

Usually, I don't ruminate, only from time to time: the predictive value of trait and state measures of rumination for the intensity of affective states

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INTRODUCTION/MOTIVATION

Emotions and their flexible regulation are essential in adapting to our environment [1]. People differ significantly in their ability to regulate their emotions, and research has traditionally focused on these differences between individuals [2,3]. However, evidence emerges that traditional laboratory measures capturing trait emotion regulation may not correspond to emotion regulation ability in real life [4]. These processes appear to show different variability between and within individuals, implying that characteristics regarded as traits in psychology – e.g., emotion regulation strategy use – may not reflect everyday functioning [5,6]. Correspondingly, recent research reported weak correlations between trait and state emotion regulation [7,8].

One of the most extensively researched emotion regulation strategies is rumination, a cognitive process that involves repeatedly and passively dwelling on negative feelings and their consequences [9]. Rumination is a putatively maladaptive strategy [10,11], and recent work argues that it intensifies stress responses and symptoms of psychopathology by extending and amplifying negative affect and interfering with proactive cognition and behavior [12].

A suitable indicator to measure the effectiveness of emotion regulation, as done in previous research [2], is emotional reactivity, the emotional reactions experienced in response to a negative occurrence [13]. Besides being a robust correlate for poor mental health [14,15], evidence supports that increased state (but not trait) rumination is associated with higher emotional reactivity [7]. However, based on the evidence about variabilities of certain constructs differing within and between individuals, as described above, the within-person examination of rumination may predict emotional reactivity even more accurately.

Based on the above, we assumed that trait indicators of rumination will not display a strong correlation with momentary rumination aggregates (Hypothesis 1).

The main aim of this study was to confirm that momentary rumination use has a substantial predictive value for emotional reactivity within the same time window (Hypothesis 2a). We also expected that the aggregated mean of these momentary rumination measures will also be associated with emotional reactivity, although not as strongly (Hypothesis 2b). We expected trait rumination to have the lowest predictive value for emotional reactivity in daily life (Hypothesis 2c).

Additionally, since rumination is generally regarded as a putatively maladaptive emotion regulation strategy we expected rumination measures to have independent predictive values for momentary negative affect, regardless of perceived stress. Based on the reasoning above, we anticipate that these measures will show the same pattern (momentary > average state-level > trait questionnaire) in the prediction of negative affect as in the prediction of emotional reactivity (Hypotheses 3a,3b,3c).

METHODS

Our sample comprised 247 individuals (N[female] = 198, Mean[age] = 38.38 years, SD[age] = 12.86 years, Range[age] = 19-73 years) recruited from the general population through the press and social media. First, they completed a baseline assessment including trait-like measures such the Cognitive Emotion Regulation Questionnaire [16]. Then, they spent up to 28 days in the Experience Sampling Method [17–19] phase of the study where they received 8 short surveys every day assessing their momentary affective states, emotion regulation, and perceived stress. 14,265 observations were obtained (per capita: Median = 45, Obs. Range = 1-197, Theor. Range = 1-224).

We ran a Spearman correlation analysis to examine the association between trait and aggregated state measures of rumination (Hypothesis 1). To test our second and third sets of hypotheses, we fitted a linear mixed-effects model (using *lme4* in R) with random intercepts and slopes for the interaction of perceived stress and negative affect per participant. A momentary negative affect composite score obtained with multilevel confirmatory factor analysis was the dependent variable. Perceived stress, the three different measures of rumination, and their interactions were entered in order to test the prediction of negative affect (main effects of rumination variables) and moderation on emotional reactivity (rumination x perceived stress interactions).

RESULTS AND DISCUSSION

First, we found only a moderate positive correlation ($r_s(245) = 0.46, p < 0.001, 95\% \text{ CI } [0.36, 0.55]$) between trait and state rumination indicators (Hypothesis 1). One may expect a higher correlation between indicators of the same construct. Certain psychometric and contextual differences could account for this result, as well as the different self-report techniques tapping different sources of self-related information.

Turning to the prediction of emotional reactivity, we found that state, aggregated mean state, and trait measures all had significant independent effects on emotional reactivity (Hypotheses 2a,b,c). However, the

magnitude of these effects overlapped, and therefore, the importance of the measures could not be ranked (see Figure 1).

