

# Rumination and Acceptance Differentially Modulate the Scope of Attention

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Rumination, characterized by repetitive and intrusive thoughts about negative personal events, has been linked to a narrow attentional scope. Conversely, emotional acceptance, which involves fully experiencing emotions in a nonevaluative way, is theorized to broaden attention. However, empirical data that support the theoretical link between rumination, acceptance, and the attentional scope are scarce. The present study examined the effects of rumination and acceptance on local (narrow attention) versus global (broad attention) processing styles. Seventy-two healthy participants were asked to describe a distressing personal event. Then, participants implemented rumination or acceptance to cope with that event. Before and after the implementation phase, participants completed a global/local processing task. The results showed that rumination led to a pre- to postmanipulation increase in local interference (i.e., greater interference caused by details when attending to a whole figure) and a decrease in global interference (i.e., smaller interference caused by a whole figure while attending to the details). In contrast, implementing emotional acceptance led to a pre- to postmanipulation reduction in local interference, with no change in global interference. Post hoc analyses indicated that the effects of rumination and acceptance on processing style were not mediated by affective changes that resulted from implementing these strategies. The findings provide support for the role played by rumination in narrowing the attentional scope and partial support for the effect of acceptance on broadening attention.

**Keywords:** emotion regulation, rumination, acceptance, global-local processing, attentional scope

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Research on perceptual processing styles distinguishes between global and local processing. While global processing (or holistic processing) refers to broad attention to the bigger picture, local processing refers to narrow attention to the details that comprise the whole (Navon, 1977). Typically developed individuals are commonly faster to identify and respond to global compared to local information in a given scene (i.e., “seeing the forest for the trees”), a phenomenon termed *global precedence* (Navon, 1977).

Multiple studies have identified links between processing style and emotional states. Findings have associated global processing with a positive mood, while local processing was associated with a negative mood (Basso et al., 1996). Moreover, experimental studies

demonstrated that following exposure to positive emotion, participants’ attention was biased to process a global figure compared to the local elements that comprised it, while exposure to negative emotions narrowed attention to local elements (Fredrickson & Branigan, 2005; Gasper & Clore, 2002). It was theorized that positive and negative emotions affect visual processing differently in order to adapt to different situations so that positive emotions broaden attention for adaptively discovering and developing resources for the long term. Conversely, negative emotions narrow attention and promote focus and concentration, which are essential in threatening situations (Fredrickson & Branigan, 2005). However, other studies have suggested that the dynamic relationship between affective states and processing styles is more complex. Some studies demonstrated that changes in processing style depend on the motivational intensity associated with a specific emotion, irrespective of its emotional valence (Gable & Harmon-Jones, 2010; Harmon-Jones et al., 2012), and others suggested that emotions are not inherently associated with processing style, but may reinforce or inhibit dominant processing style within a given moment (Huntsinger et al., 2014).

Fewer studies have assessed the relationship between information processing styles and the process that modulates and adjusts emotional reactions, namely, emotion regulation. People use different strategies to reduce, increase, or maintain emotional reactions (Gross, 1998). Some strategies are considered more adaptive than others (Gross & John, 2003). For example, rumination is an emotion regulation strategy characterized by repetitive and intrusive thinking about negative personal concerns as well as the causes and implications of negative events (Nolen-Hoeksema & Morrow, 1993). Dwelling on the consequences of negative events via rumination is associated with negative affect, increased recall of negative memories, and less effective problem-solving strategies (Nolen-Hoeksema et al., 2008). The attentional scope model of rumination postulates that individuals

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with high levels of rumination are characterized by a narrowed attentional scope (Whitmer & Gotlib, 2013).

It has been suggested that the relationship between rumination and narrowed attention may provide a cognitive explanation for the downward spiral of rumination and negative mood (Lyubomirsky & Tkach, 2004). Specifically, a narrowed attentional scope was suggested to increase cognitive resources devoted to the processing of information at the center of attention and thus enhance the focus on negative events, thoughts, and feelings while ruminating. Furthermore, narrowed attention may also decrease the encoding of peripheral information, making it more difficult to notice important changes or other information in the environment (Biss et al., 2010; Dreisbach & Goschke, 2004).

Although the attentional-scope model of rumination implies that rumination results in greater focus on details, direct empirical support for this notion has not been established. Nevertheless, research shows that many psychopathologies that are associated with a high tendency toward rumination are also associated with a bias toward local processing. These conditions include eating disorders (Lang et al., 2021; Smith et al., 2018; Weinbach et al., 2017), obsessive-compulsive disorder (Raines et al., 2017; Rankins et al., 2005), autism spectrum (Booth & Happé, 2018; Crane et al., 2013; Gotham et al., 2014; Happé & Frith, 2006), and attention deficit hyperactive disorder (Kalanthoff et al., 2013; Kandeğer et al., 2024). The co-occurrence of rumination tendencies and a local processing bias in these conditions implies that these phenomena may be interconnected.

In contrast to rumination, other emotion regulation strategies were theorized to encourage a more holistic or global form of processing. One such example is emotional acceptance. Acceptance encourages fully experiencing emotions, bodily sensations, and thoughts without attempting to control, change, or avoid them (Hayes & Pierson, 2005). Acceptance has been found to have numerous benefits for emotional well-being. Higher levels of emotional acceptance have been associated with reduced levels of stress, anxiety, and depression, as well as increased psychological well-being and happiness (e.g., Kotsou et al., 2018). Unlike rumination, acceptance encourages accepting thoughts and feelings without judging or trying to change them (Baer, 2003; Williams & Lynn, 2010). Therefore, acceptance contrasts with rumination by allowing individuals to acknowledge negative emotions without becoming entangled in them (Hilt et al., 2023).

It has been suggested that acceptance-based practices play a role in broadening the attentional scope. For example, the Mindfulness-to-Meaning Theory (Garland et al., 2015a) theorizes that mindfulness, which includes acceptance as a core component (Lindsay & Creswell, 2019), broadens the attentional scope and allows attending to previously overlooked contextual information (Garland et al., 2015b). Specifically, while rumination tends to entangle individuals in details related to their negative emotional experiences (Nolen-Hoeksema et al., 2008), acceptance-based practices may shift attentional resources from fixating on details to a broader perspective (Garland et al., 2015b). Despite this theoretical basis, there is currently no direct empirical evidence demonstrating that acceptance, as a standalone strategy, broadens the attentional scope.

