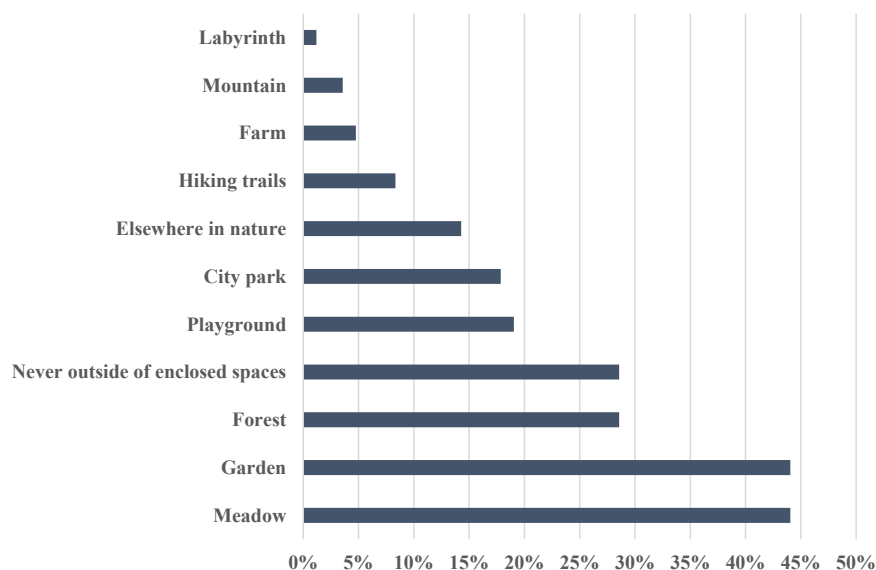


Fig. 2. Distribution of responses to the question "Where have you previously worked with clients?"

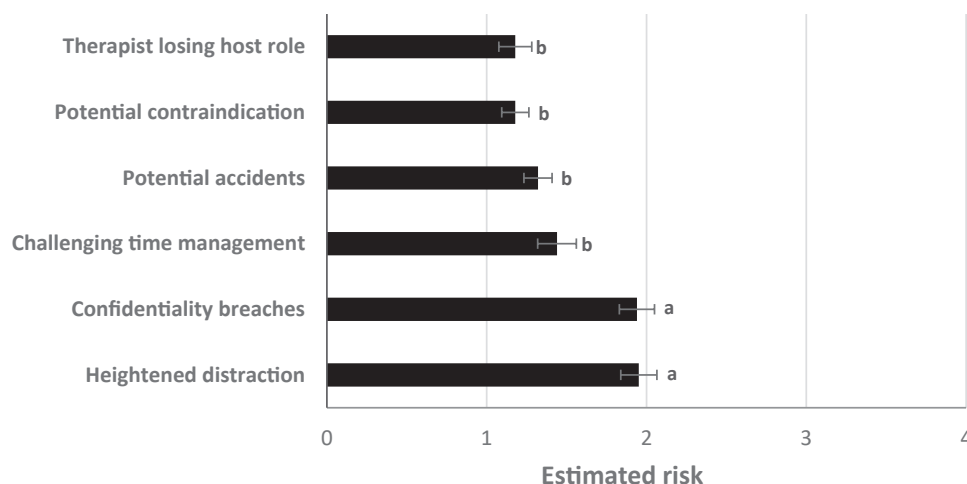


Fig. 3. Estimated risk of music therapy in nature by different risk areas. Music therapists were asked to estimate the risk on a 5-point scale from 0 (= very low) to 4 (= very high). Data are presented as least squares means $\pm$ standard errors. Statistically significant differences are indicated by differing superscripts ($p < 0.05$).

contraindication ($r = -0.231$) and potential accidents ($r = -0.267$) were negatively associated with agreeableness, while the risk of potential accidents was positively associated with extraversion ($r = 0.217$). Higher expression of the Big-Five personality trait conscientiousness was associated with lower estimated risk of therapists losing the host role during music therapy in nature ($r = -0.224$).

A total of $n = 43$ (51.2 %) participants elaborated in more detail on

potential detrimental effects of nature-integrating methods. By applying qualitative content analysis we created one main ("Challenging aspects of nature-connecting methods for music therapy" with anchor example "Working in nature is only possible under certain conditions and with selected clients. A misjudgement of this could be counterproductive.") and five subcategories: C 2.1 "Contraindications related to music therapy in nature" (anchor example: "Gait disorders, severe neurological

Table 4

Pearson correlation analyses investigating associations of the estimated risks of conducting music therapy in nature, nature connectedness and Big-Five-Personality traits in music therapists (N = 84).

Risk area	Nature Connectedness	Big-Five-Personality traits				
		N	E	O	A	C
Confidentiality breaches	-.140	.105	-.087	-.151	-.016	-.044
Potential contraindication	-.119	.122	.184	-.055	-.231 *	-.020
Potential accidents	-.022	.196	.217 *	.040	-.267 *	.093
Challenging time management	.014	-.148	-.036	.032	-.069	.086
Heightened distraction	-.005	.031	.038	-.054	-.088	.031
Therapist losing host role	.174	-.006	-.029	.026	-.121	-.224 *

Notes: *. The correlation is significant ($P < 0.05$). Estimated risks were rated on a 5-point Likert scale ranging from 0 'very low' to 4 'very high'. Abbreviations: NCI, nature connection index; N, neuroticism; E, extraversion; O, openness to experience; A, agreeableness; conscientiousness;

clinical disorders, very reduced general condition.”), C 2.2 “Leaving the music therapy room as a safe space (client)” (anchor example: “Unexpected events/noises/weather changes/animals... could jeopardize a safe setting.”), C 2.3 “Leaving the music therapy room as a familiar workplace (music therapist)” (anchor example: “The many sensory stimuli and inputs in nature overflow, cancelling out the meeting and working framework.”), C. 2.4 “Organizational and legal challenges” (anchor examples: “The unpredictability of weather conditions. It is important to make professional preparations and arrangements in advance (e.g., to point out good clothing in the event of weather changes).” and “Compliance with the obligation of confidentiality could suffer if people are listening in.”), and C 2.5 “Professional identity” (anchor example: “The seriousness of music therapy in the eyes of doctors and superiors could [...] be questioned. As it was always important to me to be appreciated for my professional role by the management, I usually didn’t dare to work outside.”).

Discussion

Results of our survey show that 75 % of participating Austrian and German music therapists have never or rarely conducted music therapy in nature. This proves to be quite comprehensible in light of Pfeifer et al.’s (2020) observation that nature and nature-assisted approaches have not yet been frequently covered aspects in music therapy theory, research, and practice. Considering the analysis of the qualitative data, one of the reasons might be that study participants fear that the credibility or seriousness of music therapy could be questioned in the eyes of members of other health professions. Previous investigations led to similar outcomes that, by taking therapy outside, professionals may feel they are transgressing the “rules” and therefore fear being seen or criticized by members of their community (Jordan, 2015).

More than a third of the participating music therapists (35.7 %) stated that they occasionally include natural materials in music therapy, whereas 21.4 % do so frequently or very frequently. Nature materials are one of the four specific features of combining nature and music therapy as described among the theoretical foundations of OdMT (Pfeifer, 2017). The lower the neuroticism score and the higher the scores for extraversion and openness to experiences (personality traits) of participating music therapists, the more frequently they integrate natural materials into their music-therapy work. Additionally, 66.6 % of the music therapists surveyed judged the potential of integrating nature and nature-connecting methods in music-therapy work to be very high or high. The higher the participating music therapists’ nature-connectedness and the openness-to-experience scores, the higher they estimated the potentials of nature-connecting methods and the inclusion of nature in music therapy. Nature connectedness may play a decisive role in this context. Previous studies (Nisbet et al., 2009) indicate a positive link between nature-relatedness and openness, and a negative correlation between nature-relatedness and neuroticism. Music therapists with a stronger connection to nature tend to be more open to including nature and nature-connecting methods in their therapeutic

work and they rate the potential of these more highly than music therapists with less connection to nature. Music therapists also commented that the connection to nature can be restored or strengthened in music therapy. In their systematic review, Moula et al. (2022) also state that arts-based (therapeutic) interventions in nature can increase nature connectedness.

A total of 66.7 % of study participants acknowledged the potential of nature and nature’s regularity in increasing awareness of life’s rhythm and addressing existential questions and grief. Nature phenomena, including the specific cycles and rhythms of or in nature (e.g., change of seasons, shift from day to night), have already been highlighted as a prominent feature of nature in OdMT – positively affecting music-therapy processes (Pfeifer, 2017, 2019b). As far as the connection between nature and existential questions are concerned, Howell and colleagues (2011) mentioned that “[t]hose who are highly nature connected may derive a sense of meaningful existence from their closeness with nature, and this may in turn boost well-being” (p. 170). Other studies, too, highlighted a significant correlation between nature connectedness and existential constructs such as meaning in life (Pfeifer et al., 2024) and a negative correlation between nature connectedness and complicated grief (Schony & Mischkowski, 2024).

The fact that approximately 75 % of the surveyed music therapists recognised the role of direct physical experiences in nature as a facilitator of self-discovery and reconnecting with one’s inner nature concurs with the outcomes of a recent meta-synthesis (Cooley et al., 2020). According to the authors, outdoor therapy enhances mind-body holism, interconnectedness with the natural world, freedom of expression, practitioner well-being, and mutuality of space and relationship between therapist and patient. Music therapists (42.9 %) also indicated that the integration of nature in music therapy can increase self-efficacy. These results coincide with the benefits of walk and talk counselling/therapy which also proved to positively affect clients’ self-efficacy (Doucette, 2004) and perception of self (Revell & McLeod, 2017), hence, self-discovery. Almost 87 % of the participating music therapists appreciated the calming, relaxing, and rejuvenating effects of nature. Effects like these have previously been investigated and documented by various authors – also in nature-related music therapy contexts (Pfeifer et al., 2019, 2020; Pfeifer & Wittmann, 2022). More than four out of ten music therapists judged natural settings to be potentially effective in addressing challenges and fears encountered by clients. Preferred nature settings among the music therapists with outdoor-therapy experiences were meadows, gardens, and forests. Pfeifer (2017) confirms that nature settings are a beneficial feature in music therapy – if music therapists keep in mind the individual needs of clients. Whatever outdoor setting may be chosen, the surrounding has to be appropriate to the patient’s health, therapeutic process, and individual development. Choosing the “right” setting will definitely influence the course of the therapeutic process (Berger & Lahad, 2013). According to the participating music therapists, the integration of nature in music therapy can improve focus and attention. Lee et al. (2015) found that even 40-second views of a flowering meadow green roof boost sustained attention, whereas

6:30 minutes of silence in a natural setting reduce rumination and increase the focus of being in the here and now (Pfeifer et al., 2020; Pfeifer & Wittmann, 2020).

More than half of the study participants were of the opinion that observing clients in natural environments as part of music therapy enhances the therapists' diagnostic insights. This is something that is consistent with Pfeifer's (2017) statement that taking music therapy to the outdoors "opens up a whole new palette of diagnostic possibilities for a therapist" (p. 191).

The majority of music therapists agreed that even listening to nature sounds could affect clients' well-being. The analysis of the qualitative free-text answers added to this by indicating that sounds of nature seem to affect self-awareness and perception of self. Previous investigations confirm these assumptions in that natural sounds proved to improve health, affect, and to lower stress and annoyance (Buxton et al., 2021). A recent study (Subirana-Malaret et al., 2023) on the mechanisms of natural elements behind the impact of forest bathing on well-being even indicated that sound-related elements were perceived as contributing the most to well-being as compared to other natural elements.

Statistical analysis showed that heightened distraction and confidentiality breaches rank highest among potential risks referring to music therapy happening in nature. Confidentiality issues were also mentioned as part of the free-text comments made by the music therapists. The unpredictability of weather conditions and the stance that working in nature is only possible under certain conditions and with selected clients were other challenges to be derived from the qualitative data. These challenges have also been identified by other study authors (Cooley et al., 2020; Jordan, 2015; Revell & McLeod, 2017). According to Jordan (2015), the therapist's competence to frame and "hold" the therapeutic process is crucial to cope with, or prevent, these challenges. Moving (music) therapy outside presupposes conscientious preparation (Knümann, 2019) – a statement also to be found among the anchor examples in our category system.

Finally, music therapists commented that nature-connecting methods in music therapy can promote the client's development in that the approach is multi-sensory (many senses are stimulated) and the outdoors positively affects the ability to self-regulate. Additionally, music therapists listed mindfulness, silence, and nature as a co-therapist as beneficial factors in this context. Mindfulness is linked to self-regulated behavior (Brown & Ryan, 2003), emotional regulation (Johnsen, 2013), and correlates with nature connectedness (Pfeifer et al., 2024). Several studies indicate the positive effects of silence in natural settings (Pfeifer et al., 2023; Pfeifer & Wittmann, 2022) and various authors have described nature as a valuable co-therapist within the therapeutic process (Berger & Lahad, 2013; Jordan, 2015; Klar, 2019a; Pfeifer, 2016, 2024).

Limitations

The primary constraint of this study lies in the ambiguity surrounding the terms "nature" and "nature-connecting method", despite efforts to define them in the survey. This ambiguity allows for varied interpretations, potentially affecting the study's results. Moreover, certain survey items were constructed for this study, potentially compromising reliability and validity. Additionally, there's a risk that music therapists who are particularly open to incorporating nature into their work were primarily drawn to, and participated in, the study. Also, reliance solely on self-reported data poses a risk of response bias.

Furthermore, the study predominantly included Austrian therapists, possibly skewing the results and limiting generalizability to the broader population of music therapists. Given the small sample size ($n = 84$), there is a possibility of Type II errors, where true effects may not have been identified as statistically significant due to the limited number of participants. Thus, it is important to interpret the results of ANOVA and correlations with some caution, considering the potential for effects not reaching significance due to the sample size. Other limitations include

the study's cross-sectional design and lack of patient's perspective.

In order to ensure quality criteria during the analysis of qualitative data, we applied the procedure of "intra-coder agreement" (Mayring, 2014, p. 111). Another option would have been to also work with "inter-coder reliability" (Mayring, 2014, p. 42) as a tool for inter-subjective testability (Mayring, 2014). However, due to the limited amount of available qualitative data material we decided to apply intra-coder agreement only. Subsequent research projects with more extensive qualitative data material and relying on coding schemes could make use of Cohen's Kappa (Cohen, 1960; Landis & Koch, 1977) or the Holsti Test (North et al., 1963) to evaluate its validity.

To address these limitations, future research should generate qualitative data material of a larger scope, adopt a longitudinal approach, incorporating patient-reported outcomes in music therapy with and without nature integration to better understand the impact of nature in music therapy.

Conclusion

Nature, nature-assisted approaches, and ecology, as well as the climate crisis and eco-anxiety, have not yet been prominent issues in music therapy theory, practice, and research. As stated in the introductory section, the "International Dictionary of Music Therapy" (Kirkland, 2013), for example, does not provide information on nature-connecting methods, nature-assisted approaches, or nature in music therapy. However, progress can be observed in that the third edition of the "Lexikon Musiktherapie" (music therapy lexicon) (Decker-Voigt & Weymann, 2021) contains a chapter on "nature and music therapy" (Pfeifer, 2021) – and there is growing interest among music-therapy students to deal with this topic.

Our study led to insights that music therapists have hardly conducted music therapy in the outdoors so far. However, they judge the potentials and benefits of the integration of nature and nature-assisted methods in music therapy as very promising. The higher the music therapists' scores of nature connectedness (assessed with the NCI – Nature Connection Index; Richardson, et al., 2019) and openness to experiences (assessed with the BFI-S – Big-Five-Inventory-SOEP; Schupp & Gerlitz, 2008), the higher they estimated the potentials of nature in music therapy. Even more, they are of the opinion that taking music therapy outside can increase the therapists' diagnostic insights and possibilities. Furthermore, listening to nature sounds was judged to positively affect clients' well-being. Considering possible risks and challenges of music therapy in nature, music therapists ranked heightened distraction and confidentiality breaches the highest.

Considering the study's outcomes, interested music therapists may raise questions referring to feasible combinations of music therapy, nature, and nature-assisted approaches in their daily work. They may also ask themselves of how to transfer the investigation's empirical findings into practical contexts. Doing so, music therapists could, for example, find specific suggestions, case examples, and methods in available literature. Bonde and Daniels Beck (2019) provide explanations and case examples based on their work with nature imagery in Guided Imagery and Music. Hypnomusiktherapy/Depth Relaxation Music Therapy is another method of receptive music therapy that has been described within and adapted to applications in nature contexts (Decker-Voigt, 2007, 2024; Decker-Voigt & Pfeifer, 2021; Pfeifer et al., 2019). Pfeifer's (2012, 2016, 2017, 2019a) publications on OdMT contain lots of case examples, descriptions of nature-assisted music-therapy methods and useful recommendations for music therapists that are interested in taking their practical work outside. Integrative music therapy, as outlined by Klar (2019a), should also be mentioned as a concept that offers valuable practical impulses and ideas for professionals.

In light of current global ecological challenges and crises (e.g., climate change, destruction of the natural environment, urbanization, decrease in green spaces), music therapists thus can make valuable

contributions to the further development of nature-integrating therapeutic approaches. Knowing, for example, about the importance and effects of the acoustic or sounding nature (e.g., natural sounds) on human mental health and well-being (Buxton et al., 2021; Nishida & Oyama-Higa, 2014; Subirana-Malaret et al., 2023) and being specifically trained to therapeutically work with sounds (Pfeifer & Wittmann, 2020) in order to restore, foster, and maintain health and well-being, music therapists could develop further nature-related and ecologically responsible concepts, methods, approaches, theories, and, of course, empirical investigations. In this way, music therapy may become an agent of change within the health care system that is currently rediscovering the importance of nature and ecology as crucial elements.

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Author contribution statements

The empirical work reported in this article was designed, planned, and statistically/qualitatively evaluated by EP, SEA, CS, and EH as the principal investigators. EP and EH drafted and revised the manuscript. RD, TO, and TP provided substantive suggestions for revisions and critically reviewed the manuscript. All authors reviewed and approved the final manuscript.

Ethical statement

The study was performed according to the ethical principles of the Declaration of Helsinki and approved by the Ethics Commission of the Faculty of Psychotherapy Science and the Faculty of Psychology at the Sigmund Freud University Vienna (application code: ACXVCPH@B-WUBOG90584). Informed consent was obtained from all individual participants included in the study.

CRediT authorship contribution statement

Eric Pfeifer: Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Sandra Elisabeth Aigner:** Conceptualization, Investigation, Methodology, Writing – review & editing. **Christine Stolterfoth:** Formal analysis, Methodology. **Rachel Dale:** Writing – review & editing. **Thomas Ostermann:** Writing – review & editing. **Thomas Probst:** Methodology, Writing – review & editing. **Elke Humer:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors state no conflict of interest and declare that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.aip.2025.102252](https://doi.org/10.1016/j.aip.2025.102252).

Data availability

Data will be made available on request.

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Open studio therapeutic aspects as experienced by adolescents in a psychiatric day treatment unit: A qualitative analysis

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ABSTRACT

This qualitative study aimed to explore the therapeutic aspects of Open Studio art therapy as experienced by adolescents in a psychiatric day treatment unit. It was based on constructivist grounded theory, youth participatory action research principles, and arts-informed research, and involved nine participants aged 13–18. Data were collected through semi-structured in-depth interviews and participants' reflections on their artworks. The triangulated approach ensured a robust investigation into the participants' experiences. Data analysis revealed three primary categories: (1) the shared creative space facilitating individual therapeutic processes; (2) creative self-expression promoting self-awareness and self-discovery; and (3) the art therapist as nurturer and guardian of the creative process. Participants emphasized the importance of a supportive creative atmosphere, a sense of belonging and community, and the art therapist's role in maintaining the creative environment. These findings highlight the relational dynamics within the Open Studio and showcase how the interaction between adolescents and the shared creative space fosters personal growth and psychological healing. The study underscores the importance of patient-centered and experientially validated therapeutic approaches and offers insights that can better align art therapy practices with adolescents' developmental and emotional needs in psychiatric settings. Study limitations and recommendations for further research are also presented.

Introduction

Mental health challenges in adolescence

Adolescence is a pivotal transition from childhood to adulthood. Given early signs of puberty, ongoing neurological development, and a prolonged transition to adult roles beyond the age of 18, contemporary researchers have broadened the concept of adolescence to include individuals aged 10–24 (Jaworska & MacQueen, 2015; Sawyer et al., 2018). This developmental stage is characterized by significant physiological, cognitive, emotional, and social transformations, making it a period of vulnerability (Sharma & Seshadri, 2019). Key developmental milestones during this time include shifting from parental to peer identification, developing autonomy (Blos, 1967; Koepke & Denissen, 2012), and navigating identity consolidation amidst conflicting ego functions (Erikson, 1968; Schachter & Galliher, 2018). This moratorium period allows adolescents to explore various identities and roles and supports their journey toward a well-rounded personal, sexual, and social identity.

Taking into account these developmental challenges involving physiological changes, processes of separation, gaining independence, and identity consolidation within a complex cultural and social context (Acheson & Papadima, 2023), some adolescents struggle with mental health conditions such as depression, anxiety, obsessive-compulsive disorder, self-harm, suicidal tendencies, and eating disorders (Harpaz-Rotem & Blatt, 2005; Shaw, 2001). Significant stressors, such as increased screen time and social media use, escalating violence and drug use, academic pressure, declines in physical activity, the global COVID-19 pandemic, acute economic and political instability, wars, and displacement, have all intensified these mental health challenges (Keyes & Platt, 2024; Loy et al., 2024; Sabag et al., 2024). Early and effective therapeutic interventions are crucial as they can enhance developmental outcomes and prevent the exacerbation of mental health problems. These interventions are significant not only for adolescents, but also for their families and communities (Wile Schwarz, 2009).

Mental health day treatment programs, varying widely within and across countries, provide an intensive and systemic multi-professional therapeutic framework while allowing adolescents to maintain

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continuity in their daily lives at home and in their communities. These programs are ideal for adolescents with acute psychiatric conditions who do not require constant supervision, offering diverse therapies, including art therapy (Kennair et al., 2011; Leffler & Frazier, 2022).

Art therapy for adolescents coping with mental health conditions

Art therapy is especially beneficial for adolescents undergoing identity formation, a process characterized by the exploration of diverse expressive modalities (Belfer, 1990). This therapeutic modality establishes a connection between adolescents and their creative potential, offering a safe, empowering medium for expression, freedom, and the evolution of personal agency through creative choices. The tangible outcomes of art therapy provide concrete evidence of the creative process and support the adolescents' therapeutic journey (Moon, 2012; Riley, 2001; Siano, 1999; Tyson & Baffour, 2004). In psychiatric settings, art therapy valuably complements multi-professional interventions, promoting rehabilitation and strengthening participants' sense of capability, self-confidence and self-worth, and enhancing well-being (Crookes, 2007; Wakeling, 2022). It also facilitates the exploration of self within the cultural and social contexts that emerge during the artmaking process (Wolk & Bat Or, 2023).

Furthermore, art therapy aligns with the strengths perspective, emphasizing patients' inherent capabilities as critical resources in their therapeutic journey (Barker, 2014). This perspective asserts that every individual has internal strengths that, when harnessed, can address challenges, and facilitate healing. Therapy thus transforms the presence of illness or trauma into an opportunity for personal growth and development (Saleebey, 2006). Implementing this approach through an open studio model in a medical setting can empower patients by leveraging their creative capacities to navigate and overcome mental health challenges.

The open studio

Rooted in the 'art as therapy' theory, the open studio approach to art therapy posits the individual's creative process and product within a group setting as central to therapeutic work. Unstructured, open and flexible, this approach can accommodate different populations, their unique needs, and various settings; based on these principles, a wide range of practices have developed (for a scoping review, see Finkel & Bat Or, 2020). By encouraging artistic exploration and personal expression without directives, the open studio approach fosters autonomy and a communal creative atmosphere.

The physical layout, offering a diverse array of easily accessible art materials, is designed to ignite and nurture the creative process. In acute psychiatry settings, the open studio space must be flexible and responsive, prioritizing the needs of participants experiencing high levels of distress (Wakeling, 2022). Art therapists play a pivotal role in maintaining this conducive atmosphere, supporting participants in their artistic pursuits without interruption and intervening only when asked for assistance (Allen, 1995; Moon, 2016; Shapiro, 2023). Reflecting the open studio's principle of equality, some art therapists also create art alongside the participants, sharing the creative process's challenges and satisfactions. (Marshall-Tierney, 2014; Moon, 2002).

This flexible platform for creative expression has proven to be especially valuable for adolescents dealing with mental health challenges. Adolescents participate according to their abilities (Block et al., 2005; Cavaliero, 2022; Deco, 1998); this experience of independence and opportunities to make choices foster enhanced autonomy. When implemented among peers, this approach encourages a sense of belonging and elicits identity development (Kelemen & Shamri-Zeevi, 2022; Shapiro, 2014). Additionally, the open studio serves as a nurturing space where adolescents can reconcile various facets of their selves (Zalman Fanunu, 2022; Bat Or & Zusman-Bloch, 2022) and helps bridge their inner experiences with the external world (Naor-Inbar,

2020), thereby greatly enhancing the therapeutic process.

Contemporary research highlights the effectiveness of this approach while evaluating therapeutic impact (Finkel & Bat Or, 2020) and the effect on emotional engagement, personal empowerment, and the development of a positive self-concept among participants (e.g., Chiu et al., 2015; Glinzak, 2016; Heller, 2015). However, in-depth exploration of the open studio's core characteristics and dynamics as a therapeutic intervention is limited (e.g., Denegri Álvarez-Calderón, 2015; Kimhi & Lubin, 2017; Nolan, 2019). Research on implementation of the open studio approach among adolescents and children (e.g., Bat Or & Zusman-Bloch, 2022; Heller, 2015; Kelemen & Shamri-Zeevi, 2022; Kim, 2024) is also sparse.

Given the limited research on the therapeutic aspects of the open studio for adolescents with mental health conditions, and particularly the lack of studies incorporating their perspectives, this study aims to illuminate adolescents' experiences and develop a theory reflecting these therapeutic aspects as perceived by them. The research questions guiding this endeavor were: (a) What characterizes the experiences of adolescent participants in an open studio within a psychiatric day treatment setting? (b) What are the main therapeutic aspects experienced by adolescents in the open studio?

Though based on research that examined participants' experiences in the open studio at three different stages of the therapeutic process, this article presents findings from the initial phase, as reflected in interviews conducted after the first two months of participation. Focusing on initial experiences enables the construction of characteristic categories that help identify changes in participants' experiences during subsequent phases. These primary categories will inform the development of a detailed theoretical model, to be presented in the future.

Method

Design

This study was designed to illuminate therapeutic aspects of the open studio setting, as seen through the eyes of participants. The study utilized a constructivist grounded theory approach to build theoretical frameworks from data, through a cyclical process of deep engagement with data, analysis, and interpretation, recognizing the crucial role of both researcher and participant perspectives in forming theory (Charmaz, 2006; Charmaz, 2014; Mills et al., 2006). Furthermore, it incorporated principles of Youth Participatory Action Research (YPAR), treating participants as experts on their own experiences and empowering them, while broadening knowledge on adolescent issues based on their perspectives (Bozlak & Kelly, 2015; Harper & Cole, 2012). Although ethical board restrictions prevented adolescents from contributing to the research design, they served as co-researchers by reflecting on their processes, the open studio therapeutic aspects, and providing feedback on emerging codes and categories during data analysis. Additionally, the design integrated art as a critical form of data, following arts-informed research principles (Cole & Knowles, 2007) that acknowledge the power of art to convey emotional and imaginative depth and breadth, and offer unique insights into participant experiences (Barone & Eisner, 2011; Eisner, 2006). Integrating different methodological approaches, the research design adheres to a triangulated approach (Flick, 2018). In summary, this multi-faceted approach not only fosters a deeper understanding of the open studio's impact but also aligns with art therapy's practice and philosophy (McNiff, 1998).

Setting and participants

This research was carried out at the Israeli health system's Alma psychiatric day treatment unit for adolescents, located at the Merhavim Medical Center for Brain and Mental Care that serves youth living in Central Israel. Referrals are usually made by family doctors, psychiatrists, psychotherapists, and social workers in the community. The unit

supports adolescents aged 12–18 with mental conditions that impair their ability to manage daily life. Nine participants, from 13 to 18 years of age ($M = 15.44$, $SD = 1.51$), took part in this study, including one male, seven female, and one transgender male (female to male). Participants’ diagnoses included depression, anxiety, OCD, acute psychosis, schizophrenia, gender dysphoria, among others (see Table 1). Participants were from middle-class Jewish families, most secular and one religious. This homogeneity reflects the social background of day treatment patients, contrasting with the broader diversity seen in inpatient acute settings. Cultural differences and social stigma surrounding psychiatric treatment may contribute to this pattern. This homogeneity is further addressed later as a research limitation.

