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BRIEF REPORT

Distinguishing between level and impact of rumination as predictors of depressive symptoms: An experience sampling study

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Rumination—repetitively thinking about one's emotional state, its causes and consequences—exacerbates negative mood and plays an important *role* in the aetiology and maintenance of depression. Yet, it is unclear whether increased vulnerability to depression is associated with simply how much a person ruminates, or the short-term impact rumination has on a person's negative mood. In the current study, we distinguish between the *level* versus the *impact* of rumination, and we examine how each uniquely predicts changes in depressive symptoms over time in an undergraduate sample. Using experience sampling, we assessed students' (N = 101) subjective experiences of positive and negative affect and their use of rumination and distraction in daily life for seven days. Participants also reported their depressive symptoms before and after the experience sampling. Increases in depressive symptoms over the week were predicted by how much people ruminated, but not by its impact on negative mood.

Keywords: Rumination; Negative affect; Depressive symptoms; Distraction; Positive affect; Experience sampling.

A large and rapidly expanding literature on rumination has shown that it is associated with various psychopathologies including anxiety, binge eating and self-harm (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). However, most notably, rumination is considered to be a major vulnerability factor for depression (Nolen-Hoeksema, 1991). Although previous studies have confirmed the link between rumination and depressive

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symptoms (Nolen-Hoeksema et al., 2008; Watkins, 2008), they have largely *focused* on individual differences in the level, or amount, a person ruminates. In the current study, we distinguish between how much a person ruminates versus the short-term impact of rumination on a person's mood and examine how each independently predicts changes in depressive symptoms over time. Making this distinction has the potential to deepen our understanding of the relationship between rumination and depression and provide clues as to where therapeutic intervention may be possible. Specifically, this distinction allows us to derive two hypotheses about how rumination predicts changes in depression over time: The first hypothesis (regarding the level of rumination) starts from the notion of individual differences in how much people ruminate and predicts that individuals who ruminate more will show increases in depressive symptoms. In contrast, the second hypothesis (regarding the impact of rumination) proposes that people also differ in terms of the short-term impact of rumination on mood and that individuals for whom ruminating has a more pronounced impact will show increases in depressive symptoms.

Rumination

A widely studied and harmful form of rumination involves the tendency to repetitively and passively focus on one's symptoms of distress and on their causes and consequences (Nolen-Hoeksema, 1991). Labelled *depressive rumination*, this involves negatively valenced, abstract and self-evaluative cognitions (Nolen-Hoeksema et al., 2008; Watkins, 2008). Rumination biases the content of thought by setting a focus on personal problems, a negative tone and self-blame (Lyubomirsky, Tucker, Caldwell, & Berg, 1999). Despite its apparently harmful consequences, people may engage in this kind of rumination in an attempt to regulate negative mood (Nolen-Hoeksema et al., 2008). In particular, people report ruminating in order to identify why they feel sad and to understand the meaning of their sadness (Raes, Hermans, Williams, Bijttebier, & Eelen, 2008). However, asking such questions can quickly spiral into an uncontrollable cycle of negative thinking. People differ substantially in the extent to which they ruminate. Whereas rumination is often seen as a relatively stable trait (Nolen-Hoeksema et al., 2008), the amount a person ruminates may fluctuate over time (e.g., Takano & Tanno, 2011).

Effects of rumination

According to Nolen-Hoeksema's (1991) Response Styles Theory (RST), ruminating in response to sad mood predicts the onset, severity and duration of depressive symptoms. This prediction has been borne out in numerous empirical studies (for a review, see Nolen-Hoeksema et al., 2008). According to the RST, one of the central pathways through which rumination exerts its influence on depression is by enhancing negative mood and cognitions, which reciprocally increase each other and lead to increased recall of negative memories (Ciesla & Roberts, 2007; Nolen-Hoeksema, 1991). These negative thoughts and memories influence a person's appraisals of their current situation, making it more likely that a person will experience the world as negative.

Previous studies have predominantly used trait measures of rumination, such as the Ruminative Responses Scale (RRS; Huffziger, Reinhard, & Kuehner, 2009; Nolen-Hoeksema & Morrow, 1991), which only capture individual differences in how much people ruminate, but not its impact on mood. Although a handful of studies have assessed momentary rumination in daily life (e.g., Moberly & Watkins, 2008a), these studies have not distinguished between the level and the impact of rumination.