The goal of the present study was to examine the impact of implementing rumination and emotional acceptance for coping with a personal distressing event on local versus global processing styles among healthy participants. The strength of using a nonclinical

population for this purpose is that it allows a stronger inference regarding causality between the two factors of interest, namely, emotion regulation strategies and processing style (Van Den Hout et al., 2017). In the study, healthy participants were asked to describe a distressing personal event. Then, participants used rumination or acceptance to cope with the described event via audio instructions. Before and after implementing acceptance or rumination, participants performed Navon's global/local processing task, enabling the assessment of their bias toward global versus local processing.

We hypothesized that participants who employed rumination to cope with their personally distressing event would show a pre- to postmanipulation increase in processing local elements of a global stimulus at the expense of processing the global stimulus. The opposite pattern was predicted in the acceptance group, namely, a pre- to postmanipulation enhancement in processing a global stimulus at the expense of the local elements that comprise it. Furthermore, in the implementation phase, and in accordance with previous research, we expected that acceptance would be more effective than rumination in reducing the negative affect that is evoked by describing a distressing personal event.

## Method

### Transparency and Openness

We report how we determined our sample size and describe all data exclusions, measures, and manipulations in the study. Data were analyzed using JASP (Version 0.19; JASP Team). All data have been publicly available at the Open Science Framework repository and can be accessed at [https://osf.io/9pwqa/?view\\_only=836da0353f1446fe8ea7a34060](https://osf.io/9pwqa/?view_only=836da0353f1446fe8ea7a34060). This study was not preregistered.

### Participants

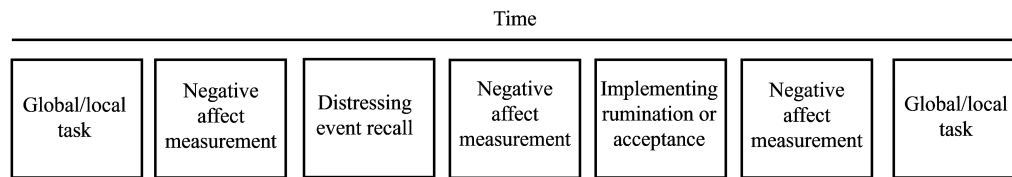
For the study, we recruited 87 healthy individuals (19 males) aged 18–35 ( $M = 26.5$ ,  $SD = 4.71$ ). Inclusion criteria included: (a) native Hebrew speakers and (b) age within the range of 18–35 years old. Exclusion criteria were the presence of a major psychiatric disorder or the use of psychiatric medication assessed via self-report. A power analysis using G\*Power (Faul et al., 2007) indicated that a sample of 62 participants would be sufficient to detect within (Time) and between (Group) factor interaction with >80% power, an  $\alpha$  of .05, and a medium effect size ( $\eta_p^2 = .06$ ). Given that no previous studies directly assessed the effects of emotion regulation strategies on processing style, a medium effect size was based on studies reporting medium-to-large effects of emotion on processing styles (Fredrickson & Branigan, 2005; Gable & Harmon-Jones, 2010; Gasper & Clore, 2002; Huntsinger et al., 2010).

### Procedure

The study was approved by the School of Psychological Sciences Ethics Committee at the University of Haifa (approval number 437/22). Participants were recruited via advertisements on social media (Facebook) and the University's participant pool.

After eligible participants gave informed consent, they completed a series of questionnaires. The next day, participants performed the online experimental task, which was designed using PsychoPy and was run online using the Pavlovia repository (Peirce et al., 2019). The sequence of the experimental task is illustrated in Figure 1.

**Figure 1**  
*The Sequence of the Experimental Task*



At the beginning of the task, participants rated their current negative affect (detailed below) and performed an arrow version of Navon's global/local task (Weinbach & Henik, 2011). Then, participants were asked to describe an adverse, unresolved autobiographical event and rate their negative affect again. Following that, participants were randomly allocated to a rumination or acceptance group. Using recorded instructions (detailed below), they implemented rumination or acceptance to cope with their described autobiographical memory. Finally, participants rated their negative affect again and performed the postmanipulation global/local processing task. Participants received a monetary reward for their participation.

### Self-Report Questionnaires

Participants completed a set of self-report questionnaires as part of a larger study. Within this study, we report those that are most relevant to the present study.

#### *The Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004)*

The Difficulties in Emotion Regulation Scale (DERS) is a 36-item self-report questionnaire that assesses emotion regulation abilities. The DERS was used to ensure no baseline differences between the groups in emotion regulation skills. Items are rated on a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). The DERS provides a total score in addition to six subscales. The DERS has demonstrated both good internal consistency, reliability, and good validity. Cronbach's  $\alpha$  in the present study was .93.

#### *Ruminative Responses Scale (Nolen-Hoeksema & Morrow, 1991)*

The Ruminative Responses Scale (RRS) is a 22-item self-report questionnaire that assesses ruminative tendency. The RRS was used to ensure no baseline differences between the groups in participants' ruminative tendencies. Items are rated on a 4-point Likert scale ranging from 1 (*almost never*) to 4 (*almost always*). It provides a total score in addition to two subscales. The RRS has demonstrated good internal consistency, reliability (Cohen & Mor, 2018), and validity (Schoofs et al., 2010). Cronbach's  $\alpha$  in the present study was .76 for the total score.

#### *The Positive and Negative Affect Scale (Watson et al., 1988)*

The Positive and Negative Affect Scale (PANAS) is a self-report questionnaire that assesses current positive and negative emotional experiences. In the present study, participants were asked to

complete the questionnaire at three assessment phases (baseline; Cronbach's  $\alpha$  = .92, postmood induction; Cronbach's  $\alpha$  = .88, postmanipulation; Cronbach's  $\alpha$  = .91). For the purpose of the study, we selected eight items assessing negative emotions at the present moment (frustrated, afraid, stressed, angry, guilty, ashamed, worried, and distressed). Items are rated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*highly*). Previous Research has shown that PANAS can detect changes in affect in response to various stimuli, such as stressors, mood inductions, and interventions (Wisco & Nolen-Hoeksema, 2009).