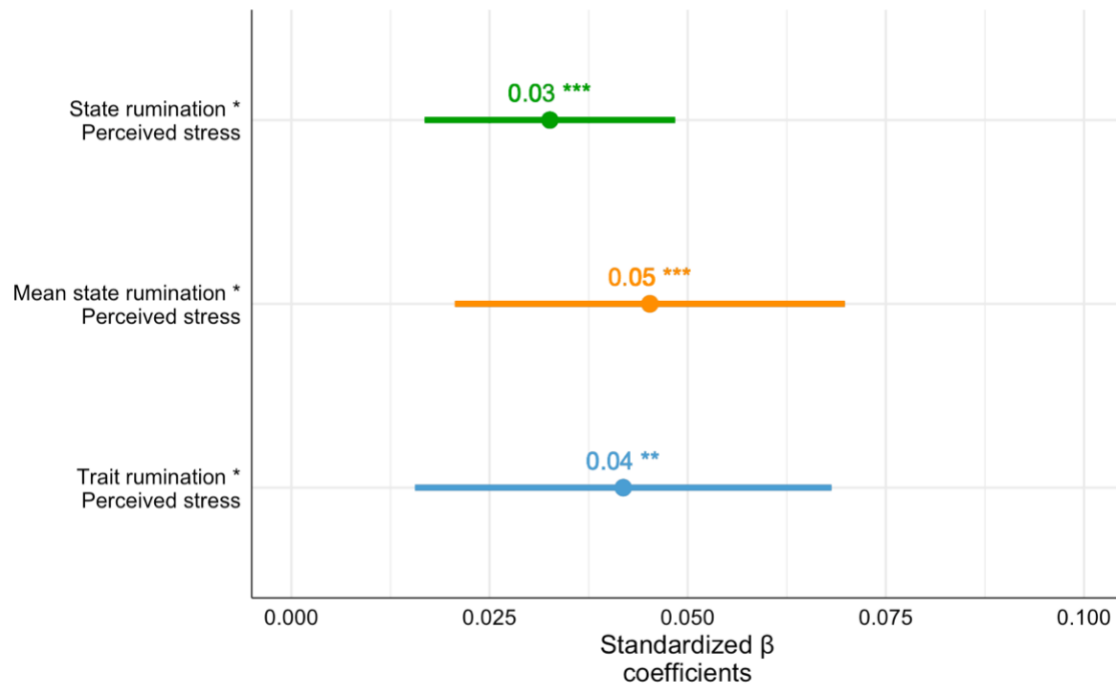


Figure 1. Standardized β coefficients indicating the moderation of emotional reactivity by different measures of rumination. Error bars show 95% confidence intervals.

On the other hand, when we looked at the main effects on negative affect (Hypotheses 3a,b,c), the mean of state measures of rumination emerged as the strongest predictor (see Figure 2). This composite indicator can essentially be considered a trait measure to some degree (as it captures the typical level of rumination in a given period), however, it incorporates the everyday variability of rumination within an individual; thus, it differs from traditional, self-report trait measures that can be subject to recall bias and lower ecological validity. Therefore, it could be regarded as a measurement 'halfway between' trait and state indicators that could possibly combine the advantages of both, thereby having the best incremental validity in predicting emotional reactivity.

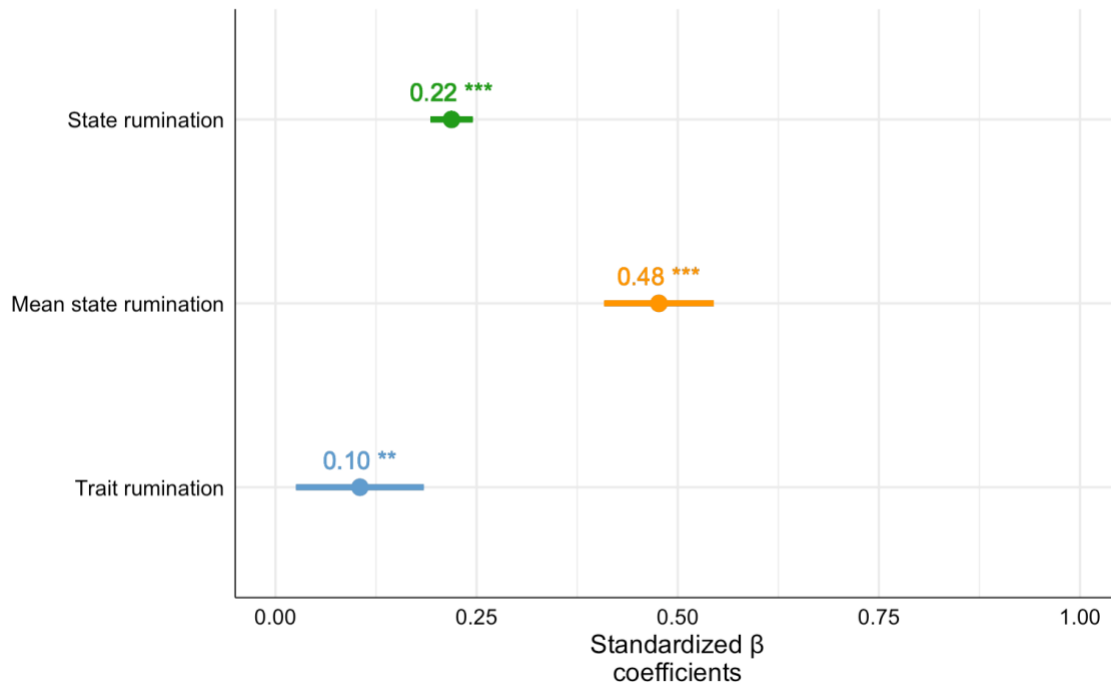


Figure 2. Standardized β coefficients indicating the prediction of negative affect by different measures of rumination. Error bars show 95% confidence intervals.

In conclusion, our findings provide valuable insight for understanding the within-individual dynamics of emotion regulation and their relationship to stress and affectivity, nuancing the common trait approach and overcoming some of its limitations. Thereby, our results corroborate the need to re-evaluate the traditional measurement of psychological constructs based on single-shot retrospective self-assessments [5,6]. Trait conceptualization and assessment is also relevant for the cognitive neuroscientific study of individual differences, which are often based on analyzing correlations between behavioral traits and neuroscientific measures.

Additionally, our findings have clinically relevant, practical implications for the personalized prediction of emotional responses to stress through simple self-report tools applicable in everyday contexts [see 20].

Keywords: experience sampling method, multilevel modeling, traits vs. states, rumination, emotion regulation, emotional reactivity, affective states

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