Distinguishing between level and impact of rumination

In the current study, we aimed to assess how individual differences in the level (i.e., frequency and intensity) and short-term impact of rumination on negative affect (NA) in daily life may each uniquely predict longer-term increases in depressive symptoms. As mentioned above, previous

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studies have mostly *focused* on the level of rumination. Whether rumination was measured at the trait or state level, these studies have repeatedly demonstrated that individuals who ruminate more display elevated depressive symptoms (Nolen-Hoeksema et al., 2008). Yet, such studies do not reveal whether how strongly people's mood changes when they ruminate may also contribute to depression. In terms of the impact of rumination, the effect of rumination on NA has been confirmed in numerous studies both in the lab and in the daily life (e.g., Brans, Koval, Verduyn, Lim, & Kuppens, 2013; Moberly & Watkins, 2008a, 2008b). These studies suggest that rumination leads to increases in NA and negative cognitions, which then continue to reciprocally amplify each other (Ciesla & Roberts, 2007; Lyubomirsky & Nolen-Hoeksema, 1995). Because of these reciprocal influences of cognitive and affective processes, the impact of rumination on NA is thought to increase *and/or* prolong depressive symptoms more globally. These findings show that the impact of rumination on NA is related to increases in depressive symptoms and suggest that people for whom rumination is more detrimental (i.e., for whom it leads to bigger increases in NA) may show greater increases in depressive symptoms. For example, two individuals who ruminate to the same level may experience different consequences from that rumination: The first individual may start feeling more sad and distressed, while the second person's mood may be relatively unchanged by rumination (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky et al., 1999).

The current study

The primary aim of the current study was to investigate the extent to which increases in depressive symptoms are predicted by individual differences in rumination in daily life. The current study goes beyond much of the existing research on the *role* of rumination in depression in the following three respects.

First, we used the Experience Sampling Method (ESM) to repeatedly assess participants' mood and use of rumination in daily life. ESM provides greater ecological validity than commonly used trait questionnaires, such as the RRS (Nolen-Hoeksema & Morrow, 1991), which rather reflect global self-assessments and may be unduly influenced by retrospective biases.

Second, previous studies of rumination in daily life have *focused* mainly on the effects of rumination on NA (Moberly & Watkins, 2008a; Takano & Tanno, 2011). Yet, rumination may also be followed by decreases in positive affect (PA; Brans et al., 2013; Huffziger, Ebner-Priemer, Koudela, Reinhard, & Kuehner, 2012), with possible downstream consequences for depressive symptoms. Similarly, few studies have compared the effects of rumination in daily life with other emotion regulation strategies, such as distraction, which involves diverting one's attention away from the emotion-eliciting stimulus (Gross & Thompson, 2007). Distraction is seen as a more adaptive response to distress because it relieves NA and has been shown to shorten depressive symptoms (Huffziger et al., 2009; Nolen-Hoeksema & Morrow, 1993). To situate our findings within a broader context, we also included measures of both PA and distraction in the current study.

Third, and most importantly, in the current study, we distinguish between the mean use (i.e., level) of rumination and distraction versus their consequences (i.e., impact) on PA and NA in daily life. While this distinction is not new, research on emotion regulation has rarely assessed both how much a particular strategy (e.g., rumination) is used versus how much it impacts subsequent affect within the same individuals and using the same methods (McRae, 2013). Making this distinction will allow us to draw a clearer picture of how rumination is associated with the development of depressive symptoms over time.

METHOD

We report how we determined our sample size, all data exclusions, all manipulations and all measures in the study.

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Participants

Participants, mostly university students, were recruited by advertisements around Leuven and paid 40€. In order to take part in the study, participants had to be between the ages of 18 and 31; native Dutch speakers and currently, not receiving treatment for any psychological disorder. Of the 108 participants recruited, seven withdrew early because the study was more time-consuming than expected, leaving a final sample of 101 participants (M_{age} = 21.40 SD_{age} = 2.15; 73.7% female). Sample size was determined by balancing the need to ensure sufficient power for detecting expected effect sizes ($r \approx .3$) and the available budget.

Materials

Depressive symptoms

Current depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). This 20-item scale measures the frequency of various depressive symptoms over the past week on a scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). The CES-D was administered at the start (CES-D Time 1; α = .86) and again at the end (CES-D Time 2; α = .91) of the study.