### Experimental Task

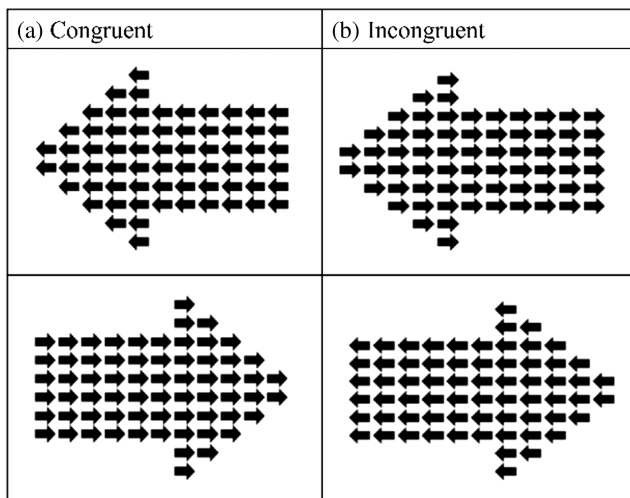
#### *Arrow Global/Local Processing Task (Weinbach & Henik, 2011)*

This is a response time-based task designed to assess participants' global versus local processing biases. Each trial began with a fixation cross presented for 2,000 ms. Then, participants were presented with a large arrow (global level) made of smaller arrows (local level). The task included a *respond-global block* and a *respond-local block*. In a respond-global block, participants were instructed to respond according to the direction of the large arrow as fast and as accurately as possible via keyboard press (i.e., left and right arrow keys) and ignore the smaller arrows. In a respond-local block, participants were instructed to respond according to the direction of the small arrows and ignore the large arrow. In half of the trials within each block, the directions of the small and large arrows were congruent (i.e., pointing in the same direction; Figure 2a). In the other half, the directions were incongruent (i.e., pointing in opposite directions; Figure 2b). Subtracting response times (RTs) in congruent trials from RTs in incongruent trials in the local and global blocks allows us to assess the global and the local interference effects, respectively. Specifically, the global interference effect is calculated as mean RTs in incongruent trials minus mean RTs in congruent trials in the respond-local block. This effect represents the extent to which the global dimension (i.e., large arrow) interfered with performance while participants responded to the local dimension (i.e., small arrows). Similarly, the local interference is calculated as mean RTs in incongruent trials minus mean RTs in congruent trials in the respond-global block (i.e., the interference caused by the small arrows while participants respond to the large arrow). The order of the respond-global and respond-local blocks was counterbalanced across participants. Each block started with eight training trials followed by 96 experimental trials (overall 192 trials).

#### *Autobiographic Recall Mood-Induction Task*

Via audio instructions, participants were asked to describe a distressing, unresolved autobiographical event that had occurred

**Figure 2**  
*Stimuli in the Arrow-Global/Local Processing Task*



*Note.* (a) In the congruent condition, the large and small arrow points are in the same direction. (b) In the incongruent condition, the large and small arrow points are in opposite directions.

recently and still elicited negative emotions. Specifically, we asked participants to choose any event that made them feel regretful, lonely, sad, rejected, angry, guilty, or hurt. Participants were given 2 min to describe the event by typing in a relevant text box on the screen. Then, participants were instructed to think about the event vividly, focusing on the sensory and emotional aspects of the experience for 1 min. Previous studies have validated similar techniques to induce negative emotion (Kuehner et al., 2009; Vine et al., 2014).

### Emotion-Regulation Strategy Manipulation

Using step-by-step audio instructions, participants were guided to use rumination or acceptance, depending on their assigned group, to cope with the distressing event they described. The guided audio instructions lasted for 6 min in both groups. The instructions were based on previous studies that manipulated rumination and acceptance strategies (Huffziger et al., 2012; Kuehner et al., 2009; Lyubomirsky et al., 2003; Singer & Dobson, 2007), and were adapted to maintain consistency in content and length between the two conditions.

**Rumination Instructions.** Following the definition of ruminative responses (Wisco & Nolen-Hoeksema, 2009) and based on previous research (Huffziger et al., 2012; Kuehner et al., 2009; Singer & Dobson, 2007), the manipulation of rumination included repetitive thinking about the adverse event. Specifically, the instructions guided participants to focus on: (a) negative feelings and emotions triggered by the event; (b) concerns and self-focused thoughts; (c) responses and behaviors; and (d) the implications, causes, and meanings of the emotions and behaviors. Full scripts for the rumination instructions can be found in Supplemental Materials A.

**Acceptance Instructions.** Based on previous studies that operationalized acceptance within experimental studies (Segal et al., 2023; Singer & Dobson, 2007), the instructions for implementing acceptance included the following components: (a) being present and mindfulness, namely keeping attention focused on emotions,

thoughts, and bodily sensations that are experienced at the present moment; (b) willingness and openness to fully experience emotions as they are; and (c) holding a nonevaluative and nonjudgmental stance toward the experienced emotions. Full scripts for the acceptance instructions can be found in Supplemental Materials B.

To amplify the effect of the rumination and acceptance manipulations, shorter versions of the assigned strategy instructions were delivered between the first and second block in the global/local processing (see Supplemental Materials C and D, respectively).

### Data Analysis

Outliers were removed before the analyses. Participants with an accuracy below 3 standard deviations (SDs) from the mean in the global/local task were excluded ( $n = 3$ ). Additionally, 12 participants were excluded because they did not exhibit an increase in negative affect after the mood induction (defined as a score of 0 or below when subtracting premood induction negative affect from postmood induction negative affect scores). This was because applying an emotion regulation strategy to manage negative affect was deemed not applicable without an increase in negative affect. Thus, the final analyses included 72 participants (37 in the acceptance group and 35 in the rumination group). For the analysis of the global/local task, erroneous responses (i.e., incorrect responses based on the specific global/local block instructions) were excluded (2.06% of the total trials).