Participants attended the unit’s therapeutic program—encompassing educational activities, intensive psychotherapy, group therapy with a creative arts focus, regular psychiatric consultations, and occupational therapy—five days a week, from 8 a.m. to 3 p.m. Additionally, weekly parental guidance sessions and family interventions were conducted, so that parents were actively involved in the treatment process. As part of the therapeutic program, all patients in the day treatment unit attended weekly 90-minute art therapy open studio sessions, facilitated by three art therapists, involving 8–10 participants.

The open studio approach was chosen as an integral part of the therapeutic program because it provided an unstructured space for artistic self-expression, allowing the adolescents free choice and autonomy within their peer group. The therapeutic staff believed these aspects significantly contributed to the adolescents’ therapeutic and rehabilitative processes, alongside the more structured educational activities and group therapy components of the therapeutic program.

The Studio is a spacious and well-lit space equipped with a wide variety of art materials, including different kinds of paints, pencils, pens, markers, clay, plasticine, wood, fabric, wool, threads, magazines, stamps, stickers, and found objects such as broken toys and medical supplies, as well as natural materials like shells, acorns, pebbles, and more. These materials are organized in an accessible manner that encourages exploration and ignites the creative process (Shapiro, 2023). Figure 1 and 2.

Table 1
Characteristics of participants.

Participant by pseudonym	Gender	Age	Primary diagnosis at time of study
Participant 1- Yael	Female	18	Social anxiety disorder of childhood F932
Participant 2- Yarden	Female	16	Depressive episode F32
Participant 3- Lee	Female	14	Moderate depressive episode F321
Participant 4- Michael	Transgender male (female to male)	13	Generalized anxiety disorder F411
Participant 5- Tal	Female	15	Mixed anxiety and depressive disorder F412
Participant 6- Tamar	Female	17	Gender identity disorder F64
Participant 7- Amit	Female	15	Unspec behavior & emotional dis. usually in childhood & adolesc. F989
Participant 8- Ori	Male	16	Social anxiety F932
Participant 9- Hila	Female	15	Psychosis Nos 2989
			Acute & transient psychotic disorders F23
			Obsessive- compulsive disorder F42
			Recurrent depressive disorder, current episode moderate F331
			Post-traumatic stress disorder F431
			Schizophrenia F20
			Adjustment disorders, mixed anxiety and depressive reaction F4322
			Panic disorder 30001



Fig. 1. Overview of the open studio space from the entrance.



Fig. 2. Overview of the open studio space from the rear.

This specific open studio followed an unstructured model, with no directives given to the adolescents. Only at the end of the session did the art therapists invite participants to share their creations voluntarily. When someone shared, participants were asked to pause their work and listen attentively. Food was not allowed; only drinks were permitted. Participants were allowed to bring their smartphones but could only use them for artistic inspiration or listening to music with headphones. Artworks were stored in personal folders and boxes in the studio, and could be taken by participants upon completing their treatment.

The open studio staff included four female Jewish art therapists who facilitated three sessions per week for separate groups (three art therapists per session). Most had experience in open studio facilitation, with seniority ranging from 1 year to 15 years ($M = 8$, $SD = 7.03$). The art therapists’ roles included witnessing the participants’ creative process, assisting where needed, and maintaining a safe space by following open studio guidelines, e.g., avoiding touching another participant’s artwork, respecting others and the space, and working safely. They also created art alongside the adolescents, modeling adult engagement in the creative process, fostering connection and mutual engagement, while ensuring a safe environment and protecting individual creativity by adhering to studio guidelines. The presence of three art therapists in each session provided flexibility to coordinate and fulfil different roles as needed. After each session, the art therapists reflected on the individual creative processes, group dynamics, and their own experiences,

also considering transference processes. They were also supervised by an art therapist who has expertise in open studio work.

Procedure

Ethical approval was obtained from the University of Haifa's Faculty of Social Welfare and Health Sciences Ethics Committee (Application # 306/21) and the Merhavim Medical Center for Brain and Mental Care Ethics Committee (Application # 666–21). This dual approval ensured adherence to rigorous ethical standards and safeguarded the welfare, rights, and privacy of the participants involved.

Informed consent was obtained from all participants and their parents prior to the start of the study, ensuring ethical conduct, emphasizing confidentiality, and highlighting the voluntary nature of participation, including their right to withdraw at any time. Over four months, 13 adolescents were invited to participate upon their admission to the unit by the first author, a staff member with no therapeutic relationship to them, ensuring ethical standards. Nine agreed to participate after they and their parents received a detailed explanation of the study and provided written consent.

A purposive sampling strategy (Morse, 2010) was employed to select participants based on their direct experience with the studied phenomenon. Participation in the open studio would allow them to reflect on its therapeutic aspects, providing valuable insights from their perspectives.

Eligible participants were required to demonstrate a willingness to engage in the study, along with the ability to introspectively analyze and articulate their experiences. The inclusion criteria specified individuals aged 12–18 who were actively participating in the open studio, undergoing treatment in the adolescent day treatment unit, and proficient in Hebrew. The exclusion criteria precluded individuals with selective mutism, low-functional communication disorders, or any other significant challenges in verbal expression.

Data collection

Three semi-structured in-depth interviews, lasting 30–60 minutes each, were conducted individually with each participant (Kvale & Brinkmann, 2009). The first interview was conducted within two months of starting the weekly 90-minute open studio sessions, followed by a second interview two to three months later, and a final interview at the end of treatment or the school year, whichever came first.

The interviews were conducted within the studio space, allowing for spontaneous engagement with artworks and discussions about the setting and its components. Each interview involved reflective discussions on the participants' artworks, with the aim of exploring their experiences and observing any changes over time. As mentioned earlier, the findings presented in this article refer specifically to analyzed data from the first interview period, after participants had attended an average of 7.5 open studio sessions.

Interview guides were crafted in collaboration with the open studio facilitators; they included initial open exploratory questions such as "Can you tell me about your experience in the open studio?" and "Can you tell me something about the artwork that you chose for us to look at together?" followed by more focused inquiries on various aspects of the open studio experience and its evolution over time, for example, "What is it like for you to create when others are also creating around you?" and "How do you understand the role of the art therapists in the open studio?". Questions were tailored to emerging interview themes to deepen understanding of the participants' experiences; this is a widespread practice in grounded theory research (Charmaz, 2008). The interviews were conducted in Hebrew, recorded, and transcribed verbatim. Quotations presented in the findings section were translated into English by the authors and carefully reviewed by an English language editor to ensure maximum accuracy. Additionally, participants' artworks were photographed for the purposes of documentation at the conclusion of

each open studio session.

Coding and data analysis

Data analysis was conducted through inductive processes that involved immersion in raw data and the development of theoretical concepts that emerged. This analysis process included multiple stages, following grounded theory principles (Charmaz, 2006; Charmaz, 2014).

Initially, interview transcripts were coded line by line using an open-coding approach, to remain open to new theoretical possibilities. In-vivo codes were applied to authentically reflect the participants' voices (Charmaz, 2006; Holton, 2010). After the open coding stage, in which initial codes were generated from the data, the analysis progressed to focused coding. This involved identifying central themes and patterns by condensing and synthesizing the initial codes into more generic codes. The transition to focused coding sought to highlight the most salient aspects of the data and reveal deeper insights. Subsequently, axial coding was employed to establish relationships between the focused codes and organize them into categories and sub-categories. This process enabled a deeper exploration of connections between categories, facilitating the development of a comprehensive theoretical model that effectively captured the complexity of the data (Strauss & Corbin, 1998). The stages were implemented flexibly, involving a constant comparison process through iterative movement between them (Charmaz, 2006; Charmaz & Belgrave, 2012). Artistic expressions were considered in conjunction with participants' reflections on their artwork, providing a visual representation of their experiences and perspectives within the open studio setting. This integrative process ensured that participants' interpretations and explanations of their artworks enriched and added depth to the verbal data collected (Carolan, 2001).

Trustworthiness

To ensure trustworthiness, the researcher employed techniques from Lincoln and Guba (1985), outlined in Nowell et al. (2017). These included methodological triangulation, data triangulation, and combining interviews with participants' reflection on their artwork. In addition, a member checking focus group of four adolescents validated preliminary findings and researcher's interpretations of the data. Reflexivity was maintained through memo-writing, and a reflexive diary with artwork (Potash, 2019), in which the researcher acknowledged potential biases, including the researcher's previous experience facilitating open studios. External supervision by an experienced researcher provided additional safeguards.

Findings

Data analysis of nine semi-structured interviews conducted in the first phase of this research, which involved reflection on participants' artworks, revealed three main categories and 9 sub-categories describing the adolescents' experience of significant therapeutic aspects of the open studio sessions that took place in the psychiatric day unit (Table 2). The categories and sub-categories are presented below, along with verbatim quotes and artworks of the participants (referred to by pseudonyms), while integrating feedback from the member checking focus group.

The shared creative space serving as a foundation for the individual's therapeutic process

Participants described the shared creative space as an essential foundation that facilitated their therapeutic process in the open studio, allowing them to explore and express their unique individuality. The presence and witnessing of others in the open studio affirmed and enriched their experiences, adding further layers to the process. The interviews revealed five characteristics of the participants' experience of

Table 2
Categories and sub-categories.

Categories	Sub-categories
The shared creative space serving as a foundation for the individual's therapeutic process	<i>Creative atmosphere</i> <i>Support and encouragement</i> <i>A sense of belonging and community</i> <i>Coping with emotional challenges that emerge while creating alongside others</i> <i>Discovering meaning in the individual's creative process</i>
Creative self-expression promoting self-awareness and self-discovery	<i>Fostering self-expression</i> <i>Nurturing self-awareness and self-discovery</i>
The art therapist as nurturer and guardian of the creative process	<i>Nurturing the creative process</i> <i>Safeguarding the creative process and the shared creative space</i>

the shared creative space that contributed to its role as a foundation for the participants' personal processes: (a) Creative atmosphere; (b) Support and encouragement; (c) A sense of belonging and community; (d) Coping with emotional challenges that emerge while creating alongside others; and (e) Discovering meaning in the individual's creative process.

Creative atmosphere

Most participants (n = 8) cited some aspects of the open studio environment that contributed to their personal process. Most of them (n = 8) emphasized the atmosphere of freedom, which allowed them to choose what they wanted to do, such as fostering self-expression and contributing to their experience of autonomy. Tamar describes her experience of this atmosphere of freedom, introducing the idea of finding, which also connotes the presence of a search:

"On the first day I was at the studio, I wasn't quite sure what to do with myself. But slowly, I'm discovering what I love. I see that there's so much you can do here [...] You always find something. You find something to do [...] The studio has a different atmosphere, there are other kids with you. There are so many materials and opportunities to do whatever you want."

Several participants (n = 4) described the experience of creating alongside their peers as a creative atmosphere that encouraged their unique expression, for example:

"Sometimes, I don't know [...] It simply immerses you in a creative atmosphere, and you see everyone doing it, and each one also does something quite different, so you feel a bit more confident to do something of your own." (Yael)

In addition, some of the participants (n = 5) regarded the way the physical space was organized (i.e., the display of artworks, the arrangement of art materials, tables covered with brown paper full of doodles, etc.) as contributing to the special atmosphere, for example:

"When there are many artworks around, of various different types, it makes this studio unique [...] It's like a place that is entirely about art [...] You have the freedom to explore your creativity and express yourself in many ways." (Ori)

Support and encouragement

All participants noted that the art therapists were supportive and encouraging. While they play an integral role in the shared creative space by creating art alongside the adolescents, their distinct role will be discussed separately. Participants also identified additional sources of support and encouragement within the shared creative space. The majority (n = 6) emphasized the supportive nature of being able to request assistance from others.

"I want to try making a cake{out of sponge- D.F}, I always want to start, but I don't know which materials to use, which ones would work best [...] I will ask them how they made this cake {refers to an artwork displayed in the open studio space – D.F}, it looks really good." (Tamar).

Three participants also mentioned that being complimented by their peers and art therapists was a source of encouragement: "There are no expectations, and I think that everything you do, others can see [...] compliment, and it's very, uh [...] encouraging." (Yael).

Some of the participants (n = 5) noted that the mandatory participation policy of the open studio was also a source of support, for example:

"I feel like coming here is obligatory, and at first, I didn't really like it. However, it somehow helps me improve my emotional state. So, I appreciate being pushed to do something, if they didn't push me, oh, I wouldn't come at all because most of the time, I just don't have the energy... if I chose not to come, I wouldn't improve in the process. So, I am indeed glad that I have to be here." (Lee).

On the other hand, three participants resisted this idea of compulsory attendance, for example:

"It's in the morning, and I don't think anyone has the energy in the morning to come here. You just have to come and stay here, and you're not allowed to leave, or be on the phone and you just have to be here and do something. Even if you don't have the strength and it's... For me, specifically, it takes a lot out of me." (Amit)

Finally, some of the participants (n = 5) said that the seating arrangement, which became spontaneously fixed over time, created continuity and contributed to the sense that this was a safe, supportive zone, for example: "You get used to sitting next to someone, or sometimes you want to restore the feeling of a previous session if you want to continue something." (Yael)

A sense of belonging and community

Five participants highlighted the importance of feeling part of a collective creative experience in the open studio, as expressed by Ori: "When working together it gives a feeling of being connected to something." A broader aspect of this sense of belonging is reflected in the incorporation of cultural and archetypal content in artworks, exemplified by Ori's artwork (Fig. 3). This artwork explores the collective trauma of the Holocaust and the rebirth, symbolized by the establishment of the State of Israel. It offers a comprehensive context for Ori's personal journey of coping with emotional crisis following the outbreak of his mental illness,



Fig. 3. Rebirth, created by Ori.

as articulated in his words:

"The truth is that it's such a symbolic thing that I did all this artwork about the Holocaust [...] There are the six million in red and they are pouring light on the country through the crack as if all the Jews who were killed illuminate our country. Thanks to them, we have a state. I remember thinking about a sentence my mom told me, when I was in a bad state, from a Leonard Cohen song that says there is a crack, and that's what allows the light to come in."

Another instance of artwork embodying archetypal content that reflects a keen sense of belonging is Tal's artwork (Fig. 4). Featuring a collage of images representing spiritual practices from around the world, the artwork might represent a connection to ancient world wisdom that can contribute to human healing processes.

A sense of partnership may empower participants, in terms of their valuing the opinions of those working alongside them, as expressed by Ori: "I value more the opinions of those that work alongside me {in comparison to the therapists' opinions-D.F} and are going through the process like I am." Furthermore, participants also noted that the sense of partnership elicited motivation, as portrayed by Yael: "Creating in the open studio gives me more motivation {in comparison to creating at home- D.F} because there are many people working around you, and it puts you in the mood."

Coping with emotional challenges that emerge while creating alongside others

Creating alongside others requires engagement, exploration and acknowledging vulnerability. Lee's words confirm this and reflect how she overcame her fear of being judged:



Fig. 4. Collage of images representing spiritual practices, created by Tal.

"Lee: At the beginning, it was like it's difficult for me to draw in front of people and have them see what I'm doing and all that. But now, it's okay, it doesn't bother me. Interviewer: What do you think helped it feel like it's no longer bothering you? Lee: (Laughs) I actually thought about that, but I really don't know. Maybe I got to know them better, or maybe I just realized that they're not just looking at my work; each one is focused on their own. So, it's like I don't need to be afraid of them looking at mine."

Five participants mentioned comparing themselves to others, particularly when they felt that others were more successful, as conveyed in Tamar's words: "Sometimes I'm a bit jealous because there are some people who know how to draw accurately." Two participants described another way of confronting vulnerability, when being exposed to the difficulties of their peers triggered their own challenges:

"There is someone who struggles the most out of everyone. and it's really, really frustrating to see it [...] she's not doing anything, and it bothers her, and then she either tears something apart or just walks back and forth ... it's not fun to see others who are struggling too..." (Amit).

Discovering meaning in the individual's creative process

Four participants stressed that group participation in the open studio enriched their experiences and made their own creative journeys more meaningful:

"When we work all together, there's meaning to it. [...] It {sharing his artwork with others in the open studio - D.F} gives me this grounding for my painting, like, I'm not left alone with it, and it gives this connection." (Ori)

Hila mentioned that drawing on the brown paper that covers the tables and serves as a shared canvas testified to her presence in the open studio: "There should be some of my drawings here {on the brown table cover - D.F} I think. I made the white one [...] It's like a proof that I was here {she smiles - D.F}."

The participants' statements affirm that the shared creative space served as a supportive foundation for their individual processes. The following category relates to the participants' perception of their therapeutic process and its significance for them.

Creative self-expression promoting self-awareness and self-discovery

Participants felt that attending the open studio contributed to their therapeutic process by facilitating self-expression, fostering self-awareness, and supporting self-discovery.

Facilitating self-expression

Participants (n = 8) cited the open studio as a space for genuine self-expression. Six participants said that the environment encouraged experimentation and exploration of suitable modes of expression. For example, Yarden noted that, initially, she lacked interest in art. However, thanks to the freedom and possibilities of the open studio, she discovered that she loved creating and became an enthusiastic participant. Several participants (n = 4) emphasized the opportunity to express themselves in a distinct way, as articulated by Tal:

"These are my most beautiful works [...] I looked at a picture on the phone while I was drawing, but I did something of my own [...] Everyone has their own style. I look at my drawings, and there are many things I added from myself."

Many participants (n = 6) engaged in spontaneous expression. Michael's creation demonstrates this process: "I called it Sparkling Stick [...] Just didn't have any idea for something, and then I was like, are there any

sparkles? And yeah, that's it, so I just did it without thinking. I simply love sparkles." (Fig. 5)

Ori noted that spontaneous expression allowed a sense of freedom and mentioned the possibility of contemplating the artwork and discovering new meaning: *"When I'm creating, I don't think. I'm just focused on what I'm doing and simply enjoy it, which is also liberating. When I'm done then I think about my artwork and how it relates to life."*

The ability to engage with emotionally challenging content through art evoked a sense of relief among two participants. Tamar explains this further: *"Here, I did all sorts of things, all kinds of words like that which didn't make me feel good. I wrote down everything, whatever it was, I let it out onto the paper."* (Fig. 6)

Nurturing self-awareness and self- discovery

The concept of self-awareness emerged from various statements of participants. Notably, participants cited a deep sense of concentration (n = 5), perhaps alluding to a state of attentiveness that produces a feeling of alignment with oneself. Yarden captured this sentiment beautifully: *"Here I am completely in my own rhythm."*

Increasing self-awareness was also evident in the way participants dealt with their personal feelings and needs ($n = 6$). For example, Yarden's awareness of her need for personal space, reflected in her artwork involving the creation of a house (Fig. 7), prompted her to adjust her sitting position in the studio; in this way, she exhibited an awareness of her changing needs.

The participants' experiences suggested that the artwork served as a means of confronting personal emotions (n = 6). Ori's explanation captures this idea:

"When I create, it gives me an opportunity, like a chance to feel, a chance to bring more out of myself, to express myself in various ways, and it gives me a bit of perspective, like some sort of inner space, to open up from within, and even to encounter my emotions."

Becoming aware of their desires sometimes prompted participants to make plans for the near future, as expressed by Yarden:

"I've just realized that I love this {creating- D.F}, and I'd like to try doing it in the afternoon [...] I want to try it with my little sister. I don't know, this is something I would like to do during my free time, rather than just being on the phone."

Another result of the participants expanded self-awareness was their discovery of new things about themselves ($n = 6$), for example, Yarden's realization, mentioned above, that she loves creating art. Another example is discovering personal creative abilities and the possibility of connecting with oneself through art, as indicated by Ori's description:



Fig. 5. Sparkling stick, created by Michael.

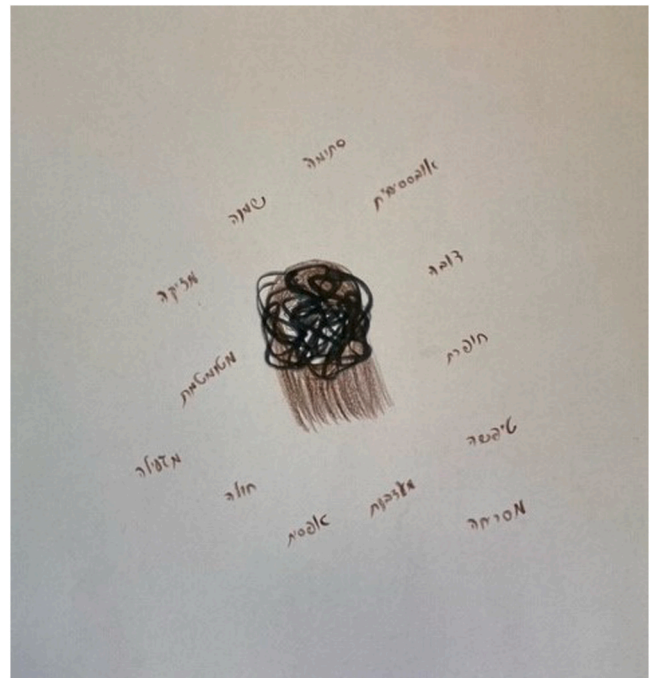


Fig. 6. Words that make me feel bad, created by Tamar.



Fig. 7. House, created by Yarden.

"I discovered that I can be more creative than I thought, or that I can connect with my emotions through art... I didn't know that if I focused and tried to create something, I would also feel connected to myself."

Other instances of self-discovery that came up in the interviews involve the ability to rely on oneself when there are no guidelines; the experience of being understood; learning that coping and overcoming fears is satisfying; and noting that helping others may give a sense of value. In this context, participants felt that the art therapist's role was to hold the space and enable the creative process, as further detailed below.

The art therapist as nurturer and guardian of the creative process

Participants noted that the art therapists had two primary roles: to nurture and safeguard individual creative processes and maintain the communal creative environment.

Nurturing the creative process

Most participants ($n = 7$) emphasized the role of art therapists in assisting them when they faced uncertainty or had difficulties during their creative endeavors. Participants emphasized the art therapists' contributions in cases of collaborative brainstorming when they were unsure about what to do, and in their suggestions on how to express their artistic concepts. Additionally, participants indicated that the art therapists helped them select suitable materials and techniques for their projects, as Yarden recounted:

"They {the art therapists- D.F} try to help in a good way, sometimes asking me what I want and all that [...] but I didn't feel any pressure or urge to do things... If I need something, I ask them. They help me, and yes, they really help."

Hila also mentioned the art therapists provide modeling when they create alongside the participants (Fig. 8):

"They {the art therapists- D.F} will give me an idea, once I took this cloth, and made a heart with it [...] it's called embroidery [...] I saw them doing it one time, and I wanted to learn how to do it."

Participants ($n = 8$) further acknowledged that the art therapists fostered an environment in which the adolescents were encouraged to express themselves authentically, promoting a sense of acceptance and belonging. Ori reflected:

"She {the art therapist- D.F} showed me how I can bring myself and work in my own way... and to do what I can... she uses such an open approach, that even if I'm not feeling my best, like, not expressing myself the best, then maybe it's still okay, there's still a place for me, that there's room for everything here."

Safeguarding the creative process and the shared creative space

During the interviews, participants elaborated on the diverse ways that the art therapists safeguarded the creative process and the shared creative space. One of these ways involves the art therapists providing a sense of holding by preserving the participants' artworks within the studio environment ($n = 5$). Lee articulated this sentiment:



Fig. 8. Embroidered heart, created by Hila.

"Usually, I don't really like what I create, so it's nice that I don't have to see it with me {she laughs - D.F} because usually I throw it away afterwards, my artworks, so it's kind of cool that they keep it. If they didn't keep it here, I would throw it away. So, it's fine that it stays here."

However, as Amit conveyed, some participants ($n = 3$) found it hard to entrust their artworks to the care of the art therapists:

"I don't like that my artworks aren't with me... Sometimes they take it too much, this whole thing, it's so we can witness our progress. And it's not relevant, because there are just things that... I just doodled a random tattoo for myself, and that's it. And it wasn't allowed to be taken out or anything. Because it symbolizes, for me, it doesn't symbolize anything. For me, it's just something random. It's annoying that they argue with you about it, saying 'but maybe in the future and this,' but I, I know for now that it's mine, and I know myself better than them. So, it's frustrating."

Another aspect mentioned involved the art therapists' support for rejected aspects of the self, exemplified by discarded artwork. Hila shared an anecdote in which the art therapist rescued an artwork discarded by a fellow participant: *"There's a girl here, and she's just all over the place. And she, she throws her artworks away. They {the art therapists- D.F} once took a piece of work out of the trash for her."*

Beyond safeguarding the individual creative process, art therapists played a crucial role in maintaining the communal creative environment. Lee elaborates: *"The art therapists help with our artworks, and also make sure that everything goes smoothly, without conflicts or issues."*

In their role as guardians of the communal space, art therapists were also responsible for upholding the open studio's ground rules. Some participants found these ground rules constraining ($n = 3$). Amit expressed her perspective:

"To oblige someone to be here, and they have no desire and no motivation, and all they want is just nothing, so it's not fun. It's also terribly boring because you can't even bring a book and read. [...] You can't be on the phone [...] They {the art therapists- D.F} said it's the rules [...] The meetings I did draw, well, I enjoyed. Sort of. Because, yes, I had fun and that. And the meetings I didn't draw, well, it was boring."

Discussion

This study sought to examine the intrinsic therapeutic aspects of the open studio model through an exploration of the experiences of adolescents with mental health conditions who participated in an art therapy open studio at a psychiatric day treatment center.

Three primary categories emerged from the participants' experiences: the shared creative space as a foundation for the individual's therapeutic process; creative self-expression promoting self-awareness and self-discovery; and the art therapist as a nurturer and guardian of the creative process. These categories align closely with the main features of the open studio and highlight a) the pivotal role of the shared creative space in enabling and supporting the individual's creative and therapeutic journey; b) the therapeutic nature of creative self-expression in fostering an experience of personal development; and c) the crucial roles of the open studio art therapists. The participating adolescents perceived the art therapists as enabling their therapeutic journey by nurturing and safeguarding the creative process and the shared creative space.

The categories, identified in the first stage of this research, illuminate a relational dynamic in which the interaction between the individual and the shared creative space—which takes place through the creation of art—fosters experiences of increased self-discovery and self-awareness. This is evident in the sub-categories 'discovering meaning in the individual's creative process' and 'nurturing self-awareness and self-discovery'. Self-discovery is considered a cornerstone in the formation of an identity and involves an exploration of unique personal potential that distinguishes the individual from others and reflects their 'true self'

(Waterman, 1984). In this regard, adolescents experiment in order to learn about their personality and form their identity (Echazu & Nocetti, 2019). The findings suggest that participants perceived the open studio as a space that encouraged experimentation through artistic expression, thereby facilitating self-discovery.

This relational dynamic between the individual and shared creative space suggests an extension of art therapy's traditional therapeutic triangle involving the client, art therapist, and artwork (Schaverien, 2000). In this evolving model, Honig et al. (2022) conceptualize a broader pentagonal set of therapeutic interactions, including the basic therapeutic triangle as well as group dynamics and the physical therapeutic space. Connected to the community-based art therapy approach (Kapitan, 2008; Ottemiller & Awais, 2016; Timm-Bottos, 2017), the open studio model incorporates a community aspect that broadens therapeutic interactions by engaging a wider social and cultural context. The sub-category of 'a sense of belonging and community' emphasizes this community element and integrates societal, cultural, and archetypal dimensions, thus extending the boundaries of the shared creative space beyond the immediate, local group setting.

This model, with its various components, can empower and serve as a valuable resource for healing. Shapiro (2023) introduces Jung's island metaphor that depicts the relationship between the individual and the collective unconscious, expanding this metaphor to describe a sense of belonging to a shared artistic realm. This conceptual framework suggests that engaging in art creation in the open studio and drawing inspiration from fellow artists can nurture the individual's connection to this collective artistic sphere. This connection can empower and facilitate a powerful sense of belonging, thus addressing the developmental needs of adolescents coping with mental health conditions, particularly those experiencing loneliness (Gardner et al., 2019); this idea is reflected in the sub-category 'support and encouragement.'

The shared creative space embodies a holistic perspective that transcends its individual components. In other words, the space is more than just the sum of its parts; this viewpoint emphasizes the interaction between these elements and the collective whole, according to psychoanalytical field theory (Bazzi, 2022; Stern, 2013a; Stern, 2013b). Within this dynamic field, there is a fluid interchange between the intrapsychic dimension and the social realm, facilitating both differentiation and continuity (Tubert-Oklander, 2016). Allen (2016) perceives art as a bridge between the individual and collective realms, allowing individuals engaged in the creative process to feel connected yet simultaneously distinct. Participation in a creative process within a communal space, such as an open studio, enables individuals to access a collective life force and express their unique identities. This environment can function as a therapeutic resource for adolescents dealing with mental health challenges, offering a secure space for them to connect with this creative life force and explore their individual selves, as depicted in the sub-category 'creative atmosphere.'

Consequently, although the open studio approach's prime concern is the individual creative process and not group dynamics, creating art alongside others in a shared space can incorporate some of Yalom and Leszcz's (2005) curative factors of group therapy, which are developmentally significant during adolescence (Akos et al., 2006; Jebreel et al., 2018). These factors include universality and socialization, present in the 'sense of belonging and community' sub-category; group cohesiveness, evident in the 'support and encouragement' sub-category; and interpersonal learning and imitative behavior, which appeared in 'creative atmosphere' and 'discovering meaning in the individual's creative process' sub-categories.