Trait rumination

Trait rumination was assessed using the 22-item RRS (Nolen-Hoeksema & Morrow, 1991). The RRS asks participants to rate how often they respond in various ways when feeling sad or depressed (e.g., "Think about a recent situation wishing it had gone better") using a scale from 1 (*almost never*) to 4 (*almost always*). The RRS was only administered at Time 1 (α = .90). Descriptive statistics are shown in Table 1.[1]

ESM questionnaire

Participants were given a smartphone that prompted them to complete a short electronic ESM questionnaire created using custom-designed software. The smartphone was accompanied by an instruction manual in which all the ESM questionnaire items were explained. Among other questions not related to the current study, the ESM questionnaire asked participants to report their current affect at each prompt and their use of rumination and distraction since the previous prompt. Specifically, participants' current levels of sadness, stress, anger, disappointment, happiness and relaxation were assessed ("how____ do you feel at the moment?") on a scale from 0 (*not at all*) to 100 (*very much*). These items were selected to reflect both high- and low-arousal positive and negative states. More items were not included to minimise participant burden and maximise compliance. NA and PA scales were formed by averaging the four negative and two positive items, respectively. Multilevel reliability analyses indicated that the NA and PA scales had beep-level reliabilities of .60 and .64 and person-level reliabilities of .96 and .95, respectively (Nezlek, 2012). Participants also reported their engagement in rumination and distraction since the previous beep on a scale ranging from 0 (*not at all*) to 100 (*almost all of the time*). Rumination was measured with the following two items: "since the previous beep, how much have you ruminated?" and "since the previous beep, how much have you *focused* on your feelings?" The first item was described in the instruction manual as "you have tried to change your feelings by analyzing them, by thinking about their causes, meanings and consequences". The two rumination items were averaged to form an overall rumination score (beep-level reliability = .61; person-level reliability = .97). A single item assessed distraction: "since the previous beep, how much have you distracted yourself from your feelings?" The instruction

[1] Several other trait questionnaires were administered during the initial lab session. These were not analysed for the current report.

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Table 1. *Descriptive statistics and intercorrelations among all measures*

			SD												
Measure	*Range*	*Mean*	*Between-persons*	*Within-persons*	*ICC*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
1. NA level	0–99.75	19.95	8.54	13.24	.29	1.00									
2. PA level	0–100	57.49	10.60	18.61	.25	−.34***	1.00								
3. Level of rumination	0–100	22.48	11.22	16.55	.31	.77***	−.19	1.00							
4. Level of distraction	0–100	27.74	18.51	20.09	.46	.36***	.06	.35***	1.00						
5. Impact of rumination on NA	.04–.56	.31	.12	–	–	−.1	.08	−.15	−.09	1.00					
6. Impact of rumination on PA	−.42–.04	−.25	.13	–	–	.15	−.24*	.16	.06	−.47***	1.00				
7. Impact of distraction on NA	−.14–.39	.10	.13	–	–	−.19	.19	−.23*	−.47***	.35***	−.20*	1.00			
8. Impact of distraction on PA	−.28–.11	−.06	.12	–	–	.14	−.23*	.09	.41***	−.12	.36***	−.64***	1.00		
9. CES-D at Time 1	1–35	12.89	7.25	–	–	.25*	−.12	.29**	.15	.06	−.13	−.17	.02	1.00	
10. CES-D at Time 2	9–38	18.01	5.42	–	–	.31**	−.29**	.33**	.13	.04	.07	−.26**	.05	.46***	1.00
11. RRS	22–65	40.70	10.43	–	–	.25*	−.11	.32**	.09	.06	−.05	−.05	−.12	.39***	.31**

Note: CES-D, Center for Epidemiologic Studies Depression Scale; RRS, Ruminative Responses Scale. Scores for 'level' of rumination and distraction are person-specific intercepts from unconditional multilevel models with rumination and distraction as the outcomes. Scores for 'impact' of rumination and distraction on NA and PA are person-specific slopes of rumination or distraction from cross-lagged multilevel models predicting current affect (controlling for affect at the previous beep). $N = 94$ for statistics relating to the RRS due to missing data for seven participants for this measure.

*$p < .05$; **$p < .01$; ***$p < .001$.

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manual explained this item as: "you have tried to change your feelings by distracting your attention away from them".

Procedure

The study lasted 9 days, beginning on a Tuesday and ending on a Wednesday. On Day 1, participants attended an introductory lab session during which they completed several dispositional measures including the first measure of depressive symptoms (CES-D Time 1), and received their smartphones with instructions for use. The ESM protocol began immediately after the introductory lab session (Day 1) and ended in the evening of Day 8.[2] Each day was divided into 10 intervals of 72 min, and smartphones were programmed to beep at random moments within each of the 10 intervals. Overall, compliance with the ESM protocol was very high: On average, participants completed 91.5% of scheduled beeps (SD = 7.7%). In total, the study collected data on 6199 sampling occasions, with an average across participants of 61.38 (SD = 5.24). On Day 9, participants attended a second lab session during which they completed several questionnaires including a second measure of depressive symptoms (CES-D Time 2), received their payment and were debriefed.