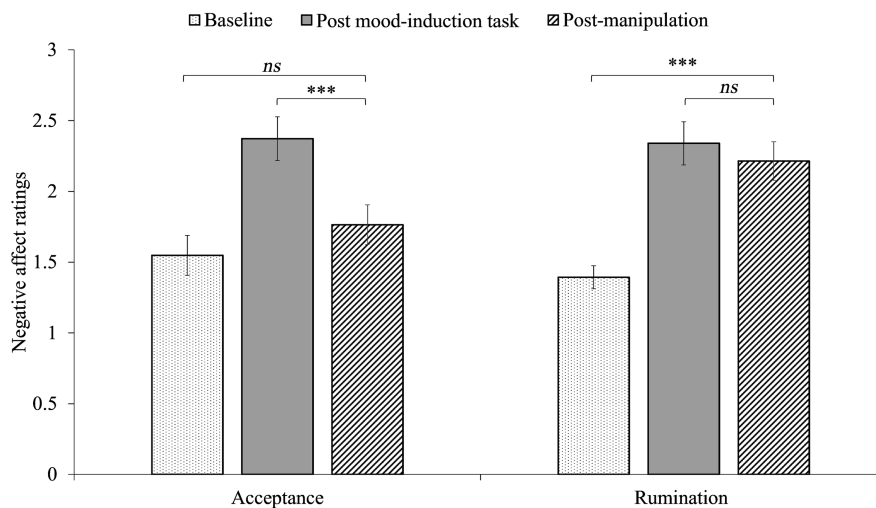
Baseline differences between the groups in emotion regulation (DERS) and rumination (RRS) were assessed using independent  $t$ -tests. To assess the effect of acceptance and rumination on changes in negative affect, we conducted a mixed-model analysis of variance (ANOVA) with Time (Baseline/Postmood induction task/Postmanipulation) as the within-subject variable and Group (Rumination/Acceptance) as the between-subject variable. The mean negative affect rating in the PANAS was used as the dependent measure.

To assess how acceptance and rumination influenced changes in the global/local processing, we used a mixed-model ANOVA in which Time (Baseline/Postmanipulation) and Block type (respond-Global/respond-Local) were used as the within-subject measures and Group (Rumination/Acceptance) as the between-subject measure. The dependent measure was the interference effect (calculated as RTs in the incongruent trials minus RTs in congruent trials), which allowed for the separation of global interference and local interference.

Post hoc mediation analyses were conducted to assess whether the effects of acceptance and rumination on global and local processing were explained by changes in negative affect following the implementation of these strategies or whether the effects were independent of affective changes. Specifically, we examined whether changes in negative affect mediated the effect of Group (Rumination/Acceptance) on pre- to postmanipulation changes in local and global interference using two separate mediation models. In one mediation model, Group (Rumination/Acceptance) was entered as the independent variable, changes in negative affect (postmood induction to postmanipulation) were included as the mediator, and changes in local interference were entered as the dependent variable. The second model used changes in global interference as the dependent variable. Both analyses were conducted using a regression-based JASP mediation module with bias-corrected bootstrapping including 5,000 resamples.



**Figure 3**  
*Changes in Negative Affect as a Function of Time and Experimental Group*



*Note.* Differences between the experimental groups (Acceptance, Rumination) in negative affect at three time points: baseline, postmood induction task (i.e., after describing a personally distressing event), post-manipulation (i.e., after implementing either acceptance or rumination based on group allocation). The y-axis represents average negative affect based on the PANAS scores. The x-axis represents the groups. Error bars represent standard errors. *ns* = not statistically significant; PANAS = The Positive and Negative Affect Scale. \*\*\*  $p < .001$ .

Finally, exploratory correlational analyses were conducted to assess whether mean-level individual differences in negative affect as assessed via the PANAS were associated with global and local interference effects at the different time points.

### Self-Report Questionnaires

The analyses showed no baseline differences between the groups in the DERS total score (Rumination:  $M = 90.51$ ,  $SD = 15.43$ ; Acceptance:  $M = 95.63$ ,  $SD = 16.04$ ),  $t(70) = 0.23$ ,  $p = .82$ , Cohen's  $d = .05$ , nor in the RRS total score (Rumination:  $M = 42.23$ ,  $SD = 10.33$ ; Acceptance:  $M = 48.05$ ,  $SD = 15.13$ ),  $t(70) = 0.09$ ,  $p = .93$ , Cohen's  $d = .02$ , affirming no a priori differences in emotion regulation between participants in the rumination and acceptance groups.

### Changes in Negative Affect During the Manipulation Phase

The analysis revealed a significant main effect for Time,  $F(2, 140) = 61.61$ ,  $p < .001$ ,  $\eta_p^2 = .47$ , and no main effect for Group,  $F(1, 70) = 0.27$ ,  $p = .60$ ,  $\eta_p^2 = .00$ . Importantly, the results revealed a two-way interaction between Group and Time (see Figure 3),  $F(2, 140) = 7.97$ ,  $p < .001$ ,  $\eta_p^2 = .10$ . Contrasts analysis revealed that after implementing the emotion regulation strategies, there was a decrease in negative affect only in the acceptance group,  $t(140) = 5.44$ ,  $p < .001$ , Cohen's  $d = 0.46$ , and not in the rumination group,  $t(140) = 1.09$ ,  $p = .28$ , Cohen's  $d = 0.09$ . In fact, after implementing acceptance, negative affect was not different from the baseline measurement (i.e., before describing the negative event),  $t(140) = 1.93$ ,  $p = .05$ , Cohen's  $d = 0.16$ , while after implementing rumination, negative affect remained

higher compared to the baseline measurement,  $t(140) = 7.15$ ,  $p < .001$ , Cohen's  $d = 0.60$ .