As observed in the sub-category 'Coping with emotional challenges that arise while creating alongside others', engaging in an open studio setting offers certain challenges in terms of the creative process and communal sharing. Most participants believed that navigating and overcoming these challenges can result in a profound sense of competence and self-worth. One prevalent challenge that emerged in the participants' descriptions of their experiences is the need to adhere to

the open studio's ground rules, such as keeping artworks within the studio, mandatory attendance, and restrictions on use of phones during sessions. Resistance to these ground rules aligns with the participants' developmental need to assert autonomy and control by resisting authority. It may also express a broader frustration regarding feelings of discrimination associated with the stigma of being labeled as 'mentally challenged'. (Lambert, 2022; Parkin & Kuczynski, 2012).

According to Finkel and Bat Or (2020), the open studio model is adaptable and can be tailored to serve the specific needs of participants and characteristics of the setting. While one of its key features is the freedom to create art in a non-directive environment, certain settings like psychiatric inpatient units (Shapiro, 2014) and educational settings (Kelemen & Shamri-Zeevi, 2022) may include mandatory participation as part of the therapeutic program. For instance, psychiatric day treatment programs designed for adolescents dealing with mental health challenges, which are often characterized by avoidance behaviors (Chu et al., 2014; Papachristou et al., 2018), typically require participation in all the therapeutic activities of the program in order to ensure maximum support of the rehabilitative process (Kennair et al., 2011).

This research provided valuable insights into adolescents' experiences of mandatory attendance of the open studio, prompting advocacy for change within the day treatment program. Consequently, the day treatment management introduced a new policy whereby participants are allowed to choose whether to continue to participate in the open studio following an initial mandatory period, thus granting them greater autonomy in their therapeutic journey. This adjustment aligns with the principles of the recovery model, which prioritize the autonomy of individuals facing mental health challenges, empowering them to make decisions about their treatment and lives (Kelly & Coughlan, 2019).

The 'art therapist as nurturer and guardian of the creative process' category aligns with Winnicott's concept of the 'environment mother,' which posits that the holding environment is crucial for an infant's development (Abram, 2018). The open studio can also be seen as a form of the 'environment mother,' facilitating individual development through its overall construct (Brown, 2008). This idea also incorporates the holding aspects that enable the studio to function as a transitional space (Deco, 1998; Wood, 2000). Participants' perceptions of art therapists as nurturing and guarding the creative process and the shared creative space reaffirms that they indeed fulfill this function.

The art therapist's role of tending to and safeguarding the creative environment to enable the natural process of artmaking resonates with the gardener metaphor, which symbolizes a support of nature's processes of growth and healing (Shore, 1995). Fulfilling this role requires art therapists to be fully present in the here and now, i.e., with the youth who are engaged in the creative process within the open studio setting. The presence of the art therapists may, in turn, encourage the adolescents to pay close attention to their own choreography when creating, which can potentially serve them in unfolding and illuminating their subjective beings.

Limitations

The current study has several limitations. First, it involved a relatively small sample size, consisting mainly of Jewish female, middle-class participants, and was conducted in a single psychiatric day treatment unit in Israel. This restricts the generalizability of the findings across gender, cultural, geographic, and institutional contexts. Secondly, the dual role of researcher and staff member at the treatment center may have influenced participants' responses during interviews, potentially affecting the authenticity and sincerity of their descriptions of their experiences. Although there were no direct therapeutic relationships maintained with the participants outside the research context, the potential influence of this dual role cannot be entirely ignored. Additionally, the researcher's previous experience as an open studio facilitator might have shaped her interpretation of participants' experiences. Reflexive practices as well as participant validation and

supervisory mechanisms were employed to minimize these biases. Another limitation concerns constraints imposed by the ethical review board: by requiring that a final research design be presented before recruiting participants, it restricted application of Youth Participatory Action Research (YPAR) principles and reduced the extent to which participants could contribute to the initial design phases of the study.

Conclusion and implications

This study enriches the body of knowledge in the art therapy field by shedding light on the experiences and insights of adolescents engaged in open studio art therapy within a psychiatric day treatment setting. It explores both the internal and relational dynamics of the open studio, drawing from the perspectives of its participants. These initial findings can lay the groundwork for future theoretical developments, in that this study can be the first step toward follow-up studies and the ultimate formulation of a more comprehensive theoretical model. Through the articulation of their experiences, adolescents reveal how the act of creating art in the open studio environment not only facilitates expression of their inner worlds but also helps them build a sense of self and community that supports their mental health and personal development.

While exploring the adolescents' perceptions of the therapeutic aspects of the open studio, the study also maps out key themes that emerge through artmaking in this setting, such as the sense of belonging, empowerment, and self-discovery. This participant-centered theoretical discussion consequently underscores the importance of agency and voice within therapeutic settings, advocating for practices that are strongly informed by the needs and experiences of those they aim to serve.

These new theoretical insights not only deepen theoretical understanding but also offer practical implications for improving art therapy practices to better address the developmental and emotional needs of adolescents in psychiatric care. Similarly, they inform art therapists who facilitate open studios in settings of this kind, enhancing their understanding of adolescents' experiences and highlighting therapeutic aspects that are especially meaningful for these participants. This corresponds with a broader movement towards patient-centered and experientially validated approaches in mental health treatment (Desai et al., 2023; Kotera et al., 2022), reinforcing the call for therapeutic methods that are inclusive, effective and provide a suitable response to the experiences of adolescents.

Moving forward, future research endeavors could expand the applicability and generalizability of our findings. To broaden the scope of research on open studios in psychiatric settings, studies could focus on increasing sample diversity by including participants from distinct cultural backgrounds and geographical locations. Furthermore, multi-site studies, implementation of longitudinal research designs, involvement of participants in the research design process through co-design methodologies, and mix-methods approaches could all lead to a more comprehensive understanding of the therapeutic impact of the open studio on adolescent mental health.

By incorporating these recommendations into future research initiatives, we can advance our understanding of the therapeutic aspects and benefits of art therapy for adolescents in psychiatric care and promote the development of more tailored and effective interventions that address the specific needs and preferences of young clients.

Ethical approval

This study was approved by the Ethics Committee of Merhavim Medical Center for Brain and Mental Care in Ness Ziona (protocol code 666–21 date of approval 7 November 2021) and by the Ethics Committee of the Faculty of Social Welfare and Health Sciences at the University of Haifa (protocol code 306/21 date of approval 14 June 2021).

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Finkel Daniela: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Bat Or Michal:** Writing – review & editing, Supervision, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) used ChatGPT-4 in order to improve readability and language. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Declaration of Competing Interest

The authors have no competing interest relevant to this study to disclose.

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Data availability

The data that has been used is confidential.

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The creative arts therapies and the climate crisis: Toward a framework for intentional engagement

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ABSTRACT

In the face of the deepening climate emergency, the field of creative arts therapies must intensify its engagement in and commitment to climate action. Creative arts therapists hold unique skills to promote positive social change, foster deep reflection and expression on the impacts of the crisis, facilitate creative problem solving, and inspire visioning and innovation for better futures. To help consider how these skills can be harnessed, the authors propose a framework that can be used across the creative arts therapies modalities and be adapted within different theoretical approaches to invite intentional climate reflection and suggest different types of action. This framework can help creative arts therapists to determine ways their professional practices can be more aligned with values of climate wellness, including their work with clients, roles as educators to participants in learning contexts, and their roles within their professional workplaces and greater communities.

A conversation on the climate crisis in the creative arts therapies (CATs) is essential, because it affects all beings, including creative arts therapists and clients (Rockström et al., 2023; Seabrook, 2020; World Health Organization, 2023). At the same time, such a conversation can quickly risk disengagement as it can be a scary and painful topic (Macagnino, 2022; Wullenkord & Reese, 2021). Although essential truths need to be acknowledged in order to have a comprehensive picture of the crisis, this difficult reality can be overwhelming, activating protective urges to avoid or deny (Macagnino, 2022; Wullenkord & Reese, 2021). This serious existential threat can raise a surge of mixed emotions, and the crisis itself is extremely complex to understand and address. Given this incredible complexity, we ask, how might creative arts therapists collectively remain engaged, aware, and connected in this discussion?

We have striven to share important facts while honouring the emotional responses these can raise. We considered varied modes of engagement with climate justice in the CAT professions, in ways that respect the diverse range and limits of abilities, knowledge, resources, and scopes of influence at different points. We encourage you, the reader, to moderate your engagement with this material to stay connected to how they can contribute to the collective process of mitigating the effects of the climate. It can also be important to pendulate (Bensimon et al., 2012; Harnden, 2024; Levine, 1997) when engaging

with this topic, given the crisis naturally activates distressing responses that can inhibit action and ability to connect. We also recommend that the reader use their own arts process to tend to emotions that arise when it feels right. Activating agency and imagining how to contribute to co-creating a better world can also be a helpful process to mitigate the uncomfortable emotions that arise during this sort of reflection. We invite therapists to pause and consider, how might you imagine a thriving earth and all its inhabitants? How might you use the arts to bring this imagining more to life? Return to these questions to stay connected with creativity and imagination while moving through this climate work.

Beginning the conversation

Current news stories commonly include extinctions, unprecedented extreme weather, massive forest fires, and mass migrations as some regions become unlivable (Dance, 2023; Duff, 2023). The global climate crisis is now an active reality as various environmental tipping points are crossed, from which there may be no return (Armstrong McKay et al., 2022; WHO, 2023). The Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change, declared that “climate change is a threat to human well-being and planetary health” (IPCC, 2023, Section C1) and that

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there is “a rapidly closing window of opportunity to secure a liveable and sustainable future for all” (IPCC, 2023, Section C1).

The Earth Commission, a group of prominent natural and social scientists, delineated eight safe and just states for the earth and determined that humanity is failing on all but one of these states (Rockström et al., 2023). Given this reality, it is devastating to see political division and dithering, powerful anti-science movements (Hotez, 2021; Philip-Muller et al., 2022), extractivist industry expansion (Egan, 2023), social polarization and conflict (Cappelli et al., 2022; Marr, 2023; Vyawahare, 2022), the delusion of infinite economic growth (Dhara & Singh, 2021), and collective denial (Schraer & Devlin, 2021; Walker & Leviston, 2019) mire our ability as a species to mobilize appropriately to try and avoid existential catastrophe.

Embedded within these systems, the CATs also need to respond to this urgency. For this paper, we reviewed literature in art therapy, dance-movement therapy, drama therapy, expressive-arts therapy, and music therapy. We recognize the diversity of approaches within each modality, but this research considers CATs from a generalized, higher-level conceptualization in order to broaden the ways we approach the climate crisis along interdisciplinary lines. As creative arts therapists, it is intrinsic to our work to invite participants/clients/patients to expand their expression and envisioning beyond verbal language. In this spirit, we invite readers' imagination and creativity to join us.

Researchers' locations

Congruent with socially just practices, we share some of our social locations so readers may further situate this work (Chin et al., 2022). Heather (she/her) is a white, cis, heterosexual, middle-class woman in her 50 s, a parent and settler of Celtic and Acadian heritage. Deborah (she/her) is a white, cis, queer, child-free woman in her 40 s and settler of Welsh and British heritage who grew up in a middle-class suburb in Canada.

At the time of writing, HM was in the traditional territory of the Anishinabewaki and Omàmiwininiwag, also known as Nominique, Québec, and DS was in the traditional territory of the Mississauga Anishinaabeg, also known as Peterborough, Ontario. Both locations experienced unprecedented heatwaves during this research. Our situations during these heatwaves were mitigated by our socioeconomic statuses, which are products of our races, family statuses, geographical location, and other systemic elements. Personal health issues for us and our families, on the other hand, increased our vulnerability within our privileged groups.

We have found Machado de Oliveira's (2021) framework of “soft-reform, radical-reform, and beyond-reform orientations of change” (pp. 88–93) helpful in situating our work amidst the complexities of conceptualizing change as it relates to the climate crisis and its interlocking polycrises. We offer a brief overview of this framework below, so readers can also locate our work within conceptualizations of change.

Machado de Oliveira's (2021) framework proposes three orientations to change along a continuum: soft-reform and beyond-reform are at opposite ends of the continuum, and radical-reform is between them. A soft-reform orientation sees the systems and structures people inhabit as valid – change comes from updating the ways that people engage with them. A radical-reform orientation to change sees problems “as a product of exclusionary representation and inadequate redistribution” (Machado de Oliveira, 2021, p. 90). Change comes from updating mechanisms within existing systems so that they are enduringly equitable and socially just. Both the soft-reform and radical-reform spaces hold hope that modernity can hold a livable future. The beyond-reform orientation to change perceives existing infrastructures as inherently unsustainable and no amount of change to them will be adequate or sufficient. Change comes by supporting a soft collapse of these infrastructures and applying lessons learned to a postcollapse reality.

The ideas presented in this paper can be most fully held within the radical-reform orientation to change of Machado de Oliveira's (2021)

framework. We honour that groups, individuals, and different parts within individuals may shift and inhabit different orientations to change, both simultaneously and separately. We experienced this dynamic engagement as part of our individual and dyadic processes during this project and we expect our thinking to continue to evolve in the future.

Moving toward a framework of intentional engagement with the climate crisis

When considering intentional engagement with the climate crisis as a professional discipline, it is important to acknowledge that the majority of the responsibility for the climate crisis lies in the hands of the fossil fuel and other extractivist industries (Borenstein, 2022; Munoz, 2023), the governments who enable them (Laville, 2019; McCarthy, 2019; Woodside & Vis, 2023), and the ultrawealthy who use power and influence to enable extractivist and other damaging practices to continue (Burga, 2022; Milman et al., 2022) in spite of research since the 1950s that petrochemical extraction is leading to the destruction of the earth (Milman, 2024). Although it is clear where the bulk of climate shame belongs, the work to stop, heal, change, and recreate humanity's future climate relationship rests in everyone's hands. Creative arts therapists' shared skills can help the collective effort to connect, dream, innovate, and generate these futures.

Many creative arts therapists actively are and have been dedicated to climate justice, activism, and scholarship, but a coordinated effort across CATs to address the climate crisis is lacking. We recognize the limited scope of power of professional fields such as CATs, but assert that creative arts therapists do have the ability and responsibility to intentionally engage with the climate crisis (Bird, 2022; Carpendale, 2010; Seabrook, 2020; Speert, 2016); by doing so, we may start ripples of life-sustaining influence that grow far beyond individual actions. Developing a framework for intentional engagement with the climate crisis for CATs can support practitioners by informing coordinated ways of acting with integrity in agreed-upon climate-informed priorities. Ideas from varied disciplines inspired us to create framework, including eco-CATs (Kellen-Taylor, 1998; Seabrook, 2020; Speert, 2016), eco-psychology (A. W. Hanley et al., 2022; Pavel & Anthony, 2015), environmental activism (S. Hanley, 2023; Traore, 2021), deep ecology (Brennan, 2020), decolonizing approaches (Kimmerer, 2015; Yunkaporta, 2020), and systems theory (Goodchild, 2021; Koenig et al., 2021).

Systemic thinking, which emerges from systems theory, moves away from linear and binary perspectives toward recognizing the myriad complex interconnections that exist between all elements of the universe (Macy & Johnstone, 2022; Wampler et al., 2020). This pan-disciplinary theory is applied across fields from the natural and social sciences, to mathematics, economics, and engineering (Hanson, 2014; Macleod, 2010). In therapy fields, systemic approaches brought paradigm shifts from considering only individuals, and potentially their closest attachment relationships, to recognizing the complex interplays in relationships and how these need to inform how therapeutic change processes are conceptualized (Wampler et al., 2020). Initially, this shift was perceived in what is now referred to as first order thinking, which considered only the family system, but soon grew to consider second order thinking, wherein the therapist becomes part of the system (Wampler et al., 2020). Wampler et al. (2020) said that “third-order thinking expands the scope of therapy to include client, therapist, societal processes, and power dynamics” (p. 427). Third order thinking enables consideration of the many interconnected levels of the system and the interplay between them, and it is of particular importance in the framework we developed and present here.

Although we cannot fully perceive the infinite complexity of all the interconnections in the network of life, exploring our own systems offered some insight into this way of perceiving. For instance, we ask you, the reader, to shift your focus from the cognitive processes you are using to read to your cardiovascular system. How do you imagine these

systems are connected? Consider the other systems in your body, keeping in mind that scientific understanding is itself limited by theoretical constructs (Stafford & Petter, 2019). Consider that bodies are not isolated entities – they are ecosystems, hosting viruses, bacteria, and other forms of life. How does this land for you? Imagine how this blurs the line between you, other life, and the environment, and even those categories. This thought pattern challenges false hierarchies, such as the belief that humans rank above other life forms. Whether it is a new or integrated approach for you, consider what obstacles to systemic thinking you notice. What ways does systemic thinking expand and flow with ease? To help prime your systemic thinking, we invite you to pause and creatively explore systems in whatever way might feel relevant in this moment.

The next section of this paper outlines the research purpose and question. This is followed by a literature review that explores publications wherein the CATs have directly addressed the climate crisis. Next, the methodology is described; it is a blend of philosophical inquiry and qualitative analysis. The resulting framework is then presented in both narrative and artistic form. It is titled *Reflective Climate Engagement Framework for CAT Practitioners* and includes seven categories. Finally, the implications of the framework are discussed, including an invitation to engagement and dialogue for all creative arts therapists.

Research purpose and question

The purpose of this project was to take a first step toward generating a framework that facilitates intentional ways of reflecting for the CATs, in response to the climate crisis and the urgent ecological and mental health challenges it presents. The hope is for it to add further invitations to and avenues of action to the important ongoing work that is being done in our fields and beyond.

To do this, we asked, what is a framework for creative arts therapists that speaks to intentional engagement with the climate crisis in ways that meet the needs of our clients, ourselves, and society?

Literature review

Environmental, ecological, and nature-based approaches have been explored in CAT scholarship since the 1990s (Carpendale, 2010; Cherdymova et al., 2019; Davis, 1999; Kopytin, 2021a, 2021b; Pochat Selby, 2021; Speert, 2016; Summer & Yermakov, 2022; Wittig & Davis, 2012). Some of this work directly acknowledged the climate crisis and took an activist stance (Bird, 2022; Bird et al., 2023; Kopytin, 2021a; Scheirich, 2020; Seabrook, 2020; Wittig & Davis, 2012), and other scholarship considered how natural elements could be integrated into the therapeutic frame, thereby expanding it into the natural world (Sweeney, 2002, 2013). This review surveyed literature that explicitly acknowledged the climate crisis and included an activist stance, both within and among CAT disciplines. The CAT disciplines are presented in alphabetical order.

Art therapy

Art therapy scholarship relevant to the climate crisis has explored the integration of environmental, eco-frameworks, and/or social justice perspectives with art therapy. The first example of this in the art therapy literature was the work of Davis, who is credited with coining the term “environmental art therapy” (Nash, 2019, p. 30). In her work with unhoused people seeking refuge in a shelter, Davis (1999) noticed how the neglected natural environment echoed the societal resource neglect in the part of the city where she was working. Sweeney, (2002), (2013) proposed integrating art therapy and ecopsychology and created a self-help style activity book for readers to engage in arts processes in nature wherein she highlighted the beneficial connections to creativity and nature for clients. Speert (2016), working from an eco-art therapy approach, invited clinicians to consider the influence of ecological and

intergenerational connections in their therapeutic understandings. Speert (2016) also suggested art therapists consider material engagement, including engagement with natural materials, as part of the eco-art therapy process. Carpendale (2010) developed a wholistic and systemic framework for ecologically informed art therapy. The framework outlined some of the cognitive and psychological tendencies that contribute to and emerge from the climate crisis and suggested ways the profession could attend to these. Carpendale’s ecologically informed art therapy work continues to evolve, integrating storytelling, the expressive arts, and environmental education (Carpendale, 2022).

Further applications of art therapy to climate awareness include Cherdymova and her team’s (2019) development of art therapy interventions to consider the concept of environmental consciousness with second year art therapy students. Scheirich’s (2020) graduate research project further explored how art therapy could address the mental health impacts of the climate crisis. Bessone’s (2019) graduate thesis also explored this theme, looking at how the practices of art therapy and eco-therapy could be integrated. Bird (2022), in his book *Social Action Art Therapy in a Time of Crisis*, critically reviewed ecological paradigms from western academic, traditional, and Indigenous frameworks, resulting in an approach to art therapy that combined social action, ecotherapy, social action, and climate justice. This approach was shown in practice by Bird and his research team (2023)’s social action research with young people and adults in Derby’s arts response to the climate crisis.

The art therapy field has provided important groundwork for considering ecological action and climate justice in practice. There is emerging but limited work on this topic in dance therapy and drama therapy.

Dance-movement therapy

In dance therapy, Burns (2012) integrated dance-movement therapy and ecopsychology to create a framework for ecosomatic psychology. As part of this work, she expanded on upon Naess’s concept of the “ecological self” (Naess, 1990, p. 175) to form the idea of the “embodied ecologic self” (Burns, 2012, p. 44). Aligned with these ideas, Copteross (2016) doctoral thesis described her work as a dance movement therapist in a social-ecological systems research group looking at transdisciplinary water resource management in South Africa. Copteross highlighted Zulu ecological approaches to health and considered wholistic ways across therapeutic approaches to consider health, noting the benefits of a transdisciplinary approach.

Drama therapy

Hart (2013) outlined a vision for ecological drama therapy, wherein drama therapy methods and climate activism were integrated to support climate activists. Nosworthy’s (2020) dissertation explored drama therapy and the natural environment in South Africa and concluded by naming the importance of these considerations in the face of the climate crisis.

Music therapy

Strides have been made in both theoretical and applied research into music therapy and the climate crisis. In a theoretical discussion, Seabrook (2020) argued that music therapists have an ethical imperative to address the climate crisis and proposed urgent engagement along professional, clinical, and academic routes, with a focus on Canadian perspectives. Seabrook (2020) also named a then-nascent approach of eco-music therapy that explicitly addressed the climate crisis. Music therapists have also identified the climate crisis when proposing broader shifts in the profession: as a way of rejecting humanism and moving toward greater interrelationality (Shaw, 2022) and to address human rights (Stige, 2022).

Examples of applied research include Coombes and Sayers (2020), who conducted a survey among British Association of Music Therapy members in Wales that explored how music therapists travelled to their work and the sustainability of their instrument purchasing and care practices. They found that 75 % of respondents travelled by car, and that sound quality and cost of instruments overrode environmental considerations for the majority of respondents (Coombes & Sayers, 2020). Ames (2023) explored a single-session community music therapy workshop in the United States that addressed “eco anxiety and promote [d] the development of ecoresponsibility, change, and agency” (p. 2) for participants. As with that in art therapy, this research forms a ground-work for addressing the climate crisis in music therapy. Finally, we review relevant research that spans across CATs.

Creative arts therapies

Although this review has thus far been organized by the literature for singular disciplines, some work has also been done to consider the climate crisis among CATs disciplines as a whole. Siddons Heginworth and Nash (2019) compiled applications of environmental practices across the CATs into a single edited book, promoting a conversation across CATs. Similarly, Wittig and Davis (2012) advocated integrating ecological justice research and practices into their group approach for CAT training.

This literature review demonstrates that although there is some interest in addressing the climate crisis within CAT disciplines and across CATs as a whole, a comprehensive CATs-wide inquiry addressing the climate crisis is lacking.

Method: developing the framework

We blended philosophical inquiry and qualitative analysis informed by social justice principles in this work. Philosophical inquiry is a broad approach to research that involves speculation, analysis, and criticism (Kuntz, 2020). This approach was useful to explore the systems relevant to CATs and the climate crisis because it serves to clarify terms, expose and evaluate underlying assumptions, and relate ideas as a systematic theory showing their connections to other systems, and it uses argument as a primary mode of inquiry and for presentation (Wheeler & Murphy, 2016, p. 243). We followed the idea of resistance inquiry work which, in part, situates philosophical inquiry as both an enacted relationality and an enacted belief that the future might become differently (Kuntz, 2020).

Grounded in this philosophical approach, we used qualitative content analysis to engage with and organize relevant concepts (Ghetti & Keith, 2016). In advance of this research, we set out considerations aligned with anti-oppressive inquiry (Johnson & Parry, 2022):

- bringing in what we know to the work while deconstructing the power processes and de-invisibilizing the structures that are part of it;
- noticing and navigating motivations around ego and dominance;
- moving toward systemic change and avoiding linear changes;
- remaining mindful of our social locations and lived experiences, including the interlocking marginalizations and privileges that these afford us;
- decolonizing through this work by not appropriating other people's work, acknowledging people's contributions, showing how we are doing the work, and being consistent and committed;
- accepting complexity; and
- noticing and avoiding thinking traps such as splitting (American Psychological Association, 2018), Cartesian structures (Daintith & Wright, 2008), and the fallacy of the single cause (Pilditch et al., 2019).

The research involved four main processes. The first was conducting

a literature review about CATs and the climate crisis, including modality-specific literature. The second process involved meeting regularly to engage in discussion about what we were reading, situated within our lived experiences and knowledge bases. We took detailed notes of these discussions and ideas, highlighting key words. Next, we engaged in qualitative content analysis by grouping key words that emerged from our discussions together to create categories. As part of this analysis, we used Miro, software that allows concepts to be represented and reorganized visually, which served to bring an element of the nonverbal to our analysis.

We created several visual representations through this process, until the categories were complete and a framework emerged. These categories were then additionally expressed in an Excel spreadsheet and in plain text to express them in more accessible ways. As a last step, we explored how each category contributed to the evolving framework. For that process, we drew upon the ideas within each category to define and articulate relevant examples.

Findings: reflective climate engagement framework for CAT practitioners

The findings elucidated seven categories to support creative arts therapists to consider ways to intentionally adopting a climate-aware framework. Equity, diversity, inclusion, and decolonization principles are central to this framework and are integrated within each category, because “the global crises of ecological degradation and social injustice are mutually reinforcing products of the same flawed systems” (Solomonian & Di Ruggiero, 2021, p. 1). Actions in the categories may be direct, indirect, intentional, unintentional, active, passive, large-scale, small-scale, performed by individuals, or performed by groups. The categories are (a) destructive ∞ productive protections, (b) preventing ∞ promoting survival, (c) obstacles to ∞ facilitator of life-sustaining change, (d) time, (e) emotional responses, (f) ethics and morality, and (g) systems change.

We use the infinity symbol (∞) to recognize the complex recursive interplay in rhythms of change, where sometimes what seems like productive movement on one level of a system is actually causing damage on another. We also consider these categories to be interconnected in different ways, with multidirectional influence between them. We invite readers to consider how these seven can infinitely connect, through visual, metaphor, sound, movement, or other ways of understanding.

This framework is not an attempt to articulate how to be an eco-creative arts therapist and does not offer clinical guidelines. The framework offers latitude for a wide range of engagement within diverse contexts and drawing upon available resources. We encourage it being layered with or connected to other frameworks.

Category 1: destructive ∞ productive protection

The category *destructive ∞ productive protection* invites curiosity about the types of intrapsychic, psychological, and/or emotional protections that may be activated by the climate crisis and which sometimes might be framed as defenses. Such protections fall along the continuum between destructive and productive protections, where *destructive protections* perpetuate the climate crisis, and *productive protections* intervene in the climate crisis. So, although these protective devices are (unconsciously) used protectively, some may also be causing damage, for example, by allowing daily responsibilities to be attended to but neglecting important climate and social justice causes we may want to advocate for or otherwise address. The complexity increases when considering the different roles that we each may hold as individuals, family and community members, therapists, and members of professional organizations, as well as broad and interconnected societal connections and all the productive and destructive protections that get enacted within and between these and beyond.

In our experiences in these varied roles, we frequently observe destructive protections in the forms of denial, minimizing, and justifying responses to the symptoms of the climate crisis. For example, a client

living through unprecedented wildfires in their area may say the fires are part of a normal pattern that happens every year and that people are overreacting. This framing may protect the client from their potential threat responses, but it results in them not taking real protective action about the legitimate threat posed by escalating forest fires. Furthermore, it further risks them contributing to denial myths that perpetuate collective inaction.

In contrast, productive protections are those that are sustainably effective over time. A different client, living in the same region as the previous example, may be frozen to inaction but very aware of how scared they are of the fires. The clinician could help them explore this situation creatively and also use the creative process to consider actions that are relevant and feasible for them. They might further consider steps to advocate at other levels of the system, such as writing letters to governmental representatives regarding forestry clearcutting and monoculture planting policies. In appropriate moments, other defenses, such as humour, can help people stay connected to one another and co-regulated, which supports function and engagement.

As clinicians, we may at times feel compelled to collude with clients' destructive protections, which can be wondered about and explored in supervision. We can also encourage the productive protections of both our client and ourselves to become more robust and accessible by highlighting them when they arise.

Questions for reflection

- What climate related protections/defenses are at play (self, client, colleague, community, institution, government, etc.)?
- What knowledge, emotions, somatic experiences (or something else) are they protecting from?
- How are these protections causing active harm and/or preventing action?
- If I widen the lens of how I am seeing this, might there be benefits or harms I am missing?