Statistical analyses

For the statistical analyses of the ESM data, we used hierarchical linear modelling to account for the nested structure of the data (Nezlek, 2012). In the current data, beeps/occasions (Level 1) are nested within persons (Level 2).

Unconditional models: Level of rumination and distraction

To estimate each participant's level of rumination and distraction, we constructed unconditional (i.e., 'intercept-only') models. Specifically, at Level 1 the outcome (Y_{ti}), representing a person i's score on rumination or distraction at time t, was predicted by an intercept (π_{0i}), representing the within-person average score on that variable. This Level 1 intercept was allowed to vary randomly across persons at Level 2. The Level 2 intercept (β_{00}) represents the average Level 1 intercept across the sample (see model equations below).

Level 1 (beep level):

$$Y_{ti} = \pi_{0i} + e_{ti} \quad (1)$$

Level 2 (person level):

$$\pi_{0i} = \beta_{00} + r_{0i} \quad (2)$$

Cross-lagged models: Impact of rumination and distraction

To estimate the impact of rumination and distraction on NA and PA for each participant, we constructed cross-lagged models in which NA or PA was predicted by rumination or distraction while controlling for NA or PA at the previous beep, indicating to what extent the regulation strategy was followed by a change in affect. Specifically, at Level 1 the outcome (affect_{ti}), representing a person i's score on NA or PA at time t, was predicted by (1) an intercept (π_{0i}), (2) an impact slope (π_{1i}) representing the prediction of current affect by a person i's use of rumination or distraction at time t (reported as occurring "since the previous beep"), and (3) an autocorrelation slope (π_{2i}) representing the association between current affect and affect at time t–1. Level 1 predictors were person-mean centred, implying that the intercept at Level 1 represented the within-person average level of affect. The Level 1 intercept and slopes were allowed to vary randomly across persons at Level 2. The Level 2 intercepts (β_{00}, β_{10} and β_{20}) represent sample averages for the Level 1 intercept and slopes (see model equations below).

[2] The last day of the ESM involved an experimental manipulation that is not reported in the current study. We report data exclusively from the first 7 days of the ESM. No other manipulations were administered.

Level 1 (beep level):

$$\text{affect}_{ti} = \pi_{0i} + \pi^*_{1i}\,(\text{regulation strategy}_{ti}) + \pi^*_{2i}\,(\text{affect}_{t-1i}) + e_{ti}$$

Level 2 (person level):

$$\pi_{0i} = \beta_{00} + r_{0i} \quad (3)$$

$$\pi_{1i} = \beta_{10} + r_{1i} \quad (4)$$

$$\pi_{2i} = \beta_{20} + r_{2i}. \quad (5)$$

Predicting change in depressive symptoms

To assess how individual differences in the level and impact of rumination and distraction predicted change in depressive symptoms, we extracted person-specific estimates from the multilevel models (above). Specifically, person-specific intercepts representing each participant's level of rumination and distraction during the ESM week were extracted from unconditional models. Person-specific slopes representing the impact of rumination and distraction on NA and PA were extracted from cross-lagged models. These estimates were used to predict change in depressive symptoms over the week using OLS regressions. In each ordinary least-squares (OLS) regression, CES-D scores at Time 2 were predicted by the level *and* impact of rumination *or* distraction, while controlling for CES-D scores at Time 1.

RESULTS

Level of rumination and distraction

Average levels of rumination and distraction across the sample (fixed effect estimates from the unconditional models) are shown as means in Table 1. Table 1 also displays the standard deviations (random effect estimates from the unconditional models) and ranges of all variables, as well as their intercorrelations. Levels of rumination and distraction were positively correlated, indicating that people who tend to ruminate more also tend to use distraction more in daily life. Furthermore, ESM and trait levels of rumination correlated positively with depressive symptoms at Time 1 and Time 2. Finally, trait rumination scores correlated with the ESM level of rumination, but not with the impact of rumination on PA or NA.