### Global/Local Processing Task

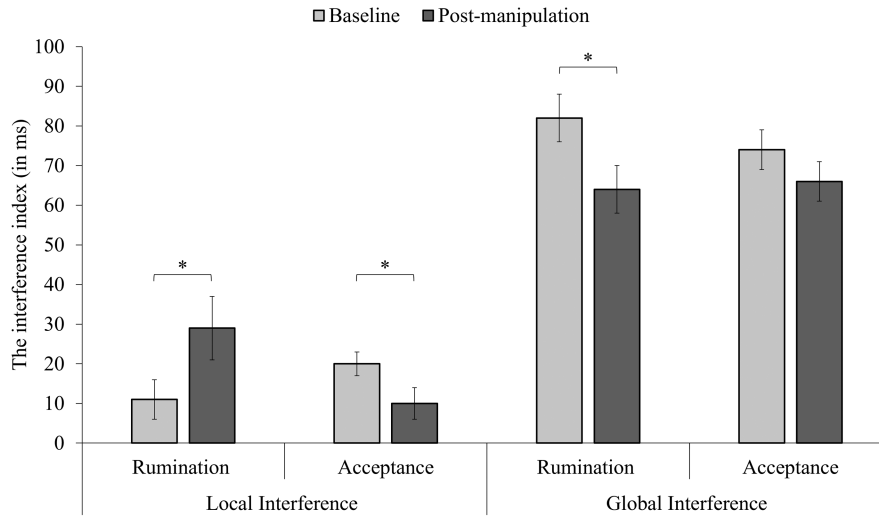
Replicating the common patterns of the global/local processing task, the ANOVA revealed a significant main effect for Block Type,  $F(1, 70) = 120.84$ ,  $p < .001$ ,  $\eta_p^2 = .63$ , indicating greater global compared to the local interference. There was no main effect for Time,  $F(1, 70) = 2.42$ ,  $p = .12$ ,  $\eta_p^2 = .03$ , nor for Group,  $F(1, 70) = 0.92$ ,  $p = .34$ ,  $\eta_p^2 = .01$ . The Block Type  $\times$  Time interaction was significant,  $F(1, 70) = 9.6$ ,  $p = .003$ ,  $\eta_p^2 = .12$ , the Block Type  $\times$  Group interaction was not significant,  $F(1, 70) = 0.04$ ,  $p = .84$ ,  $\eta_p^2 = .00$ , as well as the Group  $\times$  Time interaction,  $F(1, 70) = 2.32$ ,  $p = .13$ ,  $\eta_p^2 = .03$ . Critically, the results revealed a significant three-way Time  $\times$  Block Type  $\times$  Group interaction,  $F(1, 70) = 10.59$ ,  $p = .002$ ,  $\eta_p^2 = .13$  (see Figure 4).<sup>1</sup> Planned comparisons examined the Group  $\times$  Time interaction separately for respond-Global and respond-Local blocks.

In line with the hypothesis, in the respond-Global block, there was a significant pre- to postmanipulation increase in the interference caused by local arrows (i.e., local interference) in the rumination group,  $F(1, 70) = 5.15$ ,  $p = .03$ ,  $\eta_p^2 = .07$ . In contrast, the acceptance group showed the opposite pattern, namely, a pre- to postmanipulation decrease in local interference,  $F(1, 70) = 5.46$ ,  $p = .025$ ,  $\eta_p^2 = .07$ . Moreover, there was no baseline difference in the local interference between the groups,  $F(1, 70) = 1.9$ ,  $p = .17$ ,  $\eta_p^2 = .03$ . However, after the strategy implementation phase, the local interference was significantly larger in

<sup>1</sup> Notably, this effect remained significant when including the 12 participants who were originally excluded from the analysis for not showing a change in negative affect,  $F(1, 82) = 5.13$ ,  $p = .026$ ,  $\eta_p^2 = .06$ .

**Figure 4**

*Differences in Global and Local Interference Effects as a Function of Time and Experimental Group*



*Note.* The y-axis represents the interference index (i.e., a higher score represents larger interference). The left side of the graph represents the local interference (i.e., interference caused by the details while attending to the bigger picture). The right side of the graph represents the global interference (i.e., interference caused by the bigger picture while attending the details). The x-axis represents the experimental group. Error bars represent standard errors.

\*  $p < .05$ .

the rumination compared to the acceptance group,  $F(1, 70) = 4.84, p = .03, \eta_p^2 = .07$ .

In the respond-Local block and as hypothesized, the results showed a significant pre- to postmanipulation decrease in global interference in the rumination group,  $F(1, 70) = 10.8, p = .002, \eta_p^2 = .14$ . However, in contrast with the hypothesis, there was no pre- to postmanipulation changes in the acceptance group,  $F(1, 70) = 2.82, p = .10, \eta_p^2 = .04$ . The global interference was not significantly

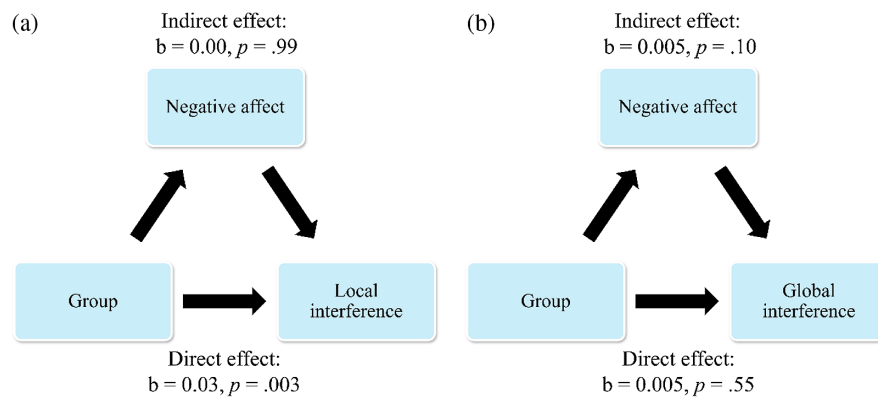
different between the groups neither at baseline,  $F(1, 70) = 0.93, p = .34, \eta_p^2 = .01$ , nor after the manipulation,  $F(1, 70) = 0.05, p = .82, \eta_p^2 = .001$ .

### Post Hoc Analyses

The mediation model with local interference as the dependent variable (Figure 5a) yielded a significant total effect,  $b = 0.03$ ,

**Figure 5**

*Mediation of Negative Affect in the Effect of Group on Local and Global Interference*



*Note.* Mediation models examining the effect of rumination versus acceptance on pre- to postmanipulation changes in local interference (a) global interference (b), with change in negative affect ratings from postmood induction to postmanipulation as the mediator. See the online article for the color version of this figure.