Category 2: preventing ∞ promoting survival

The category *preventing ∞ promoting survival* encourages creative arts therapists to consider how our actions and choices help prevent ∞ promote the survival of life.

Let us first consider actions within CATs that prevent survival by contributing to the climate emergency. For example, organizing a national or international in-person conference can require hundreds of return flights for professionals – a notoriously damaging travel method for the climate. It also generates much food, packaging, cleaning, and other unnecessary waste. In-person conferences also have negative accessibility implications, given that only those with the necessary resources of time, money, and the ability to travel long distances can attend. Of course, they also bring many relational benefits of coming together and co-learning and creating live, which may even include work that considers climate action. Redesigning conferences to consider sustainability impact also creates opportunities for creative event design. Ideas could include creating hybrid events that truly allow for participation and synergy among all delegates and presenters so that travelling long distances to attend is not required, decreasing the climate impact. Conferences could integrate local gatherings in different regions so that people could both meet with colleagues in person and connect with the larger conference group online. Conferences could also alternate yearly between purely online and hybrid formats to further reduce travel emissions.

Questions for reflection

- What sort of actions that promote survival might be possible in my professional roles?

- What other people/roles/skills/resources could expand our ability as a profession to help move toward survival? Which of these may also be helpful for our clients, our ourselves, to consider?
- What are the risks or possible collateral damage that can be caused by these actions if I consider them over time or broaden my systemic view on their potential impact?

Category 3: obstacles to ∞ facilitator of life-sustaining change

The category *obstacles to ∞ facilitator of life-sustaining change* refers to the interplay of movement toward and away from life-sustaining change processes in response to the climate crisis. Here again, it is important to remember that the movement to change is rarely simple or linear and is generally more complex and multidirectional (Amagoh, 2008).

We first consider obstacles to life-sustaining change regarding the climate crisis within CATs. One of the myriad challenges CAT practitioners may experience is attempting to make more ecologically aligned purchases, because sustainable purchase options can be more costly. Purchases can be confusing, because greenwashing convinces consumers that products are more environmentally responsible than they are (de Freitas Netto et al., 2020). More environmentally conscious items that creative arts therapists may want to invest in, like environmentally responsible office supplies, sustainably sourced furniture, and conversion to electrified and efficient heating, are often more expensive and less readily available than unsustainable options. This cost can be an obstacle to life-sustaining change as therapists may need to choose the more affordable and available option. Limitations of funding and resources can be particularly pronounced for CAT practitioners whose work is aligned with social justice, for many systemic reasons, and may as a result also have lower incomes as part of that work.

When economic resources are available, we encourage researching to find purchasing that aligns with values. For example, Ojibwe painter Anong Migwans Beam from the M'Chigeeng First Nation has created a nontoxic paint line using pigments she sources near her home, using honey from her bees in the process and innovative natural packaging (Alwahaidi, 2021). It's important to acknowledge that the climate crisis is interlocked with other oppressive systems, which create scenarios where those who have less available financial resources in turn cannot afford the often more expensive but more potentially more life-sustaining consumer choices. That said, greenwashing narratives also give an illusion that climate issues can be tackled by changing individual consumerism, perpetuating destructive capitalist structures rather than holding industry accountable and reducing consumption overall.

The interdisciplinary skills and knowledges of creative arts therapists hold tremendous potential to support and contribute to visioning, connecting, building, and moving toward more life-sustaining social and economic structures, in addition to more sustainability focused professional practices. In their community lives, many therapists are already part of social action groups, activist, grass roots organizations, and community collectives that are engaged in this essential change work. CAT professional communities include groups where creative arts therapists can connect and discuss ways of thinking, being, and working that address the climate crisis can be a way to contribute to ripples of meaningful life-sustaining change. Such robust, available, and accessible community groups include the Climate-Informed Counsellor Chapter of the Canadian Counseling and Psychotherapy Association (CCPA) and the Climate Psychology Alliance – both of which include CAT practitioners as members. Moving further in this direction, CAT professional associations could likewise develop this type of community engagement and collaborate to create broader inter-modality chapters that are connected by geography or other factors. Such groups could help move CATs toward life-sustaining change regarding the climate crisis in many ways, for example, by offering tools, training, professional connections, and inspiration to association members regarding the climate crisis.

Questions for reflection

- In what ways might this choice be an obstacle ∞ facilitator of life-sustaining change regarding the climate crisis?
- What skills, knowledge, connections or other resources do I have to contribute to groups working on life-sustaining social change?
- What reasonable resources can I expend now, what may need to wait, and what may need to be taken on by others?

Category 4: time

The *time* category invites consideration of the ways we perceive and navigate the climate crisis from a temporal perspective. This includes how to conceptualize the past, present, and future; how to engage with these temporalities; and how to engage between them. The category also includes how to consider different planes of time, such as geological time, human lifespan, and cross-generational timespans. We encourage creative arts therapists to consider ways of conceptualizing time in relationship to the climate crisis. For example, CAT practitioners might consider how to honour and integrate the notion of seven generations from The Great Law of Haudenosaunee Confederacy, wherein "each generation has a responsibility to ensure the survival for the seventh" (Clarkson et al., 1992, p. 14). This way of conceptualizing time is in stark contrast with the fast-paced life entrenched in late-stage capitalism, where people are often racing to get to the end of the workday with only immediate deliverables in mind, without any consideration for the impact of their choices on future generations.

Considerations of time can also include evaluating what needs to be done more slowly and what needs quick, urgent action with regards to the climate crisis as creative arts therapists. For example, it is urgent that all professions, including CATs, immediately engage more actively to mitigate the climate crisis in all possible ways. At the same time, some of the required changes make need to take longer, as systems can be slow to change. Change processes need to honour of principles of diversity, equity, and inclusion, for example, by ensuring that voices that have been traditionally marginalized are better heard, and this too can take time. For settlers, decolonizing ways of engagement can also be slower than hoped for, but prioritizing and investing the time is necessary to do it well. This process of listening and collaborating across diverse backgrounds and knowledges toward creating a sustainable future needs slowness built into it to be well considered and meaningful, but all delays in starting this are wasting precious time. Consider how CAT practitioners might hold these two paces of action: staying actively persistent in their engagement with challenges of the climate crisis without giving up when things take longer than they hope.

Questions for reflection

- How might your work and choices impact seven generations into the future? Does this question lead you to consider anything you would do differently?
- How might intergenerational impact of climate destruction have an impact on my client, self, region, etc.? How do systemic elements like culture, economic status, and others also influence across the generations?
- When you consider that, collectively, we have only a short amount of time to make changes before it is too late, what in your work toward sustainability needs to be sped up to meet the urgency? What about your work might be slowed down to allow for deeper or more complex reflection toward action?

Category 5: emotional responses

The category *emotional responses* invites awareness and honouring of the range and co-occurrence of emotional responses to the climate emergency. This includes the many appropriate, necessary, and hugely

distressing emotional responses people have to the climate crisis. One example is *solastalgia*, meaning: "the pain or sickness caused by the loss or lack of solace and the sense of isolation connected to the present state of one's home and territory" (Albrecht et al., 2007, p. 45). Broadening the emotional lexicon related to the climate crisis can enable creative arts therapists to better recognize and validate people's experiences. Additionally, curiosity about how emotional responses can layer and influence each other with regards to the climate crisis can also help understanding of and empathy for people's experiences. The climate emotions wheel designed by the (Climate Mental Health Network, n.d) can be a useful resource to support such emotional exploration. Although the different theoretical models of practice that CATs use can help to explore and support emotions, the specific eco-mental health literature better describes the complex ways emotional responses to climate (including trauma responses) can be understood and worked with.

Interpreting emotional responses to the climate crisis

Situations can raise any number of emotions, or combinations of emotions, in people, just as any given emotion can be interpreted in a range of ways. For example, seeing climate disasters such as flooding in the news can raise grief for all those suffering, fear of the event happening to oneself and/or loved ones, and trauma responses if there are local signs of these disasters (such as rising water levels). The same event might also register a feeling of numbness, where one might tell themselves that this does not directly affect them and interpret this numbness as apathy. In contrast, this emotional response could be understood as a deep fear that we are numbing, which then can be interpreted not as apathy but as an intolerable terror. These different ways of understanding inform how we reflect on and communicate emotional responses, and can be the basis for action or inaction.

Expression of emotional responses to the climate crisis

Emotional responses are translated into expressions, including actions, communications, and other forms of self-expression. The emotional responses to seeing the climate disaster of flooding in the news may be expressed in many different ways, such as avoiding the news; speaking to friends and family about the floods, discussing preparations for the future, or advocating for more climate resilient infrastructure. We also may become frozen, distract ourselves through scrolling to self-soothe, or find avoidance strategies. Each of these ways of expressing emotional responses to the climate crisis have different impacts on us and our relations and provide us with less agency.

Questions for reflection

- What emotions are being engaged in response to the climate crisis? How do they interconnect and influence us?
- How might the present emotions be offering important information about experiences of the climate crisis?
- What creative processes might help express the emotion?
- How can the arts support action that tends to these emotions, including taking outward action toward social change?

Category 6: ethics and morality

This category invites exploration around ethics and sense of morality as these relate to the climate crisis. With regards to ethics, we propose considering each item of the distinct codes of ethics and standards of practice within CATs through the lens of the climate crisis to see how this may shape and inform our work as creative arts therapists. For example, music therapists in Canada would consider the *Code of Ethics and Standards of Practice* of the Canadian Association of Music Therapists, and art therapists in Canada would review CATA's *Code of Ethics*

and Standards of Practice or, where they exist, their provincial association's equivalents, with this in mind. The British Association of Art Therapists has been working to create a sustainability and environmentally aware strategy (Bennet, 2024), and this practice may serve as a model for other professional associations. With regards to morality, we invite creative arts therapists to recognize and contend with the infinite moral injuries created by the climate crisis. Psychoanalyst Sally Weintrobe's work focuses on the psychological effects of climate change. She spoke to the challenges of considering such moral injuries:

The neoliberal economy violates most peoples' sense of what is right and wrong many times a day and staying with this knowledge can leave us feeling dispirited and overburdened. Who wants to be worrying about the future of the climate system when fetching the grandchildren from school? Who wants to face the guilt – the ongoing miserable sense of dirty implication – that goes with living in an economic system based solely on maximizing profit? (Weintrobe, 2018, p. 64)

Although considering the moral implications of the climate crisis is difficult and at times, unbearable, it can be useful for creative arts therapists to move forward with these issues in mind as a way of grounding ourselves in the reality of the climate crisis.

Questions for reflection

- What elements of your professional ethical codes and standards of practice relate to sustainability? What is missing that you would like to see added?
- What moral injuries related to the climate crisis have you experienced in your work? How do you feel your own moral code engage around this topic in your work? What compromises or dissonances arise as you hold the reality of the climate crisis with the tasks required in your work? How might you address those?

Category 7: systems change

The category *systems change* captures change that considers the complex interrelationships between, among, and within the vast realms of life, including biological and interpersonal. Systemic theories conceptualize change as requiring consideration not just of the components of a system, but also their processes and structures, including roles and rules (explicit and implicit), structures (visible or not), hierarchies (agreed upon or imposed, whether consciously constructed or not), and the different levels of context (e.g. concentric social structures we participate in), and forms of resources (from basic survival, like food, to social capital and other elements that provide power; Goodchild, 2021; Koenig et al., 2021; Wampler et al., 2020). Structures and processes, such as hierarchies and the approaches to resource use, are considered within these relationships in systemic change approaches. The interplay among different systems and between different levels of systems are also considered.

Indigenous sciences and knowledge contain wisdom about the complex interconnections of life. The IPCA Knowledge Basket (2024a) highlighted that "Indigenous Knowledges are part of broader political, legal, economic, and cultural systems that enable the continued generation and renewal of Indigenous Peoples to ensure their well-being" (para. 1). Knowledge needs to be considered wholistically within its knowledge system so that it can be connected to community and place in a respectful and honouring way (IPCA Knowledge Basket, 2024a). This connection is especially important for Indigenous knowledge – a colonial approach of extracting knowledge from Indigenous communities to consider it solely within a western framework must be avoided (IPCA Knowledge Basket, 2024a). The IPCA Knowledge Basket (2024b) outlined that Indigenous knowledge systems

are the political, legal, economic, and cultural systems that enable the continued generation and renewal of knowledge for Indigenous Peoples to ensure their well-being; Represent a way of life, something that has to be lived in order to be known, understood, and practised; and consider relationships not only among people but in all our relations, including with all living things, the spirit world, our ancestors, and those yet to come. (Item 6)

How CAT practitioners engage with Indigenous knowledge and Indigenous knowledge systems will, in part, depend upon their own social locations and relationships with/to Indigeneity. As creative arts therapists contemplate systemic change that includes decolonization and Indigenization, they need to avoid attempting to integrate Indigenous knowledge systems into western knowledge systems. Instead, the IPCS Knowledge Basket (2024a) encouraged the use of braiding and *etuaptmunk*, two-eyed seeing. *Braiding* is where ways of knowing are braided together in ways that maintain the integrity of each system (Kimmerer, 2015). *Etuptmunk*, two-eyed seeing, is the Mi'kmaq framework developed by Elder Albert Marshall that

refers to learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing, and from the other eye with the strengths of Western knowledges and ways of knowing ... and learning to use both these eyes together, for the benefit of all. (Institute for Integrative Science and Health, n.d., para. 3)

The CCPA identified *etuaptmunk*, two-eyed seeing, as one of four "CCPA processes of ethical decision-making", offering an example of braiding Indigenous and western systems within a therapeutic organization (CCPA, 2020, p. 5).

Creative arts therapists may benefit from bringing an understanding of systemic change to our work. On one hand, this may help therapists to consider the broader social processes that impact their clients' well-being. An asylum-seeking client may have had to leave their home country because of direct climate impacts or cultural conflicts that are somehow tied to them. Often, the neighborhoods that newcomers with lesser socioeconomic status first live in have less tree cover, more waste facilities, more traffic, less resilient infrastructure, and many other elements that make their immediate environment less protected from climate impact, while other areas benefit from climate gentrification (Landry et al., 2020; Shokry et al., 2018). Systems thinking in these ways may lead creative arts therapists to consider how they might participate in greater advocacy for climate justice, for example by writing letters to the editor of a paper or a government official to help foreground the narrative of climate change in infrastructure problems. Helping these systemic issues become more visible can also give different entry points to contributing to change by demonstrating other areas where we can serve as change agents.

Questions for reflection

- What systemic power structures, roles, and patterns are at play (in my area/for my client/me) that increase climate vulnerability?
- What part(s) of the broader context (e.g. government, industry, local power brokers, history, culture, media narratives, etc.) need to be considered to understand the issues and to find/move toward avenues of change?
- What parts of the system require more resources (e.g. funding, people power, etc.) for change to be feasible?
- How might Indigenous systems be foregrounded, perhaps through braiding and/or *etuaptmunk*, two-eyed seeing?

Discussion: a nascent framework for conscious engagement

We propose that this nascent framework be used by creative arts therapists to develop points of reflection, exploration, connection, and action around intentional engagement with the climate crisis. We

imagine the myriad diverse ways that creative arts therapists might converge and diverge in our experiences and understandings of the climate crisis, including those which are informed by intersectionality, social location, and cultural diversity.

Diverse experiences of the climate crisis in CATs

We aimed to open a framework where all are welcomed and where differences are valued and needed. At the same time, we acknowledge that our understandings and approach were influenced by our interconnected social locations, geography, experiences, and other personal elements that included our privileges. It is imperative that diverse voices, ideas, and strategies be given more opportunity and resources within this conversation. As we collaborate in this dialogue, it is also essential that creative arts therapists support practitioners who feel less comfortable or knowledgeable, or are facing other obstacles to engagement; many avenues to action and activism do not require people to engage in ways that extend beyond their capacity. CAT practitioners and leaders must also provide more platforms for the voices of individuals and groups from socioeconomically marginalized communities, particularly in the global south and other regions less protected by wealthy infrastructures and disproportionately impacted by the climate crisis (Hickel, 2020, 2021).

In reviewing the literature to help create this CAT framework for conscious engagement within the context of the climate crisis, it was evident that the current limited discourse also represents a limited diversity of perspectives and voices in the conversation. It is essential to acknowledge that many of the foundational principles of ecological justice are based on long-held Indigenous knowledges and practices, which have often been co-opted into mainstream Western frameworks (Simard, 2021). An important example of a systemic structural change regarding this, recently happened within art therapy. Three Indigenous art therapists, Fyre Jean Graveline, Jean Tate, and Jennifer Vivienne, wrote a letter to the Canadian Art Therapy Association (CATA) as the association embarked on revising its educational standards. The authors called on CATA to honour Indigenous knowledge and take responsibility for reconciliation (Graveline et al., 2021), including a call to acknowledge ecological trauma. The letter resulted in commitments to change by CATA (CATA, 2021). Of course, such changes are never so simply wrapped up, and such calls for movement requires tremendous emotional resources from those who take action.

We want to acknowledge the important social justice work done by CAT scholars, including, but not limited to: Baines, (2013), (2021); Baines and Edwards (2018); Leonard (2020); Sajani and Fietje (2023); Talwar and Sajani (2022); Talwar (2018); and Vaillancourt (2012). Although they do not directly address the climate crisis and as such are beyond the scope of this article, their contributions offer innovations around broader social action that can inspire and inform climate justice work. Intersectional considerations regarding oppressive systems are interlocked with the climate crisis.

Areas for further exploration

We also want to acknowledge that CATs are adjacent to, overlap with, and collaborate with different professions in varied, complex, and multifaceted ways. Therefore, the roles of CATs within diverse contexts and the potential for collaboration across disciplines are additional points for reflection. Finally, our framework, *Reflective Climate Engagement Framework for CAT Practitioners*, does not seek to explicitly advise CAT practitioners about if, when, or how to raise or attend to the climate crisis with clients. Further exploration of ethical implications and best practices around raising and attending to the climate crisis with clients is needed.

Moving away from colonial extractivism and toward notions of interdependence

As CAT practitioners move to engage with the climate crisis with the proposed framework, the pervasiveness of capitalistic colonial extractivism in western cultures, even within climate work, risks influencing this engagement. For example, although the beneficial effects of spending time in nature for human well-being are well researched (e.g., Cox et al., 2017; Wheeler et al., 2015; White et al., 2019), it is important to be mindful of avoiding extracting from nature without replenishing or otherwise inadvertently causing harm as part of therapeutic engagement. Indigenous cultures' reciprocal relationship with the natural environment (IPCA Knowledge Basket, 2024a) can serve as a model to decolonize therapeutic engagement with nature in the CATs.

Creative arts therapists can consider other avenues to not enact exploitative and extractive patterns of harm. An example of this is not participating in the neoliberal wellness industry, including its social media arms, that uses greenwashing, shaming, consumerism, and individualist thinking in the guise of body, nature, and spiritual connection (Badr, 2022). Social media can also play important roles for learning and the promotion of CAT work, and therefore can be hard to avoid, but creative arts therapists can commit to engage in this landscape in manners that align with values of mutual interconnection.

Moving away from extractivist paradigms involves shifting from dominating relationships to relationships of interdependence and interconnection, which includes considering not only how humans can benefit and take from nature but also how we are a part of it and can care for it/us. Music therapist Carolyn Berezna Kenny identified an "ecology of being" for music therapists that "relates one not only to the conditions of the patient, but also to the conditions of the earth herself" (Kenny, 2016, p. 474). As an Indigenous scholar, Kenny incorporated Indigenous knowledge into her music therapy approach, stating that, "the experience and process of the patient/therapist also gives energy back to the earth" (2016, p. 474). Art therapists Bird et al. (2023) likewise highlighted this interdependence between CAT participants and the earth by:

explicitly mov[ing] the practice of art therapy outwards from the purely human-built environment towards spaces that are more encompassing of organic life, at the same time as introducing the metaphor of rewinding into how the relationship between client, therapist, materials and the environment relate to each other. (p. 49)

Thus, even when there is not an overt activist stance, CATs may be promoting mutuality and reciprocity, thereby challenging dominant systems that perpetuate the climate crisis.

The experience of creating this framework

This work required us to adopt the research position of actively living in the existential threat we were trying to understand. As a result, we found ourselves experiencing myriad intense, difficult, and complex emotions that this framework speaks to, and attempting – imperfectly – to stay present amidst them, which was extremely difficult in many ways. We want to extend appreciation to readers and offer encouragement and solidarity in what is happening in these complicated times.

An urgent invitation

Given the imminent collapse of the biosphere if there is not radical social change, CAT professions and professionals needs to prioritize and escalate our commitment to ecological justice in all areas of our work, including ethics, clinical practices, community engagement, theoretical orientations, and professional training and development. The work of stopping, healing, changing, and recreating humanity's climate story lies in all of our hands; it will only happen if we each take initiative. We humbly offer this nascent framework as both a contribution to an

ongoing conversation and an invitation to collaboration. The urgency for such intentional engagement with the climate crisis cannot be overstated, and creative arts therapists can bring unique abilities to inspire and mobilize change.

CRedit authorship contribution statement

Seabrook Deborah: Writing – review & editing, Writing – original draft, Methodology, Conceptualization. **McLaughlin Heather:** Writing – review & editing, Writing – original draft, Methodology, Conceptualization.

Declaration of Competing Interest

We have no competing interests to declare.

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No data was used for the research described in the article.

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The role of puppetry in mental health promotion: A scoping review of its efficacy and applications

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Therapy

ABSTRACT

Puppetry-based interventions have gained recognition as a potential tool in therapeutic, educational, and social contexts, offering unique benefits in emotional expression, anxiety reduction, and social skills development, thereby contributing to mental health promotion. This review aims to bridge the gap between practice and theory, providing a comprehensive understanding of the role of puppetry in therapeutic and educational settings for promoting mental health. A scoping review was conducted using the PICOS framework and PRISMA-ScR guidelines, examining studies across 16 databases up to August 2024. This review evaluated 30 studies to assess the effectiveness of puppetry-based interventions across diverse populations, including children, adolescents, and vulnerable groups such as refugees and the elderly. The findings demonstrate significant improvements in emotional regulation, anxiety management, and social interaction, particularly in pediatric and educational settings. However, the review also identifies critical gaps in the literature, including the limited use of large-scale randomized controlled trials, a scarcity of longitudinal studies, and inconsistent application of theoretical frameworks. These gaps highlight the need for more rigorous and theoretically grounded research to fully optimize the benefits of puppetry-based interventions. This review consolidates existing evidence and offers a roadmap for future research, emphasizing the importance of standardized protocols and long-term outcome evaluations. The findings contribute to the growing recognition of puppetry as a valuable tool in therapeutic and educational practices, offering insights into how these interventions can be effectively tailored to meet the needs of diverse populations.

Introduction

Historically, puppetry-based interventions have been recognized for their therapeutic potential, particularly in engaging individuals across different age groups in expressive and transformative experiences (Bertrand & Bertrand, 1979; Borkin & Frank, 1986). Rooted in the tradition of storytelling and performance art as tools for education and healing, puppetry offers a dynamic medium through which complex emotions and social issues can be explored in a non-threatening, creative manner. This versatility has led to its application in various settings, including mental health care, education, public health, and social work, where traditional therapeutic methods may be less effective or

accessible (Bernier & O'Hare, 2005; de Droog et al., 2017; Karaolis, 2023a, 2023b; Kroflin & Amsden, 2022; Segal et al., 2024; Tilbrook et al., 2017).

Research has shown that puppetry can significantly enhance communication, reduce anxiety, and promote emotional regulation, particularly among children and adolescents (Aminimanesh et al., 2019; Rajesh & Jasline, 2022). For instance, in educational contexts, puppetry has facilitated learning and social interaction, helping students articulate their thoughts and feelings more effectively (McLachlan et al., 2009; Moula, 2021). In clinical settings, puppetry has been employed to alleviate preoperative anxiety in pediatric patients, with studies demonstrating its effectiveness in reducing both emotional distress and

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physiological responses to stress (Roshanzadeh et al., 2020; Suzan et al., 2020).

In this review, effectiveness is defined as the extent to which puppetry-based interventions achieve meaningful and measurable outcomes in real-world settings, addressing participants' emotional, psychological, and social needs. It encompasses statistically significant improvements in primary outcomes (e.g., anxiety reduction, behavioral change) and the intervention's relevance, acceptability, and sustainability within its context (Glasgow et al., 1999; Kazdin, 2001). This approach integrates both quantitative and qualitative measures to assess the practical impact of interventions beyond controlled research environments.

Beyond clinical and educational applications, puppetry has also been utilized to address mental health stigma and enhance emotional resilience among vulnerable populations, such as refugees, prisoners, and individuals with chronic mental health conditions (Beauregard et al., 2024; Segal et al., 2024). These interventions often combine puppetry with other forms of creative expression, such as drama, music, and visual arts, creating a holistic approach to healing and personal development (Gaiha et al., 2023; Page et al., 2022).

However, despite the growing body of evidence supporting the efficacy of puppetry-based interventions, significant limitations persist in the current literature. Many studies are constrained by small sample sizes, lack of control groups, and short-term follow-up periods, limiting the generalizability and long-term applicability of the findings (Butler et al., 2009; Ceylan & Erkut, 2023). Additionally, the theoretical frameworks underpinning these interventions are often inconsistently applied, leading to a fragmented understanding of the mechanisms through which puppetry exerts its therapeutic effects (Ingraham et al., 2019; Reid-Searl et al., 2017).

Given the diverse applications of puppetry in therapeutic, educational, and social settings, a comprehensive scoping review is essential to assess its effectiveness across these domains. This review will systematically examine the existing literature, categorizing and analyzing studies based on population demographics, theoretical frameworks, types of interventions, methodologies, and outcomes. By identifying areas where further research is needed—particularly in standardizing intervention protocols, integrating theoretical models, and evaluating long-term outcomes—this review aims to bridge the gap between practice and theory, offering a more comprehensive understanding of the role of puppetry in various contexts. Ultimately, this work seeks to inform the design of future studies, promoting the development of more effective and theoretically sound puppetry-based interventions in mental health promotion.

Methods

Search strategy

This review used the PRISMA-ScR extension for scoping reviews guidelines (Tricco et al., 2018). A comprehensive search was conducted within 16 bibliographic databases using a combination of subject heading keywords, terms, phrases, and Boolean operators (see Table 2). Search strategies were adapted based on the indexing systems of each respective database used (see supplemental material). Two of the authors [B.A.E. and W.A-R.] conducted the searches for relevant articles. Author [B.A.E] utilized Rayyan QCRI software (Ouzzani et al., 2016) to assist in the screening process while author [A.A-K.] used the Elicit software to elicit more relevant articles to the review. All retrieved articles were screened for relevance to the topic. Another author [W.A-R.] used the Elicit software to elicit more relevant articles to the review. In addition, reference lists from retrieved articles were also hand-reviewed to identify any additional relevant publications. Titles and abstracts were screened for relevancy, and potentially relevant journal abstracts were reviewed by two authors [W.A-R. and A.A-K.]. Potential articles for inclusion in this review were evaluated independently for relevance,

Table 1
PICOS Criteria for inclusion and exclusion of studies.

Parameter	Inclusion Criteria	Exclusion Criteria
Date Range	Up to and including August 2024	N/A
Population	- Adults > 18years - children and young people aged 0–17years	- Chronic or acute conditions - Developmental disabilities
Intervention type	Any mental health intervention using any form of puppetry either as the primary intervention or as part of a multi-componential intervention	- Interventions that are not based on the use of puppetry. - Interventions that do not address mental health-related outcomes.
Focus of study	Studies focusing on primary mental health intervention	- Studies excluding mental health interventions and other interventions - Studies discussing mental health as an afterthought in the discussion
Outcomes of interest	Any mental health-related outcomes of interest	N/A
Language	English	All other languages
Study Type	Intervention studies, RCTs, quasi-experimental, longitudinal, cross-sectional, qualitative studies, or conference papers with mental health intervention component assessment outcomes, case studies with an intervention component	Commentaries, narratives, editorial communications, opinion pieces, government reports, guidance documents, book reviews, theses and dissertations, systematic scoping, rapid and literature reviews

Abbreviations

N/A – Not applicable
RCTs – Randomized control trials

Table 2
Electronic Databases Used with Relevant Search Period and Terms.

Databases	Search Period	MeSH keywords, terms, phrases, and Boolean operators
PubMed; MEDLINE; Embase; BioMed Central; ScienceDirect; ArticleFirst; BioOne; BIOSIS; CINAHL; EBSCOHost; ProQuest; SAGE Reference Online; Scopus; SpringerLink; Taylor & Francis; and Wiley Online	Up to and including August 31st 2024	(All fields) mental health OR mental wellbeing OR mental wellness OR psychosocial OR psychological AND (All fields) Puppets OR puppetry OR puppeteer OR puppet show OR marionette OR ventriloquy OR ventriloquism AND (All fields) Intervention OR education OR promotion OR program

merit, and inclusion/exclusion criteria. Articles accepted for inclusion were individually reviewed by each author. Additionally, each study was assessed by an independent reviewer, and the reference list of each included article was screened for potentially eligible articles. Any disagreement was resolved by consensus. Fig. 1 provides the PRISMA flowchart leading to selected articles for this review (see Fig. 1). We explored the characteristics of interventions, target audiences, and program outcomes and tabulated the included studies (see Table 3). Given that methodological quality assessment is not a prerequisite for scoping reviews, we did not appraise the included studies (Peters et al., 2020).