Impact of rumination and distraction on NA and PA

Estimates of β_{10} from the cross-lagged models reflecting the average impact of rumination and distraction on changes in NA and PA are shown as means in Table 1. On average, participants experienced significant increases in NA after ruminating ($p < .001$). Unexpectedly, distraction was also related to significant increases in NA, on average ($p < .001$). Results were opposite and also statistically significant for PA: Rumination ($p < .001$) and distraction ($p < .001$) were both associated with decreases in PA, on average ($p < .001$).[3] Affect at $t-1$ was also significantly associated with affect at t. Specifically, the average autoregressive slopes were in the cross-lagged models including rumination and distraction, respectively, $B = .24$ (SE = .02) and $B = .32$ (SE = .02) for NA and $B = .32$ (SE = .02) and $B = .36$ (SE = .02) for PA (all ps $< .001$).

Although, on average, rumination and distraction had similar impacts on changes in affect, there were large individual differences in the impact of each strategy on PA and NA (see between-person SDs and ranges in Table 1). In particular, the impact of distraction on both NA and PA ranged from negative to positive values, indicating that for some individuals using distraction was associated with decreases in NA and increases in PA.

[3] Additional analyses testing the opposite cross-lagged associations (i.e., affect predicting changes in rumination or distraction) revealed significant associations among all variables, indicating that rumination ($B_{NA} = 0.19$, SE = 0.02, $p < .001$; $B_{PA} = -0.10$, SE = 0.02, $p < .001$) and distraction ($B_{NA} = 0.17$, SE = 0.02, $p < .001$; $B_{PA} = -0.08$, SE = 0.02, $p < .001$) were bi-directionally associated with PA and NA.

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Table 2. *Standardised beta weights from multiple regression analyses predicting depressive symptoms at Time 2*

	Model 1	*Model 2*	*Model 3*	*Model 4*	*Model 5*
CES-D Time 1	.39***	.39***	.43***	.45***	.35***
Level of rumination	.22*	.22*			.22*
Impact of rumination on NA	.05				.14
Impact of rumination on PA		−.05			.00
Level of distraction			−.02	.06	−.08
Impact of distraction on NA			−.20		−.32*
Impact of distraction on PA				.02	−.13
R^2	.253***	.253***	.244***	.214***	.300***

Note: NA, negative affect; PA, positive affect; CES-D Time 1, scores for depressive symptoms at session 1. Scores for 'level' of rumination and distraction are person-specific intercepts from unconditional multilevel models with rumination and distraction as the outcome. Scores for 'sensitivity' to rumination and distraction in terms of increases or decreases of NA and PA are person-specific slopes of rumination or distraction from cross-lagged multilevel models predicting current affect (controlling for affect at the previous beep).
*$p < .05$; **$p < .01$; ***$p < .001$.

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Impact of rumination on NA was positively correlated with impact of distraction on NA (see Table 1). The same was true for the impact of rumination and distraction on PA. Thus, individuals for whom rumination had a greater impact on mood also showed a stronger impact of distraction. Regarding correlations with depressive symptoms, only the impact of distraction on NA was significantly negatively related to depressive symptoms at Time 2.

Predicting change in depressive symptoms

Table 2 displays results of a series of multiple regression models predicting change in depressive symptoms from Time 1 to Time 2. In each model, CES-D at Time 2 was the outcome and CES-D at Time 1 was included as a covariate. In Model 1, the level of rumination and the impact of rumination on NA were entered as simultaneous predictors: Only level of rumination was significantly related to an increase in depressive symptoms, whereas impact of rumination on NA had no significant effect. Similarly, in Model 2, impact of rumination on PA showed no unique association with change in CES-D. Models 3 and 4 were equivalent analyses for distraction, which showed no significant effects.[4]

However, given the significant correlations between both the levels and impacts of rumination and distraction (see Table 1), we ran a final model regressing CES-D scores at Time 2 onto all predictors simultaneously. This model showed that in addition to the level of rumination, which remained a significant independent predictor, impact of distraction on NA also significantly predicted decreases in depressive symptoms (see Model 5 in Table 2).

DISCUSSION

The current study aimed to shed light on how different aspects of rumination are associated with depressive symptoms. Previous research has shown that rumination increases negative mood in the short-term and that how much people ruminate prospectively predicts increases in depressive symptoms (Nolen-Hoeksema et al., 2008), yet which of these processes mainly drives increases in depressive symptoms remained unclear. In the current study, we repeatedly assessed rumination and affect in daily life, allowing us to distinguish between the level a person ruminates and the

[4] We also examined the interactive effects between the level and the impact of rumination or distraction on change in depression. None of the interactions were significant, however (ps > .32).

impact of rumination on NA from moment to moment. We examined the unique contribution of these two factors in predicting change in depressive symptoms over time. For comparison, we also included measures of distraction and PA.