$\beta = 0.69$ ,  $SE = 0.01$ ,  $z = 3.18$ , 95% CI [0.01, 0.05],  $p = .001$ . The direct effect of Group on changes in local interference was also significant,  $b = 0.03$ ,  $\beta = 0.69$ ,  $SE = 0.01$ ,  $z = 2.99$ , 95% CI [0.01, 0.05],  $p = .003$ . However, the indirect effect was not significant,  $b = 0.00$ ,  $\beta = 0.00$ ,  $SE = 0.00$ ,  $z = 0.00$ , 95% CI [-0.01, 0.01],  $p = .99$ , indicating that the effect of Group on changes in local interference was not mediated by changes in negative affect. The path from group to changes in negative affect was significant,  $b = 0.48$ ,  $\beta = 0.67$ ,  $SE = 0.16$ ,  $z = 3.03$ , 95% CI [0.15, 0.78],  $p = .002$ , while the path from negative affect changes to changes in local interference was not significant,  $b = 0.00$ ,  $\beta = 0.00$ ,  $SE = 0.00$ ,  $z = 0.00$ , 95% CI [-0.02, 0.01],  $p = .99$ .

The mediation model that included global interference as the dependent variable (Figure 5b) was not significant,  $b = 0.01$ ,  $\beta = 0.30$ ,  $SE = 0.01$ ,  $z = 1.30$ , 95% CI [-0.02, 0.01],  $p = .19$ . Neither was the direct effect,  $b = 0.005$ ,  $\beta = 0.14$ ,  $SE = 0.01$ ,  $z = 0.60$ , 95% CI [-0.02, 0.01],  $p = .55$ , or the indirect effect,  $b = 0.005$ ,  $\beta = 0.16$ ,  $SE = 0.00$ ,  $z = 1.64$ , 95% CI [-0.01, 0.00],  $p = .10$ . The path from Group to changes in negative affect was identical to the model described above. The path from negative affect changes to changes in global interference was not significant,  $b = 0.01$ ,  $\beta = 0.23$ ,  $SE = 0.00$ ,  $z = 1.95$ , 95% CI [-0.02, 0.00],  $p = .05$ .

The exploratory correlational analyses regarding potential associations between mean-level individual differences in PANAS scores and global/local interference effect at the different time points did not reveal any significant correlations (see Supplemental Results).

## Discussion

The present study investigated the influence of rumination and emotional acceptance on the attentional scope. First, the results replicated common findings showing that acceptance was superior to rumination in reducing negative affect after describing a distressing personal event. Importantly, the results confirmed that rumination and acceptance have distinct effects on the attentional scope, with medium-to-large effect sizes. The results revealed that implementing rumination in response to a personally distressing event led to an increase in local interference (i.e., interference caused by details when attending to a whole figure) while implementing acceptance decreased local interference so that at postmanipulation the local interference in the rumination group was significantly larger than that in the acceptance group. The findings for global interference (i.e., interference caused by a whole figure while attending to the details) were less consistent. As expected, the rumination group showed a reduction in global interference from pre- to postmanipulation, but there was no pre- to postmanipulation difference in global interference in the acceptance group. Furthermore, there was no group difference in global interference at postmanipulation.

The attentional scope model of rumination posits that rumination is associated with a narrow scope of attention (Whitmer & Gotlib, 2013). This model suggests that the repetitive and circular nature of rumination involves focusing on details and causes of distress, making it more challenging to shift attention to a broader perspective. The results of the present study provide strong support for this theory by demonstrating that participants who engaged in rumination subsequently exhibited greater difficulty ignoring details when instructed to focus on the bigger picture. Conversely, they

were better able to ignore the bigger picture when instructed to attend to details.

It has been proposed that rumination narrows attention by increasing negative emotions (Lyubomirsky & Tkach, 2004). This is in light of previous studies that linked negative emotion with a narrow attentional scope (Fredrickson & Branigan, 2005; Gasper & Clore, 2002). However, our findings suggest that rumination uniquely influences to narrow the attentional scope, independently of its impact on emotional states. Specifically, while engaging in rumination led to an increase in negative affect, this affective change did not mediate the effect of rumination on local processing. This indicates that rumination, as a detail-oriented strategy, exerts a distinct influence on perceptual processing independently of its role in modulating affective reactions.

The results of the present study may have implications for understanding the co-occurrence of rumination and a bias toward local processing in various psychopathologies. Previous research has identified a bias toward local processing in disorders characterized by high levels of rumination (Happé & Frith, 2006; Kalanthroff et al., 2013; Lang et al., 2021; Rankins et al., 2005; Weinbach et al., 2017). The findings imply that rumination and a local processing bias in these disorders might not just co-occur but likely maintain one another. This study showed that rumination reduces interference caused by the bigger picture. As such, rumination may persist by failing to attend to competing bigger picture information while dwelling on the details related to negative events.

In contrast to rumination, acceptance-based practices such as mindfulness meditation were suggested to redirect attention away from symptoms of distress and encourage a broader perspective (Garland et al., 2015a). Broadening the attentional scope after mindfulness practice was proposed as the mechanism underlying the ability of individuals to generate more positive appraisals of negative events (Garland et al., 2015b). Aligning with these theories, this study demonstrated that at the perceptual level, implementing acceptance, a core component of mindfulness (Lindsay & Creswell, 2019), led to a better ability to ignore details while attending to the bigger picture.

Contrary to our expectations, acceptance did not lead to greater interference caused by the bigger picture (i.e., global interference). It could be that among healthy individuals who normally present a global processing bias (Navon, 1977), global interference could not be further intensified. Future studies should examine if acceptance may help redirect attention from the details to the bigger picture in populations characterized by poorer global processing (e.g., Happé & Frith, 2006; Kalanthroff et al., 2013; Lang et al., 2021; Rankins et al., 2005; Weinbach et al., 2017). Promoting acceptance in these populations may broaden the attentional scope in a way that could help attend bigger picture information and break the ruminative cycle.

Several limitations of the study should be acknowledged. First, we did not ask participants to write down how they implemented rumination and acceptance. Thus, we cannot assess the extent to which participants followed the audio instructions. However, the differential effects of rumination and acceptance on negative affect in the expected direction based on previous theory imply that participants followed instructions. Moreover, the study was conducted online, thus limiting our ability to control the environment in which participants carried out the experiment. Another limitation is the absence of a positive affect assessment, which limits our ability

to determine whether the affective changes resulting from the implementation of acceptance and rumination also apply to positive affect. In addition, the emotion types assessed using the PANAS may not have captured the full spectrum of emotions that were triggered by recalling a negative personal event. Moreover, the study assessed the short-term effects of rumination and acceptance on perceptual processing immediately after using these strategies. Thus, additional research is required to examine if and to what extent the reported effects are stable over time. Finally, the study was not preregistered.