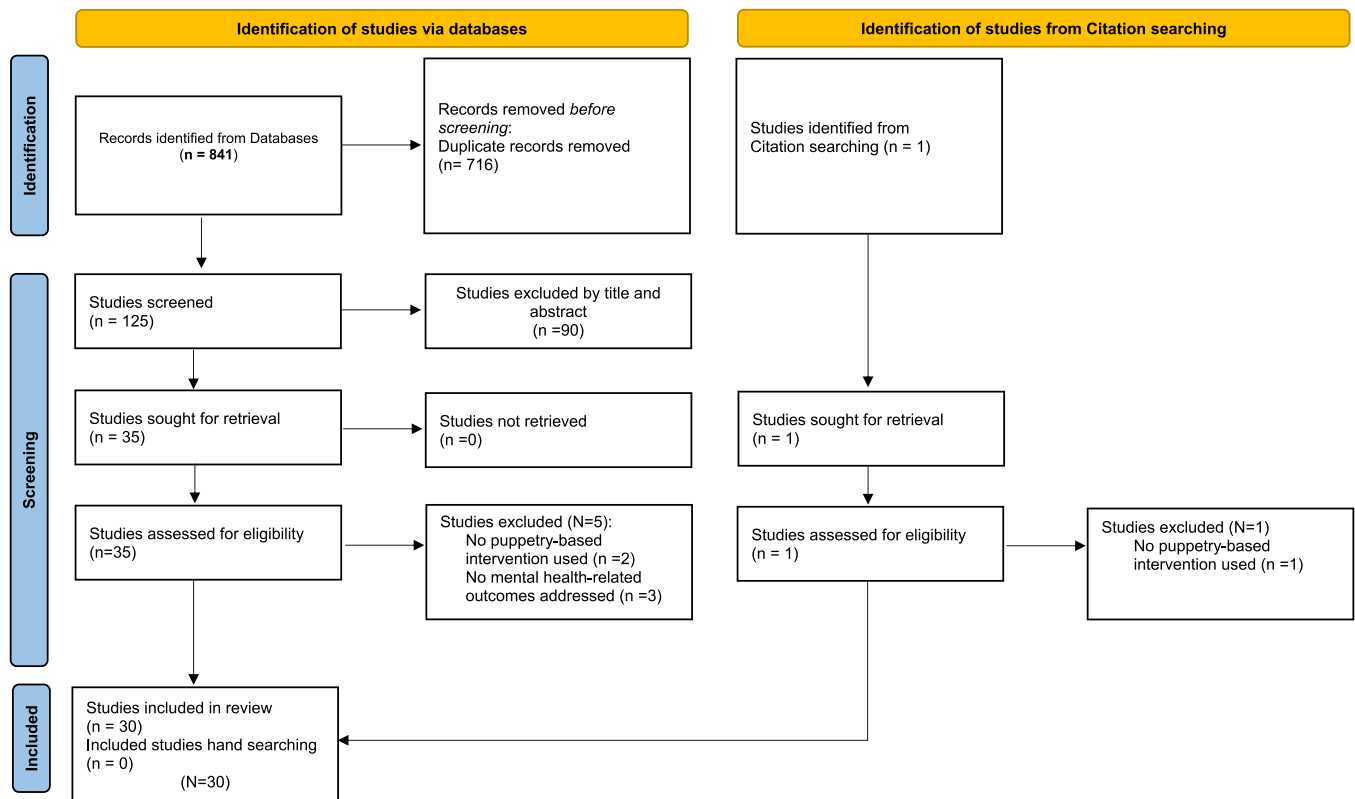


Fig. 1. PRISMA Flow diagram.

Selection criteria

The Population, Intervention, Comparison, Outcomes, and Study (PICOS) design guidelines (Higgins et al., 2019) were incorporated to develop the research question: ‘Do populations of all age groups’ (P) that are offered puppetry-based interventions (I) have improved mental health and wellness parameters (O) compared with those that do not participate in puppetry-based interventions (C)?’. This framework informed the inclusion and exclusion criteria (see Table 1). Peer-reviewed articles published in the English language were included. Interventions reported outside traditional peer-reviewed articles were excluded in this review. The search was conducted in the summer of 2024, and the results communicate the literature published up to and including August 2024.

Results

This narrative summary organizes the findings from 30 included studies, detailing their focus on populations, use of theoretical frameworks, types of interventions, methodologies, and intervention results.

Country and population of the studies

The reviewed studies spanned multiple countries and targeted a diverse range of populations. Children were the primary focus in 21 studies, ranging from preschool to adolescence. In Iran, Aminimanesh et al. (2019) studied preschool children, Roshanzadeh et al. (2020) targeted children aged 3–6 years, and Zavariani et al. (2023) focused on children in general. In Turkey, several studies focused on children undergoing surgery, including Suzan et al. (2020), Ceylan and Erkut (2023), Metlek and Çağlar (2024), Oluç and Sarılioğlu (2023), Bayar et al. (2024), Kostak et al. (2021), Kurt and Seval (2021), Yaz et al. (2024), and Tuncay and Sarman (2024). Additionally, McLachlan et al. (2009) in the USA and Topan and Sahin (2019) in Turkey studied

school-aged children, while Wang et al. (2024) in Turkey examined children aged 4–8 years.

Adults were the main population in five studies. Gaiha et al. (2023) focused on college youth in India, Ingraham et al. (2019) targeted primary care providers in the USA, Reid-Searl et al. (2017) studied nurses in pediatric care in Australia, Ward-Miller et al. (2019) focused on women with self-injurious behavior in the USA, and Page et al. (2022) conducted research on prisoners in England. Special populations were examined in four studies. Beauregard et al. (2024) conducted a case study of a 7-year-old Syrian refugee in Canada, Segal et al. (2024) focused on refugees in the USA, Lestari et al. (2022) targeted elderly individuals in Indonesia, and Pitre et al. (2007) addressed mental illness stigma in elementary school children in Canada.

Type of interventions

The review shows two type of interventions: participant-created puppets, and pre-made puppets.

Studies using participant-created puppets

Two studies utilized participant-created puppets. Gaiha et al. (2023) involved college students creating puppets as part of an arts-based intervention aimed at reducing mental health stigma and fostering empathy. Moula (2021) engaged primary school children in creating puppets as part of art therapy, facilitating emotional expression and improving well-being. These studies show enhanced emotional expression and well-being, demonstrating diverse applications across health-care, education, emotional development, and professional training.

Studies using pre-made puppets

The remaining 28 studies employed pre-made puppets across various contexts:

Table 3

Summary of literature search (N = 30).

Authors (Year)	Target Population/ Country	Type of Study	Sample Size	Type and details Intervention	Theoretical Framework	Measured Parameters	Main Results	Main Recommendations
Aminimanesh et al. (2019)	Preschool children aged from 3 to 5 years. Iran	Interventional study using pretest-post-test design	N = 75 children	Exposing 2 test groups to musical puppet shows and storytelling.	Social Learning Theory	PCBP “aggression, inattention, withdrawal, and anxiety”	Compared to storytelling, puppet shows have a stronger influence on improving PCBP. Socially favorable behaviors were more common among puppet shows group.	Kindergartens are encouraged to exploit children's passion for puppets and stories to improve their BP instead of solely relying on drugs.
Beauregard et al. (2024)	7-year-old Syrian refugee Canada	School arts-based intervention	Single Case Study	Examining the case of refugee young girl who invested the Art school-based creative expression program.	N/R	Senses of control and agency in post-crisis context	By the process of meaning-making, the girl's engagement in art-creativity helped her find a balance and regain a sense of agency and emotional stability.	School art-based interventions held in open environments that foster listening to refugees can be used as a coping strategy to enhance their adaptability.
Burarak (2021)	Junior high school students Thailand	Participatory Action Research	N = 79	Focus group discussions coupled with in-depth interviews with the participants in puppet activities.	Communication Framework	School Violence	Participatory puppet shows encourage discussion of school violence issues, foster empathy, inhibit students' violence, and raise their awareness.	Puppet shows that match students' prior experiences is a potential strategy for alleviating violence as it fosters their mutual understanding and acceptance.
Butler et al., (2009)	8-year-old male student USA	Clinical application	Single Case Study	Interventional sessions were made with the use of puppets to externalize clients' problems	Narrative Therapy	Aggressive behaviour	With the use of puppets, narrative therapy helps externalising the problem and separating the client from it.	Integrating puppets into narrative therapy can help objectify the problem and create a playful space, but it depends on clients' consent.
Domek et al. (2020)	Caregiver-child pairs USA	Pilot Investigation	N = 34	Caregivers were given finger puppets and learnt how to use them. Then, ASQ-3 was used to check their satisfaction with the puppets as an intervention.	Attachment Theory	Language development	More frequent use of puppets is significantly associated with higher ASQ-3 total scores across all age levels and higher puppet usage is associated with stronger communication.	Finger puppets offer a simple and affordable way of augmenting early infancy linguistic capabilities and promoting language interactions.
Gaiha et al. (2023)	College youth India	Pilot arts intervention	N = 371	Participants were required to create art works (e.g., puppet shows) that help them understand the causes and signs of mental ills.	Stigma and Social Identity Theory	Mental health-related stigma	Out of 371, 194 participants developed a better understanding of mental issues and stronger empathy for mentally ill people.	Studying the effectiveness of arts-based intervention in reducing stigma associated with mental health issues using mixed-method and pre-and post-intervention
Ingraham et al. (2019)	Primary care providers USA	Pilot study Pre-and-Post training assessment	N/R	Simulated training environment is designed to develop physicians' preparedness to address NSSI.	N/R	Physicians' preparedness to address suicidal behavior	Based on gestures and head movements, digital puppets that mimic patients' behavior may help refine physicians' ability to address NSSI.	Adopting gesture-based virtual puppetry system creates an effective environment for scenario rehearsal which approximates real-life behaviors.
Lestari et al. (2022)	Elderly people Indonesia	Pre-posttest Quasi-experimental	N = 34	Using consecutive sampling, and then distributing DASS	N/R	Elderly anxiety	Laughter therapy using shadow puppets' video effectively	Healthcare centers are suggested to integrate laughter therapy into playing videos of

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Table 3 (continued)

Authors (Year)	Target Population/Country	Type of Study	Sample Size	Type and details Intervention	Theoretical Framework	Measured Parameters	Main Results	Main Recommendations
				among participants.			reduced elderly anxiety with a $p = 0.001$	puppets to reduce elderly anxiety.
McLachlan et al. (2009)	6–8 years old students USA	Pre and posttest	N/R	Applying motion locomotion program to teach children how to recognize and treat others' emotions using language cards and puppets	Emotional Learning Theory	Recognition and healthy treatment of emotions	Students' role-playing during puppet shows increased the legitimacy of their emotion expression and developed their dealing with others' emotions.	School nurses are assumed to widen their impact on students' health by adopting creative health education programs. Motion locomotion program can be one of them.
Moula (2021)	Primary school children England	Pilot randomized controlled study	N = 62	Four art therapy programs were distributed across four schools, then children were interviewed to understand their experiences of performing creative arts.	Empowerment Theory and PERMA	Mild emotional and behavioral difficulties	The creative arts that affected children's wellbeing greatly were story-making and storytelling, drawings, puppetry, and songwriting as they led to emotional expression and group-bonding.	Creating opportunities for school children to engage in creative arts may help fulfill their wellbeing needs especially in crisis contexts like covid-19 pandemic.
Page et al. (2022)	Prisoners, some with autism. England	Art-based prison projects	N = 45	Four art programs were implemented including drama, dance, puppetry, and singing. Then, prisoners were interviewed to examine the effect of the art project on their mental health	Desistence Theory and Social Learning Theory	Sex offending and autistic traits	Prisoner-based arts enhance self-esteem and confidence, develop better relationship with inmates and jail staff, and build up a better prison culture. Across all arts, dance stood out due to its effect on prisoners' physical fitness and sleep.	Facilitating the attendance of prisoners' family and friends at their arts performance is needed. Training jail staff and prisoners on how to treat prisoners with behavioral issues is needed.
Pitre et al. (2007)	Elementary school children Canada	Pre and posttest	N = 36	Exposing the experimental group to hand puppets that represent individuals with mental illness to challenge their stereotype, then, distributing OMIS to them.	Attribution Theory	Stigmatizing attitudes toward mental illness	Scores for the test group improved significantly on three of six factors of OMIS including Separatism, Restrictiveness, and Stigmatization.	Puppetry plays can be used as part of anti-stigma programs, and they should be further examined.
Rajesh and Jasline (2022)	Hospitalized children India	Pre and posttest	N = 100	Exposing the test group to puppet plays. Then, a comparison between the test and control group was conducted statistically.	N/R	Anxiety	Puppet plays effectively reduce anxiety among hospitalized children.	N/R
Reid-Searl et al. (2017)	Nurses use puppets in pediatric settings Australia	Focus group sessions using open-ended questions	N = 13	Allowing nurses to learn, implement, and evaluate the use of puppets with children, then eliciting their experiences.	PUP-ED (KRS) Framework	Nurses' experience with the use of puppets with children	Using puppets helps nurses reduce children's fear and break down the barriers	Nurses should integrate play puppets into their pediatric healthcare to soothe the burden on children, but their practice should be guided by a developed framework such as PUP-ED.
Roshanzadeh et al. (2020)	3–6 years old Children Iran	Clinical trial and	N = 90	Allowing children to watch 15 minutes of	N/R	Anxiety	Children's anxiety reduced significantly after	Visual deviant techniques can be used with children

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Table 3 (continued)

Authors (Year)	Target Population/Country	Type of Study	Sample Size	Type and details Intervention	Theoretical Framework	Measured Parameters	Main Results	Main Recommendations
		interventional study		animation and puppet shows shortly before doing the surgery			the intervention ($P = 0.02$) and puppet shows had a greater effect on anxiety compared to animation ($p > 0.001$).	before surgery because of its profound impact on their anxiety
Segal et al. (2024)	Refugees USA	Pre-and post-puppet show	N = 107	Puppet shows were used as educational tools, then, participants were requested to provide their feedback on the efficacy and entertainment of puppets.	N/R	Refugees' experience with resettlement	Respondents aged 29 and younger found the puppet shows more valuable than other age groups. Elderly people found it more entertaining but less valuable.	The audiovisual use of puppets is suggested to present issues that may be difficult to be discussed using conventional verbal means
Suzan et al. (2020)	7–11 years old Children having surgery Turkey	Randomized controlled experiment	N = 81	Pain-rating and State-Trait Anxiety Inventory for Children scales were to measure the score of pain.	N/R	Children's anxiety and pain	The median pain score of the test group during and after the procedure was significantly lower than the control one. Puppet show played during the surgery effectively reduced pain and anxiety.	Healthcare providers in pediatrics are suggested to perform puppet shows during the surgery. Further research is needed to examine the effect of video-recorded puppet shows on children's anxiety and pain.
Van der Hoeven et al. (2021)	Children, mothers, and professionals in DV shelters Netherlands	Interventional study using 8-sessions therapeutic program	N = 34	Executing a play therapy program using hand puppets and seeking interviewees' feedback on its perceived benefits and barriers.	Emotional Security Theory	Domestic violence	Three themes emerged from interviews including "tunny is nice and funny", "the tunny is just like us" and "tunny invites us to ask questions and give advice on sensitive issues"	Children may use puppets to project their own problems onto it and to address their concerns.
Ward-Miller et al. (2019)	Women with self-injurious behavior USA	Pre-and post-intervention	N = 16	A psychoeducation program was implemented using hand puppets as a teaching technique then, RS was distributed to measure resourcefulness.	Resourcefulness Theory	Resourcefulness skills	Based on participants' reports, hand puppets were useful in performing resourcefulness skills. The scale scores increased insignificantly.	To strengthen participants' involvement in psychoeducation programs and skills acquisition, the use of therapeutic puppets is essential.
Zavariani et al. (2023)	Children Iran	Pre-and posttest	N = 20	Implementing 30-sessions training program with the use of puppet shows as an assistive technique.	Social Cognitive Theory	Social aptitude and behavioral issues	Virtual life competencies education using puppet shows promoted children's social skills in the posttest ($P < 0.005$). Virtual training reduced behavioral issues in the posttest ($P < 0.005$).	Further research should use randomized controlled trials with a large sample size, as the research subject is still inadequately investigated.
Topan and Sahin (2019)	School-aged children Turkey	Quasi-experimental study using pre and posttest design	N = 617	MOF Likert scale was used in the pretest phase to measure students' fears. Then, puppets representing doctors were exposed to afraid	N/R	Medical fears	Educational level ($P = 0.001$), age ($P = 0.0001$), previous hospitalization ($P = 0.0001$), and the fear of being sick ($P = 0.0001$) were factors that	N/R

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Table 3 (continued)

Authors (Year)	Target Population/Country	Type of Study	Sample Size	Type and details Intervention	Theoretical Framework	Measured Parameters	Main Results	Main Recommendations
				students. The same scale was applied to measure their fear after the intervention.			affected students' medical fears. Puppet shows representing doctors and parent-son relationship reduced such fears.	
Ceylan and Erkut (2023)	Children aged between 3 and 6 years. Turkey	Interventional study using randomized controlled trial	N = 80	FLACC and CEM scales were distributed to control and test groups. Then, a comparison was made.	N/R	Pain and emotional manifestation	The mean FLACC pain scores of children in the test group were lower than those of control group ($P < 0.001$). CEMS scores before and during the surgery were lower than those of the control group ($P < 0.001$).	Finger puppets can be hired to reduce fears and emotional responses of children undergoing surgery such as blood collection.
Metlek and Çağlar (2024)	Children aged between 3 and 6 years and their mothers Turkey	Prospective and randomized clinical trial using the pre and posttest design	N = 120 Test group N = 80 control group	Children and their mothers used play dough before and after the circumcision. Then, scales were distributed to collect data in pre and post intervention phases	N/R	Children's and Mother's anxiety	The pain and anxiety levels of children and their mothers were statistically lower than the control group ($P < 0.05$). A correlation between children's pain and anxiety and mothers' anxiety was found in the control group ($P < 0.05$).	Therapeutic play TP should be used in pediatric settings during the surgery to relieve the pain of painful medical procedures. TP also enhances communication and mutual trust between nurses and children and their parents.
Oluç and Sarialioğlu (2023)	Children aged from 3 to 6 years. Turkey	Randomized controlled experiment	N = 60 control group N = 60 test group	Therapeutic play method was applied using hand puppets. Then, data were collected using interviews and scales.	N/R	Children's fear and pain	Differences between mean fear and pain level scores between the groups were statistically significant ($P < 0.05$). Pain and fear felt by surgery were reduced using hand puppets.	Owing to their ease of use, affordability, and usefulness, hand puppets are advised to be used when performing surgeries to reduce the pain and fear felt by children.
Bayar et al. (2024)	Children aged from 6 to 12 years. Turkey	Pre posttest unmatched group model	N = 85	Children were randomly split into test and control groups, then children's anxiety in the test group was observed before and after the intervention.	N/R	Children's anxiety	A statistically significant difference between the pre and post intervention in finger puppet and distraction card groups, while there was no difference in the control group.	Non-pharmaceutical methods such as puppets and distraction cards can help manage the anxiety produced by the surgery.
Kostak et al. (2021)	Children aged between 5 and 10 years Turkey	Prospective, randomized, and controlled study	N = 70	Finger puppet play was used with the test group, while providing the control group with a routine care.	N/R	Fear of surgery	Before the surgery, no significant difference was noticed. However, during and after the operation, the hand puppet groups scored less fear compared to the control one ($p < 0.001$)	The use of finger puppet play by parents and nurses is recommended in pediatric clinics to reduce children's fears before, during, and after the operation.

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Table 3 (continued)

Authors (Year)	Target Population/ Country	Type of Study	Sample Size	Type and details Intervention	Theoretical Framework	Measured Parameters	Main Results	Main Recommendations
Kurt and Seval (2021)	Children aged between 1 and 5 years Turkey	Randomized controlled trial	N = 90	The control group with routine care, test group 1 and 2 was given hand puppets used by nurses.	N/R	Postoperative pain	Children in the control group scored stronger fears compared to test group 1 and 2 ($P < 0.001$). Control group satisfaction was lower than test ones ($P < 0.001$).	Finger puppet plays can be used to decrease fears felt by children.
Yaz et al. (2024)	3–6 years children Turkey	Randomized controlled study	N = 105	Children were split into control and test groups. Then, WBFP and CF scales were used to collect data.	N/R	Pain and Fear	A statistically significant difference was found between the bee buzzy and puppet groups and the control group in pain scores ($p < 0.05$). Pain scores were lower in Bee buzzy group compared to the puppet and control ones.	Because of their role in developing communication, decreasing fear, and distracting attention, the use of bee buzzy and puppets during phlebotomy and by nurses is recommended.
Tuncay and Sarman (2024)	5–10 years children Turkey	Time-series randomized controlled trial	N = 72	Based on a random list, children were split into ventriloquist and control groups, then the test group was exposed to male and female puppets before they undergo their surgery.	N/R	Pain, anxiety, and fear	During the surgery, both groups experienced fear, pain, and anxiety. Nevertheless, these emotions were less strong in the ventriloquist group. The same result applies to post-surgery period ($p < 0.05$).	Ventriloquist intervention, integrated with drama techniques, is advised to be used with children to reduce their fear, pain, and anxiety.
Wang et al. (2024)	4–8 years children Turkey	Within participant design using self-report questions	N1 = 70 N2 = 73 N3 = 30	Allowing children to watch two puppet videos on a laptop one representing a prosocial puppet and the another represents an antisocial puppet. Then, children's emotions, concerns, judgements, and behaviors toward both puppets are elicited using 5-point cartoon scale.	Emotional Selectivity Theory	Emotional reactions	Children felt sad after watching the pain of prosocial and antisocial puppets, but they sympathized less with antisocial ones. Second, they were happy with the pleasure of both, but they felt less happy with the antisocial ones. Third, they did not feel happy at others' pain, nor did they feel sad at others' pleasure. This applies for both types of puppets.	Future studies should investigate children's emotional responses to antisocial and prosocial behaviors using people or real-life scenarios instead of video puppets. To validate the study findings, further research may examine emotional responses using facial expression coding or psychological measurements instead of self-report questions.

Abbreviations

PCBP: Pre-school Children behavioral problems

ASQ-3: Ages-Stages Questionnaire – third edition

OMIS: Opinions About Mental Illness Scale

PUP-ED: Puppet-preparation phase, understanding the learner, play in action, evaluation, and debrief.

DV: Domestic Violence

RS: Resourcefulness scale

MOF: medical operations fears

FLACC: Face, Legs, Activity, Cry, Consolability scale.

CEM: Emotional manifestation scale

WBFP: Wong-Baker Faces Pain Rating Scale

CF: Children's fear scale

N/R: Not reported

Educational and behavioral interventions

Four studies (Aminimanesh et al., 2019; Burarak, 2021; McLachlan et al., 2009; Zavariani et al., 2023) used puppet shows to improve children's social behaviors and reduce aggression and anxiety.

Healthcare and anxiety reduction

Eleven studies (Bayar et al., 2024; Ceylan & Erkut, 2023; Kurt & Seval, 2021; Metlek & Çağlar, 2024; Oluç & Sarialioğlu, 2023; Rajesh & Jasline, 2022; Roshanzadeh et al., 2020; Suzan et al., 2020; Topan & Sahin, 2019; Tuncay & Sarman, 2024; Yaz et al., 2024). These interventions demonstrated that puppet shows reduced children's pre-surgical anxiety and pain and were effective in pediatric healthcare settings to improve communication and alleviate fear.

Training and professional development

Two studies (Domek et al., 2020; Ingraham et al., 2019) utilized puppets for caregiver and physician training, showing improvements in language development and clinical preparedness.

Emotional and psychological development

Six studies (Beauregard et al., 2024; Butler et al., 2009; Lestari et al., 2022; Page et al., 2022; Segal et al., 2024; Van der Hoeven et al., 2021) used puppets to address emotional needs in children in domestic violence.

Training and professional development

Four studies (Domek et al., 2020; Ingraham et al., 2019; Reid-Searl et al., 2017; Ward-Miller et al., 2019). These studies have shown to foster child language development, highlighting their value in early education settings, improved physicians' preparedness to address non-suicidal self-injury, provided a practical tool for clinical education, and improved resourcefulness among women with self-injurious behavior and building their therapeutic skills, respectively.

Type of theoretical framework

The scoping review of 30 studies on puppet-based interventions revealed that 14 studies utilized explicit theoretical frameworks. These frameworks guided the design and interpretation of the research, reflecting the diverse applications of puppetry in different contexts.

Social Learning Theory was used by Aminimanesh et al. (2019) and Page et al. (2022) to explore how behaviors are learned through observation and modeling. Narrative Therapy, employed by Butler et al. (2009), helped clients externalize and reframe their problems using puppets in therapeutic settings. Attachment Theory was applied by Domek et al. (2020) to enhance language development through caregiver-child interactions. Stigma and Social Identity Theory guided Gaiha et al. (2023) in reducing mental health-related stigma through creative expressions. Communication Framework was utilized by Burarak (2021) to address school violence through participatory puppet activities. Emotional Learning Theory, used by McLachlan et al. (2009), focused on emotional recognition and management in educational settings.

Empowerment Theory and Positive Emotions, Engagement, Relationships, Meaning, and Achievement (PERMA), explored by Moula (2021), promoted well-being and emotional expression among children through creative arts. Desistance Theory, investigated by Page et al. (2022), examined the role of arts in promoting behavioral change among prisoners. Social Cognitive Theory was used by Zavariani et al. (2023) to enhance social competence through virtual puppetry.

Attribution Theory, employed by Pitre et al. (2007), addressed stigmatizing attitudes towards mental illness using puppet interventions. Emotional Security Theory, applied by Van der Hoeven et al. (2021), focused on restoring emotional security in children exposed to domestic violence. Resourcefulness Theory, explored by Ward-Miller et al. (2019), used puppetry to build coping skills in women

with self-injurious behavior.

The PUP-ED (KRS) Framework (Puppet-preparation phase, understanding the learner, play in action, evaluation, and debrief) described by Reid-Searl et al. (2017), structured the use of puppets in educational and therapeutic settings. Finally, Emotional Selectivity Theory, utilized by Wang et al. (2024), examined children's emotional responses to prosocial and antisocial puppet characters.

Methodology of included studies

The methodologies used in the 30 studies reviewed spanned a wide range of experimental, quasi-experimental, and qualitative approaches.

Randomized Controlled Trials (RCTs) were the most frequently used methodology, appearing in 11 of the studies. RCTs, known for their ability to minimize bias and establish causal relationships, were utilized in studies such as Ceylan and Erkut (2023), Kurt and Seval (2021), Yaz et al. (2024), Suzan et al. (2020), Metlek and Çağlar (2024), Oluç and Sarialioğlu (2023), Bayar et al. (2024), Kostak et al. (2021), Tuncay and Sarman (2024), Moula (2021), and Roshanzadeh et al. (2020). These studies employed RCTs to assess the effectiveness of various puppetry interventions in clinical and educational settings, focusing on outcomes such as pain management, anxiety reduction, and emotional well-being.

A total of nine studies employed different control groups to compare intervention outcomes. These included:

Standard Care Control: Two studies (Aminimanesh et al., 2019; Roshanzadeh et al., 2020) used the standard care control group providing participants routine care or baseline interventions to serve as a comparator for the experimental intervention.

Waitlist Control: Suzan et al. (2020) assessed the effects of puppet shows in reducing children's anxiety and pain compared to a waitlist group, allowing for a temporal comparison.

Active Comparator: Three studies (Rajesh & Jasline, 2022; Topan & Sahin, 2019; Zavariani et al., 2023) provided participants in the control group with an alternative intervention to compare its effectiveness with the puppet-based intervention. In some studies, control groups participated in alternative interventions, such as animation-based interventions or standard educational sessions, to evaluate relative effectiveness (Zavariani et al., 2023).

No-Intervention Control: A few studies (Bayar et al., 2024; Ceylan & Erkut, 2023; Kurt & Seval, 2021) employed control groups with no intervention, serving as a baseline for assessing the impact of the experimental approach.

Quasi-experimental designs were employed in three studies, offering a methodological alternative when random assignment was not feasible. These designs were used by Lestari et al. (2022), Topan and Sahin (2019), and Zavariani et al. (2023), allowing researchers to examine the effects of puppetry interventions while accounting for potential confounding variables. These studies focused on outcomes such as anxiety reduction in the elderly during the COVID-19 pandemic, reducing fears of medical procedures in children, and enhancing social competence through virtual puppetry training.