Despite these limitations, this study presents novel findings regarding the impact of rumination and emotional acceptance as emotion regulation strategies on global versus local perceptual processing styles. The findings provide empirical support for theoretical models suggesting relationships between rumination and a narrowed attentional scope and partial support for theories linking acceptance and a broad attentional scope. Future research should further explore how to translate this knowledge to better understand psychopathologies that are characterized by emotion regulation difficulties and aberrant perceptual processing styles. Such research has the potential to uncover how emotion-perception interactions can maintain clinical symptoms in various psychological disorders.

## References

- Baer, R. A. (2003). Mindfulness training as a clinical intervention: A conceptual and empirical review. *Clinical Psychology: Science and Practice*, 10(2), 125–143. <https://doi.org/10.1093/clipsy.bpg015>
- Basso, M. R., Schefft, B. K., Ris, M. D., & Dember, W. N. (1996). Mood and global-local visual processing. *Journal of the International Neuropsychological Society*, 2(3), 249–255. <https://doi.org/10.1017/S1355617700001193>
- Biss, R. K., Hasher, L., & Thomas, R. C. (2010). Positive mood is associated with the implicit use of distraction. *Motivation and Emotion*, 34(1), 73–77. <https://doi.org/10.1007/s11031-010-9156-y>
- Booth, R. D. L., & Happé, F. G. E. (2018). Evidence of reduced global processing in autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 48(4), 1397–1408. <https://doi.org/10.1007/s10803-016-2724-6>
- Cohen, N., & Mor, N. (2018). Enhancing reappraisal by linking cognitive control and emotion. *Clinical Psychological Science*, 6(1), 155–163. <https://doi.org/10.1177/2167702617731379>
- Crane, L., Goddard, L., & Pring, L. (2013). Autobiographical memory in adults with autism spectrum disorder: The role of depressed mood, rumination, working memory and theory of mind. *Autism*, 17(2), 205–219. <https://doi.org/10.1177/1362361311418690>
- Dreisbach, G., & Goschke, T. (2004). How positive affect modulates cognitive control: Reduced perseveration at the cost of increased distractibility. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 30(2), 343–353. <https://doi.org/10.1037/0278-7393.30.2.343>
- Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, 19(3), 313–332. <https://doi.org/10.1080/02699930441000238>
- Gable, P., & Harmon-Jones, E. (2010). The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. *Psychological Science*, 21(2), 211–215. <https://doi.org/10.1177/0956797609359622>
- Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015a). The mindfulness-to-meaning theory: Extensions, applications, and challenges at the attention-appraisal-emotion interface. *Psychological Inquiry*, 26(4), 377–387. <https://doi.org/10.1080/1047840X.2015.1092493>
- Garland, E. L., Farb, N. A., Goldin, P. R., & Fredrickson, B. L. (2015b). Mindfulness broadens awareness and builds Eudaimonic meaning: A process model of mindful positive emotion regulation. *Psychological Inquiry*, 26(4), 293–314. <https://doi.org/10.1080/1047840X.2015.1064294>
- Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information. *Psychological Science*, 13(1), 34–40. <https://doi.org/10.1111/1467-9280.00406>
- Gotham, K., Bishop, S. L., Brunwasser, S., & Lord, C. (2014). Rumination and perceived impairment associated with depressive symptoms in a verbal adolescent-adult ASD sample. *Autism Research*, 7(3), 381–391. <https://doi.org/10.1002/aur.1377>
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26, 41–54. <https://doi.org/10.1007/s10862-008-9102-4>
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 2(3), 271–299. <https://doi.org/10.1037/1089-2680.2.3.271>
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348–362. <https://doi.org/10.1037/0022-3514.85.2.348>
- Happé, F., & Frith, U. (2006). The weak coherence account: Detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 36(1), 5–25. <https://doi.org/10.1007/s10803-005-0039-0>
- Harmon-Jones, E., Price, T. F., & Gable, P. A. (2012). The influence of affective states on cognitive broadening/narrowing: Considering the importance of motivational intensity. *Social and Personality Psychology Compass*, 6(4), 314–327. <https://doi.org/10.1111/j.1751-9004.2012.00432.x>
- Hayes, S. C., & Pierson, H. (2005). Acceptance and commitment therapy. In A. Freeman, S. H. Felgoise, C. M. Nezu, A. M. Nezu, & M. A. Reinecke (Eds.), *Encyclopedia of cognitive behavior therapy* (pp. 1–4). Springer. [https://doi.org/10.1007/0-306-48581-8\\_1](https://doi.org/10.1007/0-306-48581-8_1)
- Hilt, L. M., Swords, C. M., & Webb, C. A. (2023). Randomized controlled trial of a mindfulness mobile application for ruminative adolescents. *Journal of Clinical Child and Adolescent Psychology*, 54(1), 99–112. <https://doi.org/10.1080/15374416.2022.2158840>
- Huffziger, S., Ebner-Priemer, U., Koudela, S., Reinhard, I., & Kuehner, C. (2012). Induced rumination in everyday life: Advancing research approaches to study rumination. *Personality and Individual Differences*, 53(6), 790–795. <https://doi.org/10.1016/j.paid.2012.06.009>
- Huntsinger, J. R., Clore, G. L., & Bar-Anan, Y. (2010). Mood and global-local focus: Priming a local focus reverses the link between mood and global-local processing. *Emotion*, 10(5), 722–726. <https://doi.org/10.1037/a0019356>
- Huntsinger, J. R., Isbell, L. M., & Clore, G. L. (2014). The affective control of thought: Malleable, not fixed. *Psychological Review*, 121(4), 600–618. <https://doi.org/10.1037/a0037669>
- Kalanthroff, E., Napařstek, S., & Henik, A. (2013). Spatial processing in adults with attention deficit hyperactivity disorder. *Neuropsychology*, 27(5), 546–555. <https://doi.org/10.1037/a0033655>
- Kandeger, A., Odabař Ünal, Ş., Ergün, M. T., & Yavuz Atařlar, E. (2024). Excessive mind wandering, rumination, and mindfulness mediate the relationship between ADHD symptoms and anxiety and depression in adults with ADHD. *Clinical Psychology & Psychotherapy*, 31(1), Article e2940. <https://doi.org/10.1002/cpp.2940>
- Kotsou, I., Lays, C., & Fossion, P. (2018). Acceptance alone is a better predictor of psychopathology and well-being than emotional competence, emotion regulation and mindfulness. *Journal of Affective Disorders*, 226, 142–145. <https://doi.org/10.1016/j.jad.2017.09.047>



- Kuehner, C., Huffziger, S., & Liebsch, K. (2009). Rumination, distraction and mindful self-focus: Effects on mood, dysfunctional attitudes and cortisol stress response. *Psychological Medicine*, 39(2), 219–228. <https://doi.org/10.1017/S0033291708003553>
- Lang, K., Kerr-Gaffney, J., Hodsoll, J., Jassi, A., Tchanturia, K., & Krebs, G. (2021). Is poor global processing a transdiagnostic feature of body dysmorphic disorder and anorexia nervosa? A meta-analysis. *Body Image*, 37, 94–105. <https://doi.org/10.1016/j.bodyim.2021.01.012>
- Lindsay, E. K., & Creswell, J. D. (2019). Mindfulness, acceptance, and emotion regulation: Perspectives from monitor and acceptance theory (MAT). *Current Opinion in Psychology*, 28, 120–125. <https://doi.org/10.1016/j.copsyc.2018.12.004>
- Lyubomirsky, S., Kasri, F., & Zehm, K. (2003). Dysphoric rumination impairs concentration on academic tasks. *Cognitive Therapy and Research*, 27(3), 309–330. <https://doi.org/10.1023/A:1023918517378>
- Lyubomirsky, S., & Tkach, C. (2004). The consequences of dysphoric rumination. In C. Papageorgiou & A. Wells (Eds.), *Depressive rumination: Nature, theory and treatment* (pp. 21–41). Wiley. <https://doi.org/10.1002/9780470713853>
- Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology*, 9(3), 353–383. [https://doi.org/10.1016/0010-0285\(77\)90012-3](https://doi.org/10.1016/0010-0285(77)90012-3)
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, 61(1), 115–121. <https://doi.org/10.1037/0022-3514.61.1.115>
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, 7(6), 561–570. <https://doi.org/10.1080/02699939308409206>
- Nolen-Hoeksema, S., Wisco, B. E., & Lyubomirsky, S. (2008). Rethinking rumination. *Perspectives on Psychological Science*, 3(5), 400–424. <https://doi.org/10.1111/j.1745-6924.2008.00088.x>
- Peirce, J., Gray, J. R., Simpson, S., MacAskill, M., Höchenberger, R., Sogo, H., Kastman, E., & Lindeløv, J. K. (2019). PsychoPy2: Experiments in behavior made easy. *Behavior Research Methods*, 51(1), 195–203. <https://doi.org/10.3758/s13428-018-01193-y>
- Raines, A. M., Vidaurre, D. N., Portero, A. K., & Schmidt, N. B. (2017). Associations between rumination and obsessive-compulsive symptom dimensions. *Personality and Individual Differences*, 113, 63–67. <https://doi.org/10.1016/j.paid.2017.03.001>
- Rankins, D., Bradshaw, J. L., & Georgiou-Karistianis, N. (2005). Local-global processing in obsessive-compulsive disorder and comorbid Tourette's syndrome. *Brain and Cognition*, 59(1), 43–51. <https://doi.org/10.1016/j.bandc.2005.04.003>
- Schoofs, H., Hermans, D., & Raes, F. (2010). Brooding and reflection as subtypes of rumination: Evidence from confirmatory factor analysis in nonclinical samples using the Dutch Ruminative Response Scale. *Journal of Psychopathology and Behavioral Assessment*, 32(4), 609–617. <https://doi.org/10.1007/s10862-010-9182-9>
- Segal, O., Sher, H., Aderka, I. M., & Weinbach, N. (2023). Does acceptance lead to change? Training in radical acceptance improves implementation of cognitive reappraisal. *Behaviour Research and Therapy*, 164, Article 104303. <https://doi.org/10.1016/j.brat.2023.104303>
- Singer, A. R., & Dobson, K. S. (2007). An experimental investigation of the cognitive vulnerability to depression. *Behaviour Research and Therapy*, 45(3), 563–575. <https://doi.org/10.1016/j.brat.2006.05.007>
- Smith, K. E., Mason, T. B., & Lavender, J. M. (2018). Rumination and eating disorder psychopathology: A meta-analysis. *Clinical Psychology Review*, 61, 9–23. <https://doi.org/10.1016/j.cpr.2018.03.004>
- Van Den Hout, M. A., Engelhard, I. M., & McNally, R. J. (2017). Thoughts on experimental psychopathology. *Psychopathology Review*, 4(2), 141–154. <https://doi.org/10.5127/pr.045115>
- Vine, V., Aldao, A., Nolen-Hoeksema, S., & Phil, M. (2014). Chasing clarity: Rumination as a strategy for making sense of emotions. *Journal of Experimental Psychopathology*, 5(3), 229–243. <https://doi.org/10.5127/jep.038513>
- Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54(6), 1063–1070. <https://doi.org/10.1037/0022-3514.54.6.1063>
- Weinbach, N., & Henik, A. (2011). Phasic alertness can modulate executive control by enhancing global processing of visual stimuli. *Cognition*, 121(3), 454–458. <https://doi.org/10.1016/j.cognition.2011.08.010>
- Weinbach, N., Perry, A., Sher, H., Lock, J. D., & Henik, A. (2017). Weak central coherence in weight-restored adolescent anorexia nervosa: Characteristics and remediation. *International Journal of Eating Disorders*, 50(8), 924–932. <https://doi.org/10.1002/eat.22711>
- Whitmer, A. J., & Gotlib, I. H. (2013). An attentional scope model of rumination. *Psychological Bulletin*, 139(5), 1036–1061. <https://doi.org/10.1037/a0030923>
- Williams, J. C., & Lynn, S. J. (2010). Acceptance: An historical and conceptual review. *Imagination, Cognition and Personality*, 30(1), 5–56. <https://doi.org/10.2190/IC.30.1.c>
- Wisco, B. E., & Nolen-Hoeksema, S. (2009). The interaction of mood and rumination in depression: Effects on mood maintenance and mood-congruent autobiographical memory. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 27(3), 144–159. <https://doi.org/10.1007/s10942-009-0096-y>

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