Pre-Post-Test Design were employed in five studies utilized pre- and post-test designs, which measure changes in outcomes before and after an intervention but do not include a control group. Aminimanesh et al. (2019), Rajesh and Jasline (2022), Pitre et al. (2007), McLachlan et al. (2009), and Segal et al. (2024) employed this approach to assess the impact of puppetry on behavioral problems, anxiety reduction, stigmatizing attitudes, emotional recognition, and mental health stigma, respectively.

Pilot studies, conducted in four of the reviewed studies, served as preliminary investigations to test the feasibility and initial effectiveness of puppetry interventions. Domek et al. (2020), Gaiha et al. (2023), Ingraham et al. (2019), and Page et al. (2022) conducted pilot studies to explore the use of puppetry in early childhood development, mental health festivals, physician training, and arts-based interventions with prisoners. These studies provided valuable insights that could inform

larger-scale research.

Single case studies were employed in three studies to conduct in-depth qualitative investigations of puppetry interventions. [Beauregard et al. \(2024\)](#), [Butler et al. \(2009\)](#), and [Reid-Searl et al. \(2017\)](#) used this approach to explore the experiences of individuals or small groups, providing detailed narratives on the integration of puppetry in therapeutic and educational settings.

Participatory Action Research (PAR) was used in one study by [Burarak \(2021\)](#). This approach involved collaboration between researchers and participants to identify issues, develop interventions, and implement changes. The study focused on reducing school violence behavior in early adolescence through folk puppet theater, highlighting the active role of participants in the research process.

Finally, three studies employed interventional designs without using RCTs. These studies, conducted by [Van der Hoeven et al. \(2021\)](#), [Ward-Miller et al. \(2019\)](#), and [Wang et al. \(2024\)](#), implemented puppetry interventions and observed their effects in settings such as domestic violence shelters, therapy for women who self-injure, and children's emotional responses to pain and pleasure.

Types of interventions

Studies were classified based on intervention type, revealing a diverse range of approaches to using puppetry in various contexts. These approaches include standalone, multi-component, multimodal, therapeutic, and educational and training interventions.

Standalone Puppetry Interventions. Six studies utilized puppetry as the primary and sole method of intervention. These studies focused on the direct application of puppetry without integrating other therapeutic or educational methods. [Aminimanesh et al. \(2019\)](#) examined the effectiveness of puppet shows and storytelling on children's behavioral problems, while [Butler et al. \(2009\)](#) used puppetry within narrative therapy to help children externalize their problems. [Rajesh and Jasline \(2022\)](#) evaluated the impact of puppet play on reducing anxiety among hospitalized children, and [Suzan et al. \(2020\)](#) explored the effect of puppet shows on reducing anxiety and pain levels in children undergoing circumcision. [Roshanzadeh et al. \(2020\)](#) investigated children's anxiety in surgical waiting rooms after watching puppet shows, and [Topan and Sahin \(2019\)](#) assessed the efficiency of puppet shows in alleviating fears of medical procedures among school-aged children.

Multicomponent-Based Interventions. Six studies integrated puppetry as one component within a broader set of interventions, each designed to address various aspects of a problem. Multicomponent interventions consist of several distinct components, each designed to address different aspects of a problem or contribute to an overall goal. These components may or may not involve different sensory modalities but are distinct parts of the intervention. [Beauregard et al. \(2024\)](#) integrated puppetry into a creative expression program that included art and storytelling, aimed at supporting immigrant and refugee children. While [Gaiha et al. \(2023\)](#) combined puppetry with other forms of art and performance during a youth creative expression festival to address mental health issues. [Page et al. \(2022\)](#) examined male prisoners' experiences with drama, dance, singing, and puppetry as part of a multi-component arts-based intervention. Similarly, [Moula \(2021\)](#) included puppetry as part of a multicomponent arts therapy intervention to promote children's well-being. [Reid-Searl et al. \(2017\)](#) used puppetry as one component of an educational intervention in an acute pediatric unit, alongside other teaching methods. [Segal et al. \(2024\)](#) combined puppetry with other creative modalities such as drama, music, and visual arts to address mental health stigma and emotional resilience among refugees.

Multi-Modal Interventions. Eight studies employed multi-modal interventions, which used puppetry in conjunction with other sensory modalities, enhancing the effectiveness of the intervention. [Tuncay and Sarman \(2024\)](#) utilized ventriloquism and puppetry combined with drama techniques to manage pain, anxiety, and fear in children during

invasive procedures. [Yaz et al. \(2024\)](#) combined puppetry with vibrating cold application to reduce pain and fear during phlebotomy in children, while [Oluç and Sarıaloğlu \(2023\)](#) integrated hand puppetry with therapeutic play to address fear and pain during blood collection in preschool children. [Bayar et al. \(2024\)](#) used finger puppets alongside distraction cards and kaleidoscopes to reduce anxiety in children undergoing day surgery. Additionally, [McLachlan et al. \(2009\)](#) incorporated puppetry into a program that included various sensory activities to promote emotional health by teaching children to recognize and express emotions. [Ceylan and Erkut \(2023\)](#) used finger puppets combined with other techniques to manage pain and emotional distress during venous blood collection in children, and [Kurt and Seval \(2021\)](#) employed finger puppets to manage postoperative pain in children.

Therapeutic Interventions. Four studies incorporated puppetry within therapeutic contexts aimed at addressing psychological, emotional, or behavioral issues. [Ward-Miller et al. \(2019\)](#) used puppetry as a tool to teach resourcefulness skills to women who self-injure. [Van der Hoeven et al. \(2021\)](#) employed a hand puppet in a program for young children in domestic violence shelters to facilitate emotional expression and communication. [Lestari et al. \(2022\)](#) utilized *Wayang Kulit* (a traditional form of shadow puppets originally found in the cultures of Indonesia) video media as part of laughter therapy to reduce elderly anxiety during the COVID-19 pandemic. [Metlek and Çağlar \(2024\)](#) integrated therapeutic play and puppetry to reduce pain and anxiety in children during circumcision.

Educational and Training Interventions. Four studies used puppetry as an educational or training tool, often within learning or healthcare contexts. [Ingraham et al. \(2019\)](#) employed digital puppetry to prepare physicians for addressing non-suicidal self-injury among teens as part of a training program. [Domek et al. \(2020\)](#) used finger puppets to support caregivers in communicating with infants, focusing on enhancing early childhood development. [Reid-Searl et al. \(2017\)](#) integrated puppetry into an educational program for nurses working in pediatric settings, combining it with other teaching methods. Finally, [Zavariani et al. \(2023\)](#) implemented puppetry as part of a virtual training program aimed at enhancing social competence and managing behavioral challenges in children.

Interventions outcomes

The interventions investigated across the 30 articles revealed diverse and nuanced outcomes. These studies have been categorized based on the level of success in achieving their intended outcomes. Interventions were categorized as *highly successful* if they showed statistically significant or consistent, meaningful improvements. *Moderate success* indicated positive trends or partial improvements without consistent statistical significance. *Limited success* referred to minimal or localized benefits with no broader applicability.

Highly successful outcomes

Several studies demonstrated significant positive outcomes in reducing anxiety, managing pain, and enhancing social-emotional skills among children and other populations. For instance, [Aminimanesh et al. \(2019\)](#) found that puppet shows demonstrated effectiveness in reducing aggression and fostering pro-social behaviors among children. Similarly, [Bayar et al. \(2024\)](#) conducted a pre-and post-test study in Turkey, which found that finger puppets and distraction cards significantly reduced anxiety in children aged 6–12 years undergoing surgery. In a single case study by [Beauregard et al. \(2024\)](#), an art-based school intervention integrating puppetry helped a 7-year-old Syrian refugee in Canada regain a sense of agency and emotional stability. Another study by [Ceylan and Erkut \(2023\)](#) in Turkey demonstrated that finger puppets effectively reduced pain and emotional responses in children undergoing surgery. [Kurt and Seval \(2021\)](#) showed that finger puppet plays significantly reduced fears and postoperative pain in children aged 1–5 years in a RCT in Turkey, while [McLachlan et al. \(2009\)](#) found that

puppetry and motion locomotion programs significantly improved emotional regulation and social skills in students aged 6–8 years in the USA. [Roshanzadeh et al. \(2020\)](#) also reported that puppet shows before surgery significantly reduced anxiety in children compared to animation in a clinical trial in Iran. Additionally, [Suzan et al. \(2020\)](#) demonstrated that puppet shows during surgery significantly reduced pain and anxiety in children aged 7–11 years in Turkey, and [Tuncay and Sarman \(2024\)](#) found that ventriloquist puppet shows significantly reduced pain, anxiety, and fear in children aged 5–10 years undergoing surgery in Turkey. Finally, [Yaz et al. \(2024\)](#) found that puppet shows significantly reduced pain and fear in children aged 3–6 years during phlebotomy in a randomized controlled study in Turkey, and [Moula \(2021\)](#) highlighted the effectiveness of creative arts, including puppetry, in improving children's emotional and behavioral well-being in primary schools in Iran.

Moderate success

Several studies reported positive outcomes, although with certain limitations. [Butler et al. \(2009\)](#) conducted a study in the USA where narrative therapy using puppets effectively managed aggressive behavior in an 8-year-old boy, though the study was limited by its single-case design. [Domek et al. \(2020\)](#) found that training caregivers to use finger puppets showed positive feedback on satisfaction, but the effectiveness in reducing children's anxiety was unclear. [Gaiha et al. \(2023\)](#) demonstrated that arts-based interventions, including puppetry, were moderately effective in reducing mental health stigma among college students in India. In the USA, [Ingraham et al. \(2019\)](#) found that digital puppetry in a simulated training environment effectively enhanced primary care providers' preparedness, though the effects were moderate. [Rajesh and Jasline \(2022\)](#) conducted a pre-and post-test study in India, which showed that puppet plays effectively reduced anxiety among hospitalized children, though the sample size was relatively small. In Australia, [Reid-Searl et al. \(2017\)](#) found that training nurses to use puppets in pediatric care was positively received, though the impact on clinical practice varied. Lastly, [Segal et al. \(2024\)](#) utilized puppet shows as part of an arts-based intervention for refugees, showing improvement in engagement but inconsistent effects on emotional stability, and [Suzan et al. \(2020\)](#) reported that puppet shows were effective in reducing pain and anxiety during surgery in Turkey, though the long-term impact on anxiety reduction was not fully established.

Mixed results

Some studies reported both positive and less effective outcomes, indicating that while the interventions had some benefits, they were not consistently effective across all measures. [Van der Hoeven et al. \(2021\)](#) implemented a therapeutic play program using hand puppets in domestic violence shelters, showing some improvement in emotional expression but limited impact on reducing anxiety. [Lestari et al. \(2022\)](#) conducted a quasi-experimental study in Indonesia that used laughter therapy with shadow puppets to reduce anxiety among elderly participants, but the results were not consistent across all participants. In Turkey, [Metlek and Çağlar \(2024\)](#) found that therapeutic play with playdough before and after circumcision had mixed success in reducing anxiety in children and their mothers. [Oluç and Sarialioğlu \(2023\)](#) conducted a randomized controlled experiment in Turkey that showed therapeutic play using hand puppets had mixed impacts on fear and pain reduction in children undergoing surgery. [Page et al. \(2022\)](#) utilized art-based prison projects, including puppetry, to enhance the mental health of prisoners, showing some positive engagement but inconsistent improvements in mental health outcomes. [Segal et al. \(2024\)](#) also reported mixed results when using puppet shows as part of an arts-based intervention for refugees, showing some improvement in engagement but inconsistent effects on emotional stability. [Ward-Miller et al. \(2019\)](#) implemented a psychoeducation program using puppets to teach resourcefulness skills to women with self-injurious behavior, with mixed results in terms of skill acquisition and retention. [Zavariani et al. \(2023\)](#) implemented a 30-session puppet show training program in Iran, which

showed mixed outcomes with only marginal improvements in social skills and behavior.

Limited success

Lastly, a few studies reported minimal or limited success, indicating that the interventions had little impact or that the study design limited the ability to observe significant outcomes. [Beauregard et al. \(2024\)](#) found that although the intervention showed positive outcomes in a single case study of a Syrian refugee, the impact was limited by the study's scope and generalizability. [Pitre et al. \(2007\)](#) focused on reducing mental health stigma in Canada using arts-based interventions, including puppetry, which showed limited success due to inconsistent participation and engagement. [Suzan et al. \(2020\)](#) reported that while puppet shows were effective during surgery in Turkey, the long-term impact was limited, highlighting the need for additional follow-up studies. Lastly, [Topan and Sahin \(2019\)](#) found that puppetry was somewhat effective in reducing anxiety and fear in children in Turkey, but the intervention had limited success in older age groups.

Discussion

This scoping review explored the diverse applications and outcomes of puppetry-based interventions across various populations and settings, revealing the significant potential of this creative tool in addressing a range of emotional, psychological, and social challenges. The studies reviewed employed a variety of methodologies, including experimental, quasi-experimental, pilot, and qualitative intervention designs, each contributing unique insights into the effectiveness and limitations of puppetry as a mental health-focused intervention.

The use of puppetry has emerged as a versatile intervention, producing significant positive mental health outcomes across different age groups—from children and adolescents to adults and the elderly—and in various contexts, including healthcare, education, and therapeutic settings. High success was reported in studies such as those by [Aminimanesh et al. \(2019\)](#) and [Rajesh and Jasline \(2022\)](#), where puppetry interventions significantly improved behavioral outcomes and reduced anxiety among children. These findings align with existing literature highlighting the effectiveness of puppetry in enhancing social-emotional learning and reducing anxiety in young children ([Díaz-Rodríguez et al., 2021](#); [Komang et al., 2024](#)). Similarly, [Lestari et al. \(2022\)](#) reported significant reductions in anxiety among elderly participants through laughter therapy using puppets, supporting broader evidence that creative interventions can be particularly effective in geriatric care ([Galassi et al., 2022](#)).

In educational settings, puppetry enhanced language development and emotional recognition and reduced stigma associated with mental illness, as demonstrated by studies such as [Domek et al. \(2020\)](#) and [Pitre et al. \(2007\)](#). These results are consistent with research suggesting that puppetry can be a powerful pedagogical tool, particularly in early childhood education ([Kröger & Nupponen, 2019](#); [Timmins & King, 2024](#)). The mixed-methods study by [Gaiha et al. \(2023\)](#) further demonstrated the potential of puppetry to reduce mental health stigma among college students, reflecting the growing interest in creative arts-based interventions to address complex psychosocial issues ([Nathan et al., 2023](#)).

The studies achieving highly successful outcomes often shared several common characteristics that contributed to their effectiveness. The review highlights diverse methodological approaches, with some studies employing pre-post designs and others using randomized controlled trials. For instance, [Aminimanesh et al. \(2019\)](#) and [Suzan et al. \(2020\)](#) designed interventions that directly addressed children's specific anxieties and behavioral issues using engaging, age-appropriate puppet shows. The success of these studies can also be attributed to their use of RCTs, which provided robust evidence of effectiveness. Moreover, the settings of these interventions, often clinical or educational environments with structured and supportive frameworks, allowed for the

consistent application of the intervention, further contributing to their success. Positive outcomes in studies such as those by [Roshanzadeh et al. \(2020\)](#) and [Tuncay and Sarman \(2024\)](#) highlight the importance of integrating puppets with other therapeutic practices, such as pain management protocols, which enhanced the overall impact of the interventions.

Interventions that showed moderate success often faced challenges related to their implementation or the populations they targeted. While these studies generally reported positive outcomes, the effects were not as pronounced or consistent as in the highly successful cases. For example, [Butler et al. \(2009\)](#) and [Gaiha et al. \(2023\)](#) implemented contextually relevant interventions but faced limitations due to small sample sizes or the complexity of the issues being addressed. In some cases, the interventions may have been beneficial but were not comprehensive enough to produce significant changes across all measured outcomes. The moderate success of these studies suggests that while puppetry can be an effective tool, its impact may be enhanced by combining it with other interventions or by tailoring it more precisely to the population's needs.

Studies reporting mixed results highlight the challenges of applying puppetry-based interventions across diverse populations and settings. These studies often showed that while some participants benefited from the intervention, others did not experience significant improvements. For instance, [Van der Hoeven et al. \(2021\)](#) and [Lestari et al. \(2022\)](#) found that while puppetry helped some individuals express emotions or reduce anxiety, the results were inconsistent across all participants. This inconsistency could be due to several factors, including cultural differences, the varying receptiveness of participants to the intervention, or the specific way the intervention was implemented.

The studies that achieved limited success provide essential insights into the challenges associated with puppetry-based interventions. These interventions often faced difficulties related to the scale of implementation, participant engagement, or a lack of alignment with contextual factors that influence their effectiveness. For example, [Beauregard et al. \(2024\)](#) and [Pitre et al. \(2007\)](#) conducted innovative interventions, but their small scale and challenges in maintaining consistent participant engagement limited their impact. Similarly, interventions such as those by [Suzan et al. \(2020\)](#) and [Topan and Sahin \(2019\)](#) showed short-term benefits but lacked sustained follow-up, which may have reduced their long-term effectiveness. These findings suggest that the success of puppetry-based interventions depends not only on their design and implementation but also on their ability to address the specific needs and contexts of the populations they serve. Moreover, the absence of long-term engagement highlights the importance of incorporating follow-up strategies to maintain the benefits of these interventions over time. This underscores the need for comprehensive approaches that include thoughtful intervention design, long-term evaluation, and a deeper understanding of how puppetry influences behavior and emotional well-being.

One of the significant limitations contributing to mixed and limited outcomes was the small sample size in many studies, which constrained the generalizability of findings. For example, studies such as [Domek et al. \(2020\)](#) and [Lestari et al. \(2022\)](#) involved relatively small cohorts, reducing statistical power and raising concerns about the broader applicability of results. This issue is common in creative and therapeutic intervention research, where logistical constraints often limit sample sizes ([Rickson & McFerran, 2014](#)). However, the insights gleaned from smaller-scale studies remain valuable, especially in exploring innovative approaches like puppetry-based interventions.

Another challenge was the reliance on qualitative methods and subjective measures in some studies, such as [Van der Hoeven et al. \(2021\)](#) and [Burarak \(2021\)](#), which relied on participant feedback to assess outcomes. While qualitative methods provide essential insights into participants' subjective experiences and contextual factors, their findings are not typically generalizable, and variations in participant perceptions can influence results. This highlights the importance of

combining qualitative methods with quantitative approaches to achieve a more balanced understanding of intervention outcomes. Far from being a limitation, the complementary use of qualitative methods enriches the evidence base by capturing the nuanced, lived experiences that quantitative data alone may overlook ([Creswell & Poth, 2024](#)).

The design and methodology of several studies also posed challenges. For instance, the absence of control groups in studies such as [Zavariani et al. \(2023\)](#) and [Page et al. \(2022\)](#) limited the ability to definitively attribute observed outcomes to the intervention. Single-case study designs, while providing in-depth insights, lacked the broader applicability needed for general conclusions, as seen in [Butler et al. \(2009\)](#) and [Beauregard et al. \(2024\)](#). In contrast, experimental and quasi-experimental designs offered stronger evidence of effectiveness. For example, [Rajesh and Jasline \(2022\)](#) and [Suzan et al. \(2020\)](#) used randomized controlled trials (RCTs) to demonstrate the impact of puppetry-based interventions on reducing anxiety, providing robust data to support these approaches.

The use of mixed-methods approaches in studies such as [Page et al. \(2022\)](#) and [Gaiha et al. \(2023\)](#) was particularly effective in capturing both measurable outcomes and participants' subjective experiences. By combining quantitative and qualitative data, these studies offered a comprehensive understanding of the interventions, illustrating how methodological diversity can strengthen creative arts research. Mixed-methods approaches allow researchers to assess both the efficacy of the intervention and the nuanced ways in which participants engage with and benefit from it, making them a valuable tool for future studies.

Strength and limitations of included studies

The diversity of frameworks, ranging from Social Learning Theory to Emotional Security Theory, provides a comprehensive understanding of issues such as behavioral problems, emotional expression, and stigma reduction. This theoretical variety allows researchers to tailor interventions to specific populations, enhancing their relevance and effectiveness. These frameworks were applied across various settings, including schools, healthcare facilities, and prisons, demonstrating puppetry's versatility in addressing a wide range of social, emotional, and psychological issues. Additionally, frameworks such as PUP-ED (KRS) and Empowerment Theory offer structured approaches to intervention design and implementation, ensuring consistency and replicability in puppet-based interventions.

While the use of theoretical frameworks is commendable as it adds rigor and structure to the research, there are some critiques to consider. First, not all studies explicitly mentioned their theoretical underpinnings, which can lead to ambiguity in understanding the mechanisms behind the interventions. The absence of guiding theories in some studies may limit the depth of analysis and understanding of the interventions' impact. Additionally, there is an over-reliance on familiar theories, such as Social Learning Theory, which may restrict the exploration of new perspectives and narrow the understanding of puppet-based interventions. Most studies also relied on a single theoretical framework, limiting the opportunity for cross-theory integration that could provide a more holistic analysis, such as combining Social Cognitive Theory with Emotional Learning Theory. The depth of theoretical engagement varies significantly, with some studies offering detailed guidance while others merely mention a framework without thorough integration, potentially weakening the theoretical foundation. Furthermore, challenges in applying and measuring constructs such as "empowerment" or "emotional security," especially when relying on self-reported measures or qualitative feedback, may complicate the accurate assessment of the interventions' true impact. For example, [Beauregard et al. \(2024\)](#) and [Segal et al. \(2024\)](#) likely utilized relevant theories in their trauma and social work-focused interventions, but these were not explicitly stated in the references provided, potentially weakening the studies' conceptual foundations. Furthermore, some studies, such as [Suzan et al. \(2020\)](#), seem to imply the use of frameworks such as

Cognitive Behavioral Therapy, but without clear articulation, theoretical application remains speculative.

As a delimitation for this review, it is important to note that studies involving chronic or acute conditions and developmental disabilities were excluded. This review excluded studies involving chronic, acute, or developmental conditions, such as autism spectrum disorders, to focus on puppetry interventions for general mental well-being. While this aligns with the scope of the current review, it limits the applicability of our findings to broader therapeutic contexts. We acknowledge the wealth of research on puppetry's role in supporting individuals with specific conditions, as detailed in a complementary scoping review currently under review. Together, these reviews aim to provide a comprehensive understanding of puppetry's applications in both general and condition-specific contexts.

Implications for practice and future research

The findings from this scoping review underscore the significant potential of puppetry-based interventions in therapeutic, educational, and clinical settings while also highlighting important considerations for future research and practice. These results have multifaceted implications, addressing the design and implementation of interventions, the importance of context, and the need for further research to strengthen the evidence base.

The review revealed that well-designed puppetry-based interventions, particularly those using RCTs and tailored to the specific needs of the target population, consistently produced the most favorable outcomes. This suggests that careful attention to the design of puppetry interventions, including selecting appropriate methodologies, clear objectives, and using control groups, is critical to their success. Practitioners and researchers should prioritize these elements to maximize the effectiveness of interventions. Furthermore, the findings highlight the importance of integrating puppetry with other therapeutic practices, such as pain management protocols or educational curricula, to enhance the overall impact. This integration supports the therapeutic goals and helps create a more holistic approach to treatment and education.

Interventions using participant-created puppets, common in art therapy, foster self-expression and emotional exploration, making them ideal for building personal insight. In contrast, pre-made puppets, often used in play and drama therapy, facilitate immediate role-play, storytelling, and social interaction. Practitioners should align the choice of puppet style with intervention goals, integrating both approaches when appropriate to balance personal creativity with structured engagement. This distinction allows for more targeted and effective use of puppetry-based interventions.

Contextual considerations are another important issue. The mixed and limited success of some studies points to the critical role of context in the effectiveness of puppetry-based interventions. Cultural differences, the specific population characteristics, and the setting in which the intervention is implemented can all significantly influence outcomes. For instance, highly successful interventions in clinical or educational environments with structured support may not be as effective in less controlled or resource-limited settings. This suggests that practitioners should be mindful of the context when designing and implementing puppetry-based interventions, adapting them to the cultural and environmental conditions of the population they aim to serve. This also includes considering participants' receptiveness to the intervention and ensuring that the delivery of the intervention is culturally sensitive and appropriate. The review highlights several methodological limitations in the current body of literature, such as small sample sizes, lack of control groups, and reliance on qualitative methods. These limitations reduce the generalizability and robustness of the findings, making it difficult to draw definitive conclusions about the effectiveness of puppetry-based interventions across different settings and populations. Therefore, there is a pressing need for more rigorous research, including large-scale RCTs, to establish stronger evidence for the

efficacy of these interventions. Future studies should also incorporate long-term follow-up to assess the sustained impact of puppetry-based interventions, which are currently underexplored. By addressing these gaps, researchers can contribute to a more comprehensive understanding of how puppetry can be effectively utilized in diverse contexts.

The effectiveness of puppetry-based interventions in reducing anxiety, managing pain, and enhancing social-emotional skills suggests that these interventions could be widely adopted in various settings, including schools, hospitals, and community centers. Policymakers and practitioners should consider incorporating puppetry into existing therapeutic and educational programs, particularly those aimed at children, adolescents, and vulnerable populations. Additionally, the review suggests there is value in developing standardized protocols for puppetry-based interventions to ensure consistency and quality in their application. These protocols could be used to train practitioners, educators, and therapists, thereby expanding the reach and impact of these interventions.

The review also raises important considerations regarding equity and access to puppetry-based interventions. While these interventions have shown promise, their effectiveness may be limited in under-resourced settings where access to training, materials, and support is constrained. To address this, efforts should ensure these interventions are accessible to all populations, regardless of socio-economic status or geographic location. This might involve the development of low-cost or easily replicable puppetry programs and initiatives to train local practitioners in delivering these interventions. Additionally, policymakers should consider funding and supporting research and programs to bring puppetry-based interventions to minoritized, marginalized, and underserved groups and communities.

The use of puppetry-based interventions, particularly in vulnerable populations such as children, displaced populations, refugees, and individuals with mental health issues, necessitates careful ethical consideration. Practitioners must ensure that these interventions are delivered in a manner that respects participants' dignity, autonomy, and well-being. This includes obtaining informed consent, ensuring confidentiality, and being sensitive to participants' emotional and psychological needs. Additionally, the potential power dynamics between the facilitator and participants should be carefully managed to avoid any form of coercion or undue influence.

The implications of this review point towards several future directions for research and practice. First, there is a need to explore the use of puppetry-based interventions in new and diverse populations, such as adults with chronic conditions or communities affected by trauma. Second, integrating technology with puppetry, such as digital puppetry or virtual reality, presents a promising avenue for innovation in this field. Finally, interdisciplinary collaborations between researchers, practitioners, and artists could lead to developing more creative and effective puppetry-based interventions, expanding their applicability and impact.

Reflection on interventionists

A critical gap identified in this review is the lack of detailed reporting on the qualifications and roles of interventionists conducting puppetry-based interventions. Few studies specified whether the interventions were delivered by mental health professionals, educators, artists, or other facilitators. This absence of information limits the understanding of how the expertise and training of interventionists influence the design, delivery, and outcomes of puppetry-based interventions.

The professional background of facilitators is particularly significant in clinical contexts, where ethical considerations such as maintaining therapeutic boundaries and managing participant vulnerabilities are paramount. For example, interventions led by mental health professionals may prioritize psychological well-being, while those conducted by educators or artists might focus on creative expression or skill development. Future studies should explicitly report on the roles and

qualifications of interventionists to explore how these factors shape the intervention process and outcomes. Additionally, this focus could guide the development of standardized training and ethical guidelines for implementing puppetry-based interventions in clinical and non-clinical settings.

Conclusion and implications

Future research should investigate the influence of specific puppetry styles, particularly folk or culturally significant forms, on intervention efficacy. Understanding how cultural narratives and aesthetics contribute to therapeutic outcomes could inform the design of more contextually relevant interventions. Moreover, systematically examining the qualifications and roles of interventionists is essential for developing best practices, particularly when implementing puppetry in clinical and therapeutic contexts. By addressing these gaps, researchers can enhance the evidence base and ensure the ethical and effective application of puppetry-based interventions.

While puppetry-based interventions show considerable promise across various settings and populations, their effectiveness can vary significantly depending on the design, implementation, and contextual factors. To maximize the impact of these interventions, future research should address these limitations by employing more different rigorous methodologies, theories, control groups, increasing sample sizes, and incorporating long-term follow-up to better understand the sustained effects of puppetry-based interventions.

Compliance with Ethical Standards

Given the nature of this review, no ethical oversight was found to be necessary and, therefore, no institutional review board was acquired.

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CRedit authorship contribution statement

Wahiba Abu-Ras: Writing – review & editing, Writing – original draft, Supervision, Software, Resources, Project administration, Formal analysis, Data curation. **Basil H. Aboul-Enein:** Writing – review & editing, Writing – original draft, Supervision, Software, Resources, Project administration, Methodology, Data curation, Conceptualization. **Ahmed Al-Kubaisi:** Writing – review & editing, Writing – original draft, Software, Resources, Formal analysis, Data curation. **Leena Babiker Idris:** Writing – review & editing, Writing – original draft, Supervision.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.aip.2025.102251](https://doi.org/10.1016/j.aip.2025.102251).

Data availability

No data was used for the research described in the article.

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Two ways to measure interpersonal synchrony in dance/movement therapy: Comparing accelerometer data with observational data

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ABSTRACT

Moving in synchrony with others is associated with heightened social engagement and cooperation between individuals. Creative arts-based approaches such as dance/movement therapy (DMT) incorporate nonverbal techniques to develop interpersonal synchrony and group cohesion, and to enhance kinesthetic empathy. While DMT commonly uses Laban Movement Analysis (LMA), an analytical assessment system to observe and interpret movement, it is subject to personal bias and observer fatigue. Therefore, our goal was to explore the utility of the accelerometer to objectively measure rhythmic synchrony (RS) and spatial synchrony (SS) with 14 middle school students during 10 weekly group DMT sessions and to examine changes in mean scores for RS and SS over three time points. A wrist-worn accelerometer and Laban Movement Analysis (LMA), were used to measure RS and SS between individuals in each group. Biometric and observational data were compared to observe trends between both data sets. Participants' subjective experiences of wearing the device during movement were also investigated. Although no statistical significance was found in IS scores across groups, in comparing the two data sets, overall biometric scores of RS increased marginally between the three time points, and overall observational scores notably increased between T1 and T2 and decreased between T2 and T3. Group 2 demonstrated similar upward trends in both data sets. This study is the first to investigate the useability of the accelerometer to measure interpersonal synchrony in DMT. Although the findings are encouraging, further investigation is needed to provide definitive information on the usefulness of the accelerometer in this context. Limitations and suggestions for future research are included.

Introduction

The ability to read and match other people's feelings and nonverbal

cues is an important social skill and a common treatment goal in dance/movement therapy (DMT). By definition, DMT is the "psychotherapeutic use of movement to promote emotional, social, cognitive, and physical

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integration of the individual, for the purpose of improving health and well-being" (American Dance Therapy Association, 2020). Dance movement therapists use nonverbal techniques such as rhythmic movement and mirroring to develop interpersonal synchrony (IS) and group cohesion with clients in both individual and group therapy settings. Mirroring is a commonly used practice in DMT and can be defined as joining and responding empathically to another's "total movement experience, i.e., patterns, qualities, emotional tone, etc." (Sandel, 1993, p. 100). An important aspect of the mirroring technique is the reflection of the quality of the movement rather than the exact imitation or mimicking of the movement (Mastrominico et al., 2018). This practice is used by dance/movement therapists to develop empathic relationships with clients and has been a core concept since the inception of DMT (Fischman, 2009).

Interpersonal synchrony is generally defined as the extemporaneous rhythmic and temporal harmonization of feelings, thoughts, and physiological processes between two or more individuals (Bargh & Ackerman, 2010; Mayo & Gordon, 2020; Palumbo et al., 2017). This term has been variously described and operationalized in the DMT literature over the years. Brown and Avstreich (1989)/(2007) described IS as the "harmonious and simultaneous responsiveness without merger or loss of boundaries or self/object differentiation" (p. 97) and that it is the "cornerstone of empathy" (p. 103) fundamental to the therapeutic relationship and to the creative process.

Specifically, rhythmic synchrony (RS) is described as the "simultaneous movement of like or unlike body parts which operate at identical rates" (Fraenkel, 1983, p. 38), and spatial synchrony (SS) is described as the "sharing of same body parts, moving in the same direction, with the same point of change in direction" (Adler, 1968, p. 46). Moving in RS with others can result in feelings of "well-being, relaxation and good fellowship" (Chace, 1951/1993, p. 196). Group members feed off each other's energy while expressing their feelings through RS, which results in a sense of "strength and security" (Chaiklin & Schmais, 1993, p. 81). Evidence also suggests that communication and cooperation among adults is enhanced when their movements and voices are synchronized (Gill, 2012) and when people share intentionality through music, dance, and collective rituals of rhythmic movements (Reddish et al., 2013). Additionally, synchronized dancing releases endorphins, thereby encouraging social bonding between strangers (Tarr et al., 2016). The degree to which people move in synchrony with each other has been identified as an important factor to measure social engagement between individuals (Ward et al., 2018). Therefore, it is possible to assume that IS might serve as an indicator of empathy.

Measuring IS, however, can be challenging. Dance/movement therapy researchers have had some success assessing IS during counseling sessions and friendly conversations (Fraenkel, 1983) and during movement-based interactions with adolescents and adults with autism (Manders et al., 2021). Both studies measured IS in dyads through subjective viewing of video-recorded movement sessions by trained observers who analyzed rhythmic, spatial, and effort synchrony. Whereas Manders et al. (2021) used a Laban Movement Analysis (LMA) framework, an observation-based assessment/evaluation system commonly used in DMT, Fraenkel used the Fraenkel-Franks Index of Shared Behaviors to measure IS (Fraenkel, 1983). However, subjective observation and analysis of movement tends to be influenced by, but not limited to, personal preferences, biases, our affinities, and age (Adiante, 2018). Although an objective measure can mitigate the potential risk of bias, no DMT study has yet examined the usefulness of the objective measure of IS.

New technologies such as wearable sensors, also known as accelerometers, have recently gained popularity and are being widely used in public health and occupational health research (Lee et al., 2017). Although accelerometers have been primarily used to measure physical activity levels, they can also be used to monitor complex physiological responses such as heart rate, body temperature, energy expenditure, and sleep-wake patterns (Lee et al., 2017). Accelerometers are portable and

can be worn on different body parts including the wrist, upper arm, chest, waist, hip, thigh, or ankle (Lee et al., 2017). These devices can also be integrated within everyday devices like smartphones and smart watches, thereby providing an opportunity to take research on human behavior and physiology out of the laboratory and into everyday life (Ward et al., 2018).

The accelerometer is a novel and promising technological tool that can potentially be used to obtain objective data on IS. Rehabilitation or exercise science studies have used different models of accelerometers to measure movement synchrony in different settings with some success. For example, movement synchrony is an important parameter in team sports and has been measured using a Shimmer2R Wireless Wearable Sensor (Shimmer Research Ltd., Dublin, Ireland) attached to different body parts to enhance synchronized performance in rowing (Cesarini et al., 2014). Similarly, an accelerometer app installed on mobile phones (The Physics Toolbox Accelerometer app; <https://www.vieyrasoftware.net/>) has been used with a large group of people dancing in a club environment to explore the correlation between music and group synchrony (Ellamil et al., 2016). Additionally, wrist-worn accelerometers (Empatica E4, Empatica, Cambridge, MA, USA) have been used to measure levels of IS (rhythmic and spatial) between actors and children with autism during a theater performance (Ward et al., 2018) and to measure RS and the resultant impact on social affiliation among groups of participants who performed choreographic movement tasks together (von Zimmerman et al., 2018). A recent study used the ActiGraph GT3X to measure partner synchrony in couples to investigate the correlation between moderate-to-vigorous physical activity and sedentary behavior of couples in relation to personal moderate-to-vigorous physical activity/sedentary behavior, days of the week, and other relationship variables such as amount of time spent together and quality and feelings of closeness in the relationship (Pauly et al., 2020).

Although preliminary results from these studies are encouraging in demonstrating the feasibility of using the accelerometer as a tool to measure IS in natural settings, the system of using accelerometers to collect objective data on IS is still very new. Additionally, IS has primarily been measured in dyads, and there is no published evidence on the feasibility of using wearable sensor technology to measure variables such as RS and SS in the context of group DMT and IS. Moreover, while LMA has been used in the past to observe IS in DMT, only one recent study (Manders et al., 2021) has formally applied LMA to measure IS in dyads with autistic individuals. This is the first study to apply LMA to measure group IS in DMT.

Therefore, the goals of this study were to:

1. Examine the useability of the wrist-worn accelerometer to measure IS between individuals in the context of group DMT with middle school students.
2. Measure change in mean scores in biometric and observational data for RS and SS over three time points (BL, week 5 and week 10).
3. Compare the biometric data collected from the accelerometer with observational data of IS to observe trends between both data sets.

Methods

Study design

This study adopted a single group repeated measure design to examine changes in IS by measuring RS (i.e., beat/second and lead and lag times) and SS (i.e., acceleration profiles in space) using a wrist-worn accelerometer (ActiGraph GT9X-BT Link) at three time points: at baseline (T1, week 1), midpoint (T2, week 5), and posttest (T3, week 10). Interpersonal synchrony was also measured through subjective observation of RS and SS and rating of video recordings by three Certified Laban Movement Analysts using an LMA framework. Observational data were visually compared with accelerometer data regarding changes in participants' IS using side-by-side line graphs. Qualitative feedback

was obtained at the end of the study from participants on the acceptability of wearing the accelerometer watch during the DMT sessions.

Study participants and procedures

This paper reports part of the procedures and outcomes of a larger doctoral dissertation study that examined the impact of group DMT on interpersonal synchrony, empathy, peer relationships, and cultural self-efficacy in the context of ethnic bullying among racially and ethnically diverse middle school students (Prakash, 2023). The occurrence of bullying peaks in middle school (Hong & Espelage, 2012) and violence in middle school has been associated with personal shaming and isolation of marginalized students (Beardall et al., 2007). Therefore, this study recruited a middle school population with various racial and ethnic backgrounds to engage in a group DMT intervention designed to foster social skills and cultural self-efficacy through the engagement in synchronous and interactive dance/movement activities.

A total of 21 participants were recruited from 3 middle schools: one public (group 1, $n = 7$), one private (group 2, $n = 8$), and one charter (group 3, $n = 6$) in Washington DC and Philadelphia. Participants were recruited after obtaining approval from the institutional review board of Drexel University and from the respective school principals. Copies of the flyers were distributed to the students and their parents/legal guardians. Inclusion criteria comprised middle school students (a) of any gender and any single or mixed racial/ethnic identity; (b) interested in exploring issues around diversity; and (c) interested in enhancing their multicultural self-efficacy and ability to make friends and interact with students from diverse cultural backgrounds. Exclusion criteria included (a) inability to participate in moderate dance/movement activities due to physical limitations; (b) cognitive limitations that would compromise the ability to understand and provide written and verbal feedback; and (c) diagnosis of oppositional defiant disorder or conduct disorder that could compromise the safety of the groups. Interested participants were remotely screened in the presence of their parents/legal guardians via a Health Insurance Portability and Accountability Act (HIPAA) compliant video-conference platform (Zoom Video Communications, Inc). Following the signing of consent/assent forms, all participants engaged in a weekly 50-min group DMT session over 10 weeks; filled out surveys at three time points (weeks 1, 5, and 10); provided weekly verbal feedback; and participated in a semistructured interview at the end of the study.

DMT intervention

The intervention (Table 1) was developed and implemented by the first author NP, who is a Board Certified Dance/Movement Therapist and Certified Movement Analyst. The intervention comprised 10 weekly 50-min group DMT sessions and focused on developing IS, empathy, positive peer relationships, and cultural self-efficacy. Dance/movement therapy techniques such as mirroring, synchronous rhythmic movement including creative dance using drums and the body as an instrument, a movement biography (i.e., sharing their name, something about themselves, and their likes and dislikes, in movement), a group sculpture, flocking like birds, and group dance choreography were included to explore themes that focused on building IS in the group and empathic peer relationships. Each 50-min session began with a verbal check-in and warm-up of body parts, followed by creative movement activities, a cool down, and a group discussion. The sessions took place in a classroom where the privacy of the group was ensured.

Data collection

Biometric data

Participants were fitted with an activity monitor i.e., ActiGraph GT9X-BT Link sensor, a noninvasive device that can be worn on the wrist like a wristwatch to measure changes in levels of RS and SS. During

Table 1
Dance/movement therapy intervention.

Week	Theme	Main Activities
1	Getting to know each other	Introductions using verbal and gestural cultural greetings and creation of group safety rules
2	Body awareness	Body scan and embodying rhythm of the drum to bring awareness to bodily sensations
3	Self-compassion	Loving kindness meditation (Schwartz, 2021) and building self-confidence through movement to enhance self-compassion
4	Understanding my emotions	Emotions charades, freeze dance, and the 4 B's of self-settling i.e., Brakes, Breathe, Brain, Body (Kornblum, 2002) to enhance emotional awareness and emotional regulation
5	Spatial awareness	Establishing individual space bubbles to bring awareness to the use of space in relation to others
6	Reaching out, making connections	Embodied self-expression and mirroring movement in dyads to build connections
7	Understanding emotional expression of others	Mirroring each other's emotions and having an embodied conversation to enhance emotional understanding of others
8	Respectful exchanges	Group dance choreography using rhythm and music to enhance respectful communication
9	Compassion in action/finding common ground	Creative movement in groups, flocking like birds, and loving kindness meditation to build compassion for others
10	Mutual support	Dancing down the path of encouragement with peer support and building a group sculpture to encourage mutual support

sessions 1, 5, and 10, ActiGraph data were collected at 100 Hz (except for one session where sampling was 60 Hz due to initialization error) and exported as raw linear acceleration on the X, Y, and Z axes (meters/s²). ActiGraphs were initialized on a secure computer prior to data collection to synchronize the time to the common computer clock, to mark the units individually with an identifier name, and to set the start of the 1-hr recording to coincide with the session time. ActiGraphs started recording automatically at the preset time at the beginning of the session. Due to the experimental nature of the study and due to limited funds, only one wrist-worn ActiGraph was provided per participant and was worn on the right wrist during the entire sessions 1, 5, and 10. Thus, data collection was limited to movements of the right hand/arm only. Participants collectively clapped three times to indicate the start and end points of the pre-identified 5-min time frame during the session when they engaged in synchronized rhythmic dance/movement. During this 5-min time frame, participants took turns to lead and follow movement. The movement developed organically based on the movement preference of the leader. The rest of the group mirrored and attempted to synchronize with the leader's movements. The 1-hr long raw data was downloaded from the device at the end of each session and truncated to the 5-min time frame. Rhythmic (magnitude of acceleration) and spatial (trajectory of the movement) components of synchrony were extracted. This epoch or time zone of movement was used to analyze IS after the data were extracted from the device at the end of each session. Participants were blinded to the purpose of accelerometer data collection.

Observational data

Interpersonal synchrony was also assessed via video observations of movement parameters that correlate with RS and SS among participants by two Certified Movement Analysts using LMA, a system that is used to observe, synthesize, and analyze human movement (Laban/Bartenieff Institute of Movement Studies, 2023). Video data were captured using two tripod mounted GoPro Hero9 cameras that were placed in opposite directions in the space to capture movement from all group members.

The analysts (KB & CB) trained for the study protocol rated IS of full

body movements from the same video segments of the pre-identified 5-min epoch (time zone of movement used for the ActiGraph data analysis). An interrater agreement between the raters was established prior to the data analysis by watching video segments of session recordings together to agree on moments when both raters clearly observed RS and SS. They then independently watched videos taken from 2 different camera angles of pre-identified 5-min segments from sessions 1, 5, and 10. The raters were blinded to the data collection time points to mitigate bias. Raters entered time stamps where they observed at least two or more participants moving like or unlike body parts simultaneously at identical rates in RS (Fraenkel, 1983). Similarly, they recorded SS when they observed two or more participants moving and changing direction of different body parts at the same point in time (Adler, 1968). Both raters then met to compare and consolidate their ratings and to clarify moments when they were not in agreement. When there was disagreement, the raters revisited those moments in the videos together to establish consensus through discussion.

Qualitative data

Exit interviews were conducted to obtain participants' feedback on the ease of wearing the accelerometer watch during the movement groups. Interviews were audio recorded.

Data analysis

Biometric data

ActiGraph data were downloaded and exported as a comma-separated variable (CSV) file using the ActiLife 6 software (ActiGraph, Pensacola, FL, USA). These CSV files, each containing 1 hr of acceleration data on the X, Y, and Z axes, were then loaded into Matlab 2019b

(MathLab, Natick, MA, USA). Data across all participants within each session were truncated to include only the epoch when synchronized dance/movement was performed (3–5 min). This step was done visually by graphing total acceleration (magnitude) and locating the 3 claps that were performed at the beginning and end of the synchronized dance. A high-pass Butterworth filter was used on the raw acceleration data to minimize the effect of gravitational acceleration (Dias Pereira Dos Santos et al., 2018). Next, a 10 Hz Butterworth low-pass filter was applied to remove high-frequency components usually associated with accidental taps and bumps in movement. Cross correlation (with normalization) is a method to compare similarities between two time-series data (Derrick & Thomas, 2004). Matlab's XCORR function was used to perform cross-correlation across all participants within a session. The maximum lag was set to 1 s to account for any latencies that might arise when someone is following movements of the leader.

Additionally, a video was created by compositing the session video (from one camera) and a corresponding 10-s graph of the ActiGraph's total acceleration (magnitude) of each participant, to serve as a visual aid to observe changes in biometric data. A visual representation of synchronized dance performed by a group of participants demonstrates the moment when all participants were in high RS or in total acceleration with each other when their arms were raised (Fig. 1).

The steps used in cross-correlation analysis are described using visual examples of one representational sample from G3 and T3 in the tables below. As a first step, RS between participants and within the group was measured by examining the average interparticipant cross-correlations of total acceleration readings from the ActiGraph (Table 2). The peak values of cross-correlations represent the highest inter-participant RS within the max-lag window of 1-s. To calculate interparticipant results of RS, cross-correlations were normalized such that the autocorrelations

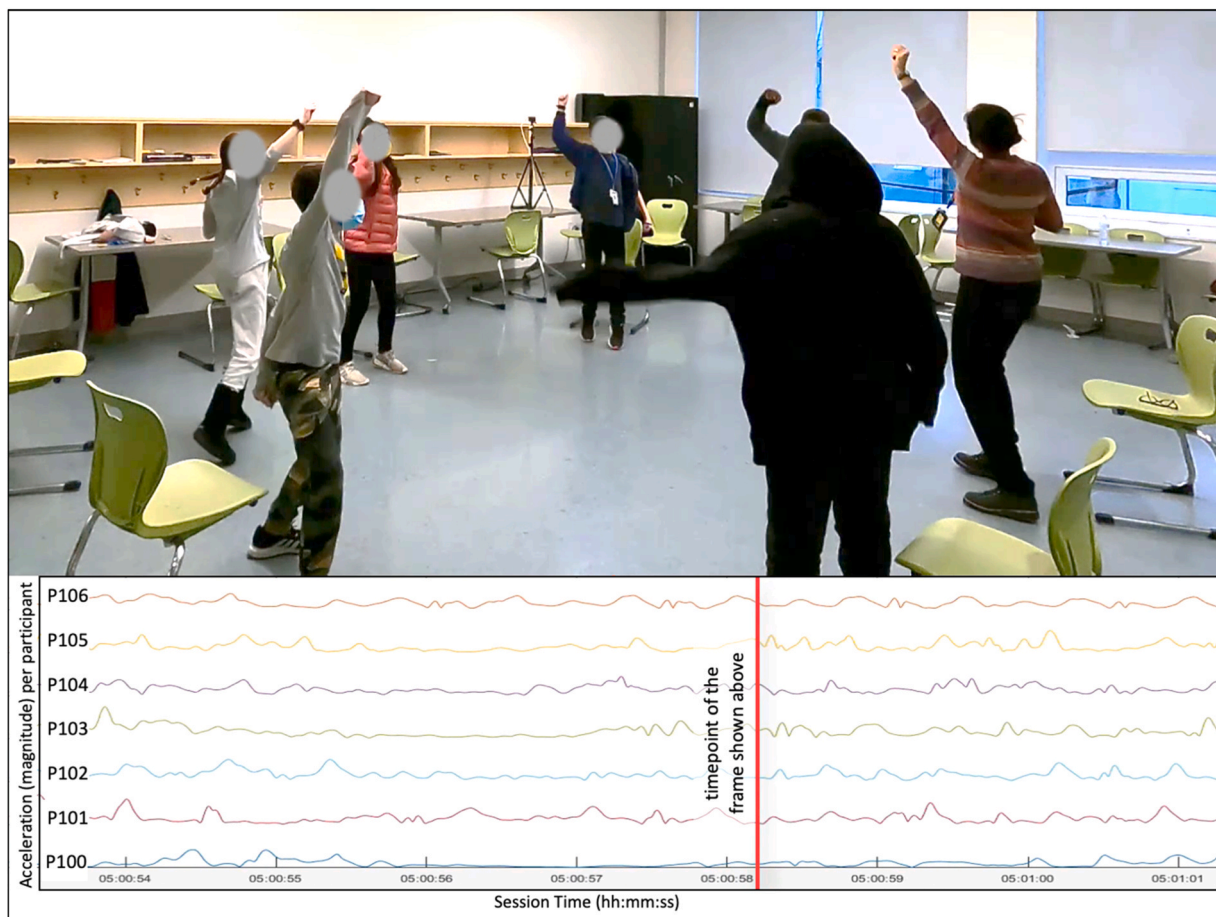


Fig. 1. Visual representation of the synchronized dance and biometric data.

Table 2

Xcorr – peak cross-correlation coefficients with no modifiers.

G3_T3	P301	P302	P303	P304	P305	P306
P301	7723	6169	5769	6573	5381	5121
P302	6169	7114	6304	6556	5430	5252
P303	5769	6304	12,202	7292	6274	6988
P304	6573	6556	7292	10,790	5954	6068
P305	5381	5430	6274	5954	8261	4962
P306	5121	5252	6988	6068	4962	8317

Note. G3 = Group 3; T3 = timepoint 3; P = participant.

at zero-lag equaled 1 (Buck et al., 2002; Stoica & Moses, 2005) (Table 3). Additionally, cross-correlations were transformed using Fisher's Z-transformation, and averages of the transformed values were calculated and back-transformed to correlations (Fisher, 1921, 1973) (Table 4). Similarly, the average, minimum, and maximum inter-participant cross-correlation of total acceleration readings by time were calculated using the same method used for calculating the average interparticipant cross-correlations of total acceleration reading by time and group.

Analyzing RS first would inform the analysis of SS by examining long epochs of high RS within the movement. However, after analyzing the data for RS, it was found that locating long epochs of high RS to measure SS was challenging due to the spontaneous nature of the movements and a lack of repetitive/consistent movements among participants. Therefore, this method of analysis was not conducive to analyzing SS and was discontinued.

Observational data

To examine the change over time in RS, SS, RF, and SF, we fit linear mixed effects models with time (categorical), group, and the interaction between time and group included as fixed effects. Models also included subject-level random intercepts (Lavielle, 2015). We additionally assessed the relationship between time and these outcomes using mixed effects models stratified by group. These models were used to estimate the mean outcome at each time point and to investigate differences in outcome by time and group. All mixed effects models were fit in R version 4.1.2 (R Foundation for Statistical Computing, Institute for Statistics and Mathematics, Vienna, Austria) using the lme4 package (v.1.1–27.1) (Bates et al., 2015).

Qualitative data

Qualitative data were analyzed by two coders (NP & KS) using thematic analysis procedures outlined by Braun and Clarke (2006). An external coder also coded the data independently to ensure accuracy of the identified themes from the data.

Results

Of the 21 participants, data from 14 (67 %) participants who completed at least 8 out of 10 weekly sessions and who provided movement synchrony data for at least 2 out of the 3 sessions were analyzed. Two out of 7 participants withdrew from group 1, and 5/8 from group 2. Group 3 had 6 participants with no attrition. After-school

Table 3

Xcorr – peak cross-correlation coefficients (Normalized).

G3_T3	P301	P302	P303	P304	P305	P306
P301	35.1	28.0	26.2	29.9	24.5	23.3
P302	28.0	32.3	28.7	29.8	24.7	23.9
P303	26.2	28.7	55.5	33.1	28.5	31.8
P304	29.9	29.8	33.1	49.0	27.1	27.6
P305	24.5	24.7	28.5	27.1	37.5	22.6
P306	23.3	23.9	31.8	27.6	22.6	37.8

Note. G3 = Group 3; T3 = timepoint 3; P = participant.

Table 4

Xcorr – peak cross-correlation coefficients with (after normalization and Fisher's Z Transformation).

G3_T3	P301	P302	P303	P304	P305	P306
P301		28.0	26.2	29.9	24.5	23.3
P302	28.0		28.7	29.8	24.7	23.9
P303	26.2	28.7		33.1	28.5	31.8
P304	29.9	29.8	33.1		27.1	27.6
P305	24.5	24.7	28.5	27.1		22.6
P306	23.9	31.8	27.6	22.6		

Note. G3 = Group 3; T3 = timepoint 3; P = participant.

activity conflicts were the primary reason for missed sessions.

Demographics

The demographics of the participants whose data were analyzed are summarized in Table 5. The mean age of the participants was 11.36 years; 28.57 % were male; 64.29 % were female; and 7.14 % were other. Additionally, 42.86 % identified as white, 23.08 % as Black, 21.43 % as mixed race, and 7.14 % as Asian and Hispanic each. The majority of the participants were from the sixth grade (42.86 %), with 28.57 % from the fifth grade, and 14.29 % from the seventh and eighth grades each.

Biometric data

Overall results of RS in addition to group results are reported in Table 6.

The average interparticipant correlation of total acceleration was 0.67; it increased marginally from T1 (0.65) to T3 (0.68). The largest group-specific change was observed between T1 (0.51) and T2 (0.73) in group 2. However, group 2 lost five out of eight participants between T1 and T2, which may have influenced these results. The interparticipant correlation for group 1 did not change between T1 (0.70) and T2 (0.70) and decreased marginally between T2 (0.70) and T3 (0.68). Group 3 demonstrated a decrease between T1 (0.70) and T2 (0.58) and an increase thereafter at T3 (0.68).

The average, minimum, and maximum interparticipant cross-correlations of total acceleration readings by time were calculated using the same method used for calculating the average interparticipant cross-correlations of total acceleration readings by time and group (Table 7).

The minimum and maximum subject-specific total acceleration

Table 5

Demographic data of study participants included in the analysis (N = 14).

	Group 1	Group 2	Group 3	Total
Age (mean, SD)	10.4 (0.55)	11.33 (0.58)	12.17 (0.98)	11.36 (1.08)
Gender				
Male	3 (60 %)	0 (0 %)	1 (16.67 %)	4 (28.57 %)
Female	2 (40 %)	2 (66.67 %)	5 (83.33 %)	9 (64.29 %)
Other	0 (0 %)	1 (33.33 %)	0 (0 %)	1 (7.14 %)
Ethnicity				
Not Hispanic/Latino	5 (100 %)	3 (100 %)	3 (50 %)	11 (78.57 %)
Hispanic/Latino	0 (0 %)	0 (0 %)	3 (50 %)	3 (21.43 %)
Race				
Black	1 (20 %)	1 (33.33 %)	1 (16.67 %)	3 (23.08 %)
White	3 (60 %)	1 (33.33 %)	2 (33.33 %)	6 (42.86 %)
Hispanic	0 (0 %)	0 (0 %)	1 (16.67 %)	1 (7.14 %)
Asian	0 (0 %)	1 (33.33 %)	0 (0 %)	1 (7.14 %)
Mixed Race	1 (20 %)	0 (0 %)	2 (33.33 %)	3 (21.43 %)
Grade				
5	3 (60 %)	0 (0 %)	1 (16.67 %)	4 (28.57 %)
6	2 (40 %)	3 (100 %)	1 (16.67 %)	6 (42.86 %)
7	0 (0 %)	0 (0 %)	2 (33.33 %)	2 (14.29 %)
8	0 (0 %)	0 (0 %)	2 (33.33 %)	2 (14.29 %)

Table 6

Average interparticipant cross-correlations of total acceleration readings from the actigraph by time and group for rhythmic synchrony.

	Time 1	Time 2	Time 3	Overall
Group 1	0.70	0.70	0.68	0.69
Group 2	0.51	0.73		0.64
Group 3	0.70	0.58	0.68	0.66
Overall	0.65	0.67	0.68	0.67

Table 7

Average, minimum, and maximum interparticipant cross-correlations of total acceleration readings from the actigraph by time for rhythmic synchrony.

	Minimum	Mean	Maximum
Time 1	0.41	0.66	0.75
Time 2	0.56	0.68	0.75
Time 3	0.64	0.69	0.74

cross-correlation values at T1 were 0.41 and 0.75, respectively. This range narrowed at T2 (0.56–0.76) and again at T3 (0.64–0.74). Whereas the minimum values went up between T1 (0.41) and T3 (0.64), the maximum values mostly remained the same between T1 (0.75), T2 (0.75), and T3 (0.74). Narrowing of the range in subject-specific total acceleration cross-correlation values was explained by examining individual participant scores. The increase in minimum values indicated that certain individual participants increased their capacity to rhythmically synchronize with the group over time. Similarly, the unchanged maximum values indicated that certain individual participants demonstrated their capacity to rhythmically synchronize with the group from the start.

Observational data

Because no statistical significance was found in the total scores across groups, results have also been reported by individual group (Table 8). Additionally, since group 2 did not provide data at T3, their data only include results from T1 and T2. The *p* value threshold for significance was set at < 0.01 due to a limited sample size and the fact that multiple comparisons were made.

Table 8

Change in mean (standard deviation) scores over time in rhythmic synchrony and spatial synchrony from observational data.

	Group 1 (n = 5)	Group 2 (n = 3)	Group 3 (n = 5)	Total (N = 13)	<i>p</i> value: time*group interaction ^b
Rhythmic synchrony					
T1 (BL)	32 (11.12)	31.75 (2.55)	76.25 (16.88)	41.72 (21.21)	< 0.01
T2	59.4 (25.66)	160.67 (11.68)	104 (21.44)	99.92 (44.82)	
T3	58.6 (23.04)		36.33 (22.81)	46.45 (24.65)	
<i>p</i> value (time) ^a	0.01	< 0.01	0.04	0.39	
Spatial synchrony					
T1 (BL)	95.67 (12.96)	138 (23.95)	173 (16.51)	131.67 (34.81)	< 0.01
T2	50.6 (6.66)	174.67 (17.04)	136.2 (36.54)	112.15 (57.49)	
T3	90.6 (15.55)		73.17 (49.29)	81.09 (37.34)	
<i>p</i> value (time) ^a	0.62	0.04	< 0.01	0.01	
Rhythmic frequency					
T1 (BL)	11.8 (5.45)	16.4 (7.5)	16.4 (7.5)	15.06 (4.26)	< 0.01
T2	20 (8.46)	21.8 (9.68)	13.2 (6.69)	17.15 (5.37)	
T3	23.6 (9.89)		16.4 (7.5)	17.45 (9.62)	
<i>p</i> value (time)	< 0.01	< 0.01	< 0.01	0.23	
Spatial frequency					
T1 (BL)	21 (6.16)	12.4 (4.39)	17 (4.9)	20.44 (4.89)	< 0.14
T2	16 (4.9)	13 (4.9)	13 (4.9)	17.23 (3.9)	
T3	22.4 (6.58)		14 (4.9)	16.64 (8.72)	
<i>p</i> value (time) ^a	0.27	0.21	< 0.01	< 0.01	

Note. BL = Baseline.

^a P-value for the slope term for time (session) in linear mixed effects models stratified by study group. Time was included as a continuous linear predictor.

^b P-value for the time (session) by group interaction term in linear mixed effects model.

Rhythmic synchrony

The average time in RS in group 1 increased between T1 and T2 (32–59.4 s) and did not change between T2 and T3 (59.4 and 58.6 s). Group 2 demonstrated an increase between T1 and T2 (31.75–160.67 s). Similarly, in group 3, RS increased between T1 and T2 (76.25–104 s) but decreased between T2 and T3 (104–36.33 s). Examining the time point as a linear predictor of time in RS in a mixed effect model showed a statistically significant positive association between time point and time in RS for group 1 (*p* = 0.01) and group 2 (*p* = <0.01) with no significance for group 3. Rhythmic synchrony scores across groups and by group are reported in Fig. 2.

Average frequency in RS increased throughout the three time points (11.8, 20, and 23.6 s respectively) for group 1, and group 2 demonstrated an increase between T1 and T2 (16.4–21.8 s). Group 3 demonstrated a decrease between T1 and T2 (16.4–13.2 s), and an increase between T2 and T3 (13.2–16.4 s). A statistically significant positive association was found between time point and frequency in RS (*p* = <0.01) for groups 1 and 2 while a statistically significant negative association was observed between time point and frequency in RS (*p* = <0.01) for group 3. Frequency scores across groups and by group for RS are reported in Fig. 3.

Spatial synchrony

Average time in SS decreased between T1 and T2 (95.67–50.6 s) and increased between T2 and T3 (50.6–90.6 s) for group 1. Group 2 demonstrated an increase between T1 and T2 (138–174.67 s) and group 3 demonstrated a decrease between T1, T2, and T3 (173–136.2–73.17 s). Group 3 demonstrated a statistically significant negative association between time point and time in SS (*p* = <0.01) while no significance was found for groups 1 and 2. Spatial synchrony scores across groups and by group are reported in Fig. 4.

Average frequency in SS decreased between T1 and T2 (21–16 s) and increased between T2 and T3 (16–22.4 s) for group 1. Group 2 demonstrated an increase between T1 and T2 (12.4–13 s). Group 3 demonstrated a decrease between T1 and T2 (17–13 s) and an increase between T2 and T3 (13–14 s). A statistically significant negative association between time point and frequency in SS (*p* = <0.01) was found for group 3 and no significance for groups 1 and 2. No evidence was found of a difference in the linear relationship between time point and frequency in SS between groups. Total frequency scores across groups

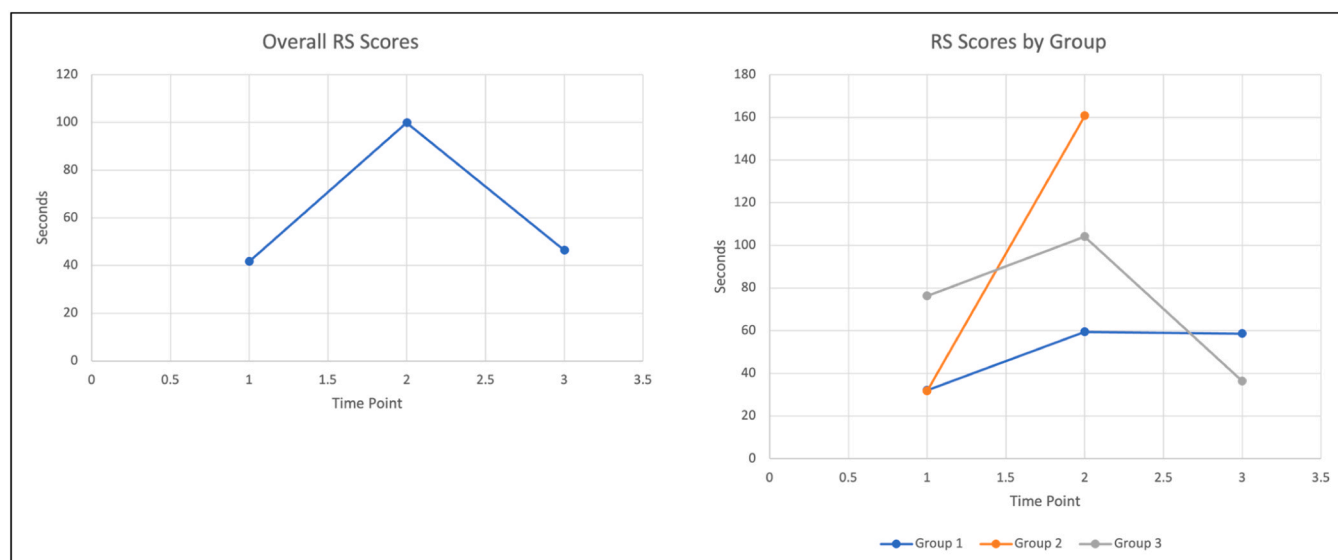


Fig. 2. Rhythmic synchrony. Note. RS = Rhythmic synchrony.

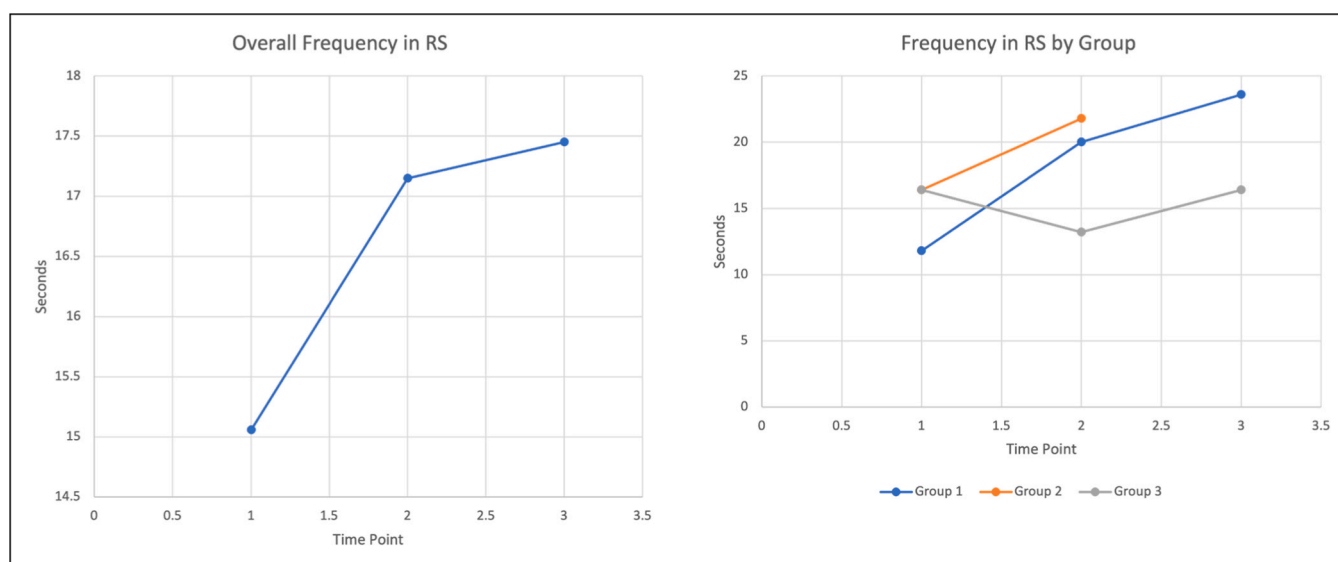


Fig. 3. Rhythmic frequency. Note. RS = Rhythmic synchrony.

and by group for SS are reported in Fig. 5.

Comparison between biometric and observational data

Because technical challenges limited the ability to analyze SS biometric data, comparisons were made only between biometric and observational data of RS to examine trends between both data sets (Fig. 6). Overall, observational data demonstrated a notable increase in RS between T1 and T2 (41.72–99.92 s) and a notable decrease between T2 and T3 (99.92–46.45 s). Overall biometric data demonstrated a marginal increase in the interparticipant cross-correlation in RS between T1, T2, and T3 (0.65–0.67–0.68). Only group 2 demonstrated similar upward trends in both observational and biometric data between T1 and T2. Whereas observational data demonstrated a notable increase in RS between T1 and T2 (31.75–160.67 s), biometric data also demonstrated an increase in interparticipant cross-correlation between T1 and T2 (0.51–0.73). Group 1 demonstrated an increase in observational data between T1 and T2 (32–59.4 s) with minimal change between T2 and T3 (59.4–58.6). The interparticipant cross-correlation in this group

remained mostly the same between T1, T2, and T3 (0.70–0.70–0.68). Group 3 demonstrated a notable increase in observational data of RS between T1 and T2 (76.25–104 s) and a notable decrease between T2 and T3 (104–36.33 s). The interparticipant cross-correlation marginally decreased between T1 and T2 (0.70–0.58) and marginally increased between T2 and T3 (0.58–0.68).

Qualitative Results

Overall, participants shared that they did not mind wearing the ActiGraph for the duration of the three movement sessions and mostly forgot about them after some time. According to one participant, “it is like me wearing my braces, after a while I do not notice it is there” (P105). On the other hand, only a few participants found the watch uncomfortable because it was either too big, did not fit properly, or collected sweat. Some participants expressed that the symbol of the running man on the watch was like a symbol of life that motivated them to start moving.

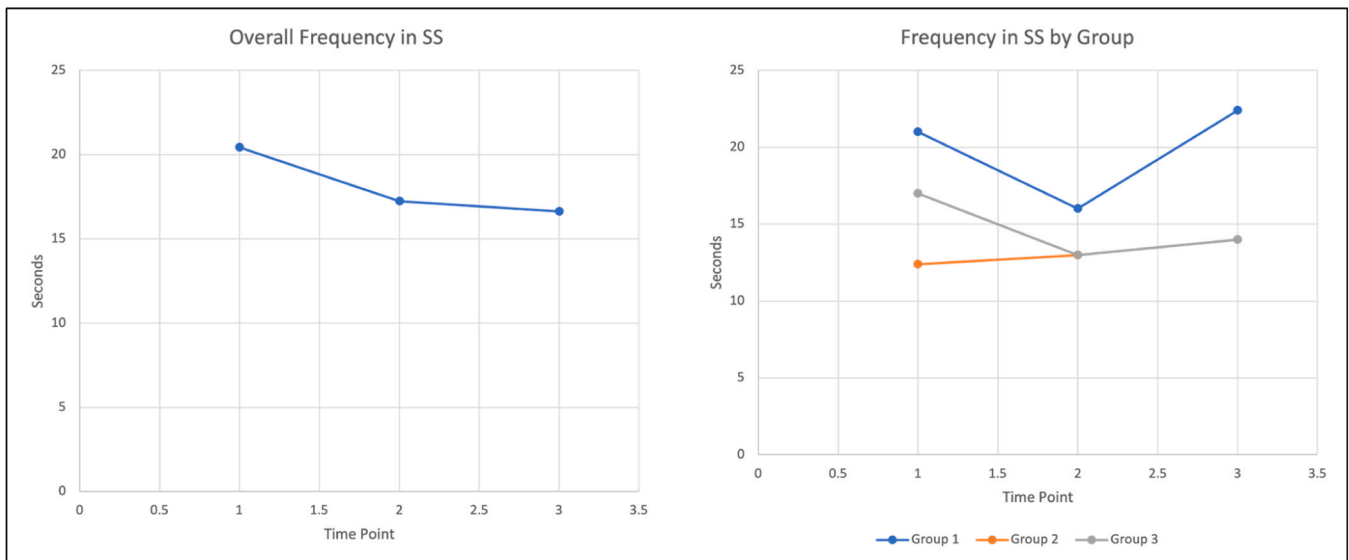


Fig. 4. Spatial synchrony. Note. SS = Spatial synchrony.

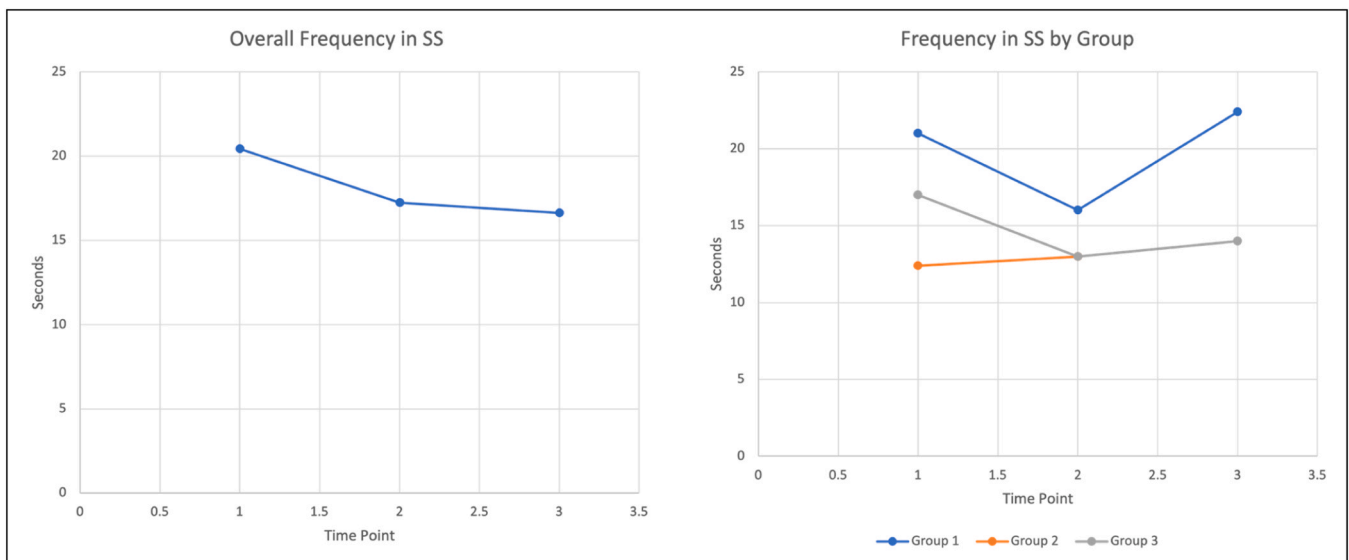


Fig. 5. Spatial frequency. Note. SS = Spatial synchrony.

Discussion

This study explored the novel use of the ActiGraph GT9X-BT Link to collect biometric data to measure changes in mean scores of IS with diverse groups of middle school students and compared the data to the observational IS data. Interpersonal synchrony was measured as a potential indicator of empathy. Although movement observation is commonly used in DMT, only one study has applied LMA to measure group synchrony in dyads of autistic individuals (Manders et al., 2021), making this the first study to apply LMA to measure IS in a group context. Additionally, this is also the first study to examine the usability of a wrist-worn accelerometer to measure IS in a DMT group context. Likewise, although prior studies have used different models of accelerometers to measure synchrony in different settings in dyads and with groups (Cesarini et al., 2014; Ellamil et al., 2016; Pauly et al., 2020; von Zimmerman et al., 2018; Ward et al., 2018), this type of accelerometer analysis, and specifically the ActiGraph GT9X-BT Link has never been used to measure group IS in DMT before.

Interpersonal synchrony was measured by observing and collecting

both rhythmic and spatial components of synchrony during group interactions. Results from the observational data indicated a significant increase in RS for G1 and G2. However, a significant downward trend was observed across time points for SS for G1 and G3. This disparity in significant findings between RS and SS may be attributed to music's distinct role in eliciting RS, which was not taken into consideration while designing the study and could account for these differences. The connection between neural-level rhythmic entrainment and the motor system has been well established, wherein the rhythm present in music activates the motor system in the brain, encouraging listeners to synchronize their body movements with the beat (Fiveash et al., 2023). Therefore, we could attribute the significant increase in RS to the accompanying music (i.e., beat) that provided an external structure encouraging participants to naturally entrain with the rhythm of the music being played as well as with each other. Although music can strongly promote RS, SS requires additional visual and/or verbal cues from the movement leader and is comparatively more challenging to achieve if participants are not following these cues. Therefore, these variations could account for the differences observed in the results

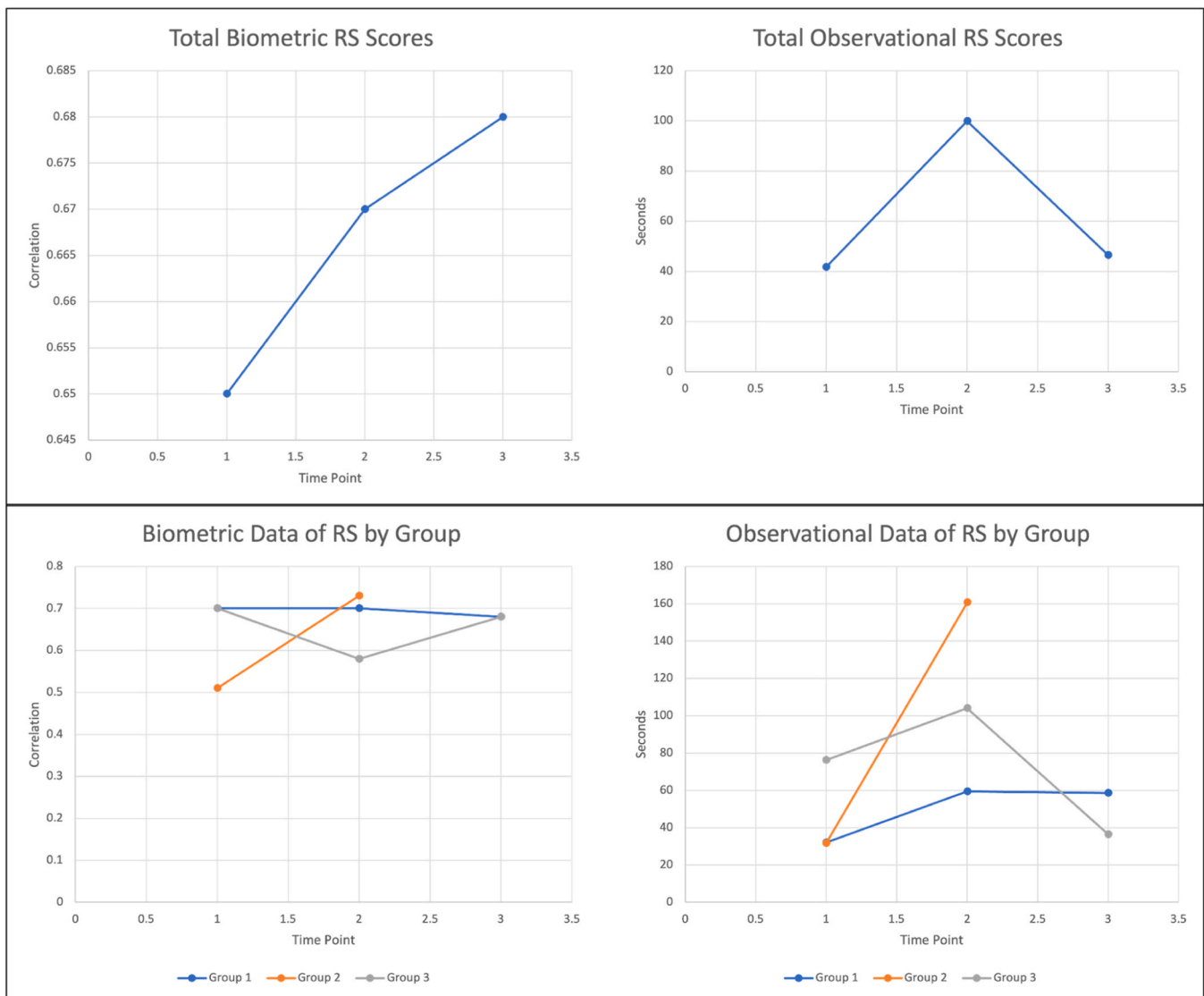


Fig. 6. Comparison of biometric data with observational data of rhythmic synchrony. Note. RS = Rhythmic synchrony.

between RS and SS.

Additionally, on completion of the RS analysis for the ActiGraph, it was noted that long epochs of high RS within the movement could not be isolated due to the spontaneous nature of the movements. Therefore, the ability to apply cross-correlation analysis to measure SS was a challenge and had to be discontinued. Including a movement intervention protocol that used choreographed movement sequences with more consistency (long durations of specific movement patterns) and repetitiveness would have been more conducive to this method of data collection and analysis.

In comparing the biometric and observational data on RS, similar trends were discovered. There was an overall increase of RS between T1 and T2, although the magnitude of the change was markedly greater in the observational data than in the biometric data. Whereas biometric data continued to demonstrate a steady increase between T2 and T3, observational data demonstrated a significant decrease between these two time points. When we compared the data by individual groups, only group 2 demonstrated similar upward trends between T1 and T2 in both data sets. However, the increase in RS in the observational data was distinctly greater than that in the biometric data.

Possible explanations for the differences in the results of the biometric and observational data include the following. Firstly, the methods used to collect data varied between the two systems. Although

movement observation has the capacity to include full-bodied observations of RS, the ActiGraph could capture the movement of only the right hand/arm because the watch was worn on the right wrist. For example, during a mirroring exercise in DMT, a participant leading movement with the right hand was mirrored across the space by other participants using the left hand. Although this was clearly visible during movement observation, the movement of the left hand could not have been adequately captured by the ActiGraph worn on the right hand of the participant. Therefore, it is possible that the significant results of RS in the observational data were due to a more expansive view of the body versus the single limb of the ActiGraph.

Secondly, group movements captured via the ActiGraph over the three time points were random and spontaneous rather than prescribed/structured or repetitive/consistent. Previous studies have used the accelerometer to measure group synchrony using repetitive movements such as rowing (Cesarini et al., 2014), prechoreographed dancing (Ellamil et al., 2016), or back-and-forth movements in rocking chairs (Richardson et al., 2012). However, this study attempted to measure movements that developed organically from participants with rapid changes as the movement was passed around, a common format followed in traditional DMT groups that reinforces creative and expressive social interaction. Because cross-correlational analysis is better suited to capture inflection points of limb accelerations during repetitive

rhythmic movements in dance/movement, the lack of repetitiveness and consistency in the movements could have limited the capacity of the cross-correlation measure to capture the inter-participant SS more effectively. Additionally, repetitive movements captured over an extensive period are recommended for ActiGraph analysis to confidently interpret cross-correlation as a measure of RS, which was revealed by this study. In contrast, movement observation by trained raters has the potential to capture moments of RS irrespective of the nature of the movement.

Despite the differences between the two methods of measuring group IS mentioned previously, a commonality lies in the fact that both these methods can take movement analysis out of the laboratory and into everyday settings. Accelerometers are noninvasive and portable, thereby allowing multiple devices to be worn on different body parts (Lee et al., 2017), which is in contrast to methods such as motion-capture systems that require a laboratory setting with multiple cameras, a connected computer, and reflective markers adhered to different body parts (Wang et al., 2022). Additionally, most participants endorsed the comfort of wearing the watches, reporting that they did not notice the watches on their wrists. Similarly, movement observation uses portable video cameras that can be easily transported into everyday settings and placed noninvasively in the space to capture movement. Therefore, both these systems for measuring IS are accessible methods and thus useful not only to the DMT researchers, but also to other researchers interested in measuring IS. Although the results are preliminary and should be interpreted with caution, it is encouraging to observe some similar trends between the observational and biometric IS data.

Limitations and implications for future research

First, this study was conducted during the COVID-19 pandemic, which challenged the recruitment process and resulted in a small sample size limiting the generalizability of the overall results. Future studies might benefit from recruiting a larger sample to address this limitation. Also, one of the groups (i.e., group 2) experienced high attrition due to competing after-school activities during the scheduled study session times. Missing data from group 2 at T3 could possibly have impacted the internal validity of the study. Taking this into consideration when designing a study intervention will help mitigate the risk of high attrition.

Second, the presence of music during the movement task likely fostered a more organic entrainment effect among participants, facilitating their synchronization not only with the music but also with each other. This could potentially explain the significant results observed for RS in contrast to SS. Future researchers should consider examining RS with and without music to explore participants' capacity to rhythmically synchronize with one another, with and without the aid of an external rhythmic structure.

Third, due to limited resources, only one ActiGraph was used per participant. This situation restricted data collection to movements of the right hand. Additionally, if a movement of the right hand was mirrored by the left hand of the participants moving across from the leader, these IS data could not be captured. Therefore, future studies might benefit from including multiple devices attached to various body parts (e.g., both wrists, ankles, waist) to capture IS more accurately across the whole body. Further, for accelerometers to be used with confidence for these and similar purposes, the data output should be both reliable and valid. A concurrent validation study in which an accelerometer is compared with a 3-dimensional motion analysis system will provide more definitive evidence of the feasibility of using the accelerometer to assess IS.

Fourth, as addressed before, analyzing SS data was challenging due to the spontaneous and short duration movements of the participants that were not optimal for cross-correlation analysis and limited the capacity of this method of analysis to capture interparticipant SS more

effectively. To mitigate these challenges, researchers should consider using choreographed movement sequence(s) that are fixed in length and repeatable across data collection time points to enhance the efficacy of cross-correlation analysis when examining SS data. Moreover, even though participants largely found the use of the wrist-worn accelerometer acceptable, some reported discomfort in wearing them due to sizing and fitting issues. Future researchers could consider using child friendly accelerometers that fit smaller wrists better.

Finally, even though both movement observation raters agreed on moments of observed RS, they found it challenging to agree on exact moments when RS was initiated/ended, and this may have impacted the results. Future studies could consider including a third LMA coder to enhance the reliability of the movement observation results and could also consider providing additional training to establish stronger inter-rater reliability between the LMA coders. As such, further refinement of the study protocol to optimize the comparative analysis of biometric and observational data is needed.

Despite the limitations, this study provides important information to clinicians, researchers, and movers who are interested in measuring IS. The application of the accelerometer to measure biometric data for group IS is an additional and valuable resource to movement observation in DMT. Likewise, researchers in other fields interested in measuring IS can also use this study as a resource for future investigation of IS by considering the application of the accelerometer and/or movement observation.

Conclusion

The use of technology is widely recognized as a key tool in human movement analysis. Compared to video analysis, which requires a huge computational effort and many resources, accelerometers provide a cost-effective, less effort-intensive option for human movement researchers to collect relevant data via miniaturized wearable devices. This study was the first of its kind in DMT to use accelerometers to measure IS with diverse groups of children in a middle school setting. Even though the results are preliminary and should be interpreted with caution, it is encouraging to observe some similar trends between the accelerometer data and the observational LMA data. This study contributes valuable new knowledge not only to the field of DMT but also to researchers who are interested in exploring the use of the wearable accelerometer to measure group IS.

CRedit authorship contribution statement

Nalini Prakash: Writing – original draft, Project administration, Methodology, Investigation, Funding acquisition, Data curation, Conceptualization. **Daniel T. Vader:** Writing – review & editing, Methodology, Formal analysis. **Arun Ramakrishnan:** Writing – review & editing, Supervision, Software, Project administration, Methodology, Formal analysis, Data curation. **Nancy Beardall:** Writing – review & editing, Supervision. **Sherry Goodill:** Writing – review & editing, Supervision, Conceptualization. **Minjung Shim:** Writing – review & editing, Supervision, Conceptualization. **Renee H. Moore:** Supervision, Methodology, Formal analysis.

Financial interests

The authors declare they have no financial interests.

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Disclosure statement

The authors report there are no competing interests to declare.

Competing interest

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Data availability

Data will be made available on request.

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