Our findings showed that increases in depressive symptoms over the week were predicted by individual differences in the level of rumination, but not by individual differences in short-term emotional responsiveness to rumination in daily life. This finding is in line with previous questionnaire studies that found trait rumination to predict increases in depressive symptoms (Ciesla & Roberts, 2007; Lyubomirsky and Nolen-Hoeksema, 1993; Nolen-Hoeksema & Morrow, 1993), yet it challenges the notion that rumination influences depression through increasing negative mood (e.g., Nolen-Hoeksema et al., 2008). Sure enough, we found that ruminating was associated with increased levels of NA in daily life, consistent with previous studies (e.g., Moberly & Watkins, 2008a; Takano & Tanno, 2011). Yet, experiencing a greater impact of rumination on NA in itself did not predict changes in depressive symptoms over the course of the study.

The current findings have both theoretical and practical implications. First, the current study provides support for the link between rumination and increases in depressive symptoms, proposed by the RST. However, our findings also challenge the RST by suggesting that rumination is associated with increases in depressive symptoms through how much people engage in it, regardless of the impact of rumination. In contrast, the RST would suggest that rumination enhances negative mood and negative thinking, which mutually start to influence each other and, *via* increases in negative memories and appraisals, eventually lead to increases in depressive symptoms (Nolen-Hoeksema et al., 2008). The current findings suggest that in the short term, within-person changes in mood may not play such a decisive *role* in predicting depressive symptoms. Other pathways have been proposed through which rumination impacts depression, such as impaired problem-solving and reduced social support (Nolen-Hoeksema et al., 2008). Therefore, our findings do not challenge that there may be such pathways from rumination to depression, but rather call into question whether mood is the most important factor at play at this micro-dynamic level. As such, we would like to encourage further research identifying the exact pathways through which rumination influences depression.

Second, our findings have consequences for clinical practice. We found that simply ruminating more, regardless of what effect this has on a person's mood, is associated with increases in depressive symptoms. This suggests that, in the context of treating depressive symptoms, it may be important to intervene before rumination occurs (or early in the process) rather than attempt to alter the affective consequences of rumination. Various factors of Cognitive-Behavioural Therapy target reducing rumination (Watkins et al., 2007). Especially, interventions *focusing* on training in concrete and specific thinking have proven successful in decreasing rumination and may, therefore, offer promise in treating depression (Watkins, Baeyens, & Read, 2009; Watkins et al., 2012).

An unexpected finding was that, on average, distraction was related to increases in NA and decreases in PA. Although this appears to suggest that distraction is harmful, an alternative explanation for this finding is that people may simply use distraction when experiencing high levels of NA *and/or* when ruminating (see the significant positive correlation between the mean use of rumination and distraction in Table 1). Put otherwise, the association between distraction and worsening mood may be due to the fact that people distract themselves in an attempt to disrupt their rumination or repair low mood.

We also found that the impact of distraction on NA was associated with a significant decrease in depressive symptoms over the week, independent of the level of distraction. Although this association is somewhat puzzling, it is important to note that the impact of distraction on NA ranged from negative to positive values in the current study (see Table 1), implying that participants with the 'lowest' impact of distraction on NA actually experienced short-term decreases in NA. Thus, the negative association between the impact of

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distraction on NA and changes in depressive symptoms implies that participants who derived some short-term benefit from distraction were those who showed larger increases in depressive symptoms across the week. This is actually consistent with previous experimental evidence (e.g., Huffziger et al., 2009; Nolen-Hoeksema et al., 2008), which suggests that the short-term beneficial effects of distraction are larger for individuals with higher (or here: increasing) levels of depressive symptoms. One other alternative explanation for this finding could be that people who showed a larger increase in depressive symptoms over the week were less able to distract themselves from their feelings when experiencing increases in NA.

Limitations and future directions

We note a number of limitations of the current study. First, our sample consisted mostly of students (aged 18–31 years) who were not clinically selected on depression, limiting the generalisability of our findings to clinical populations. Second, while rumination and distraction were reported as occurring "since the previous beep", they were assessed concurrently with PA and NA. Thus, we cannot rule out the possibility that rumination or distraction were the consequences rather than causes of changes in affect (*cf.* Brans et al., 2013). Third, there are many ways to define, assess and conceptualise rumination. Our measure of rumination did not capture the duration or uncontrollability of ruminative thought, nor was it constructed to differentiate between adaptive and maladaptive forms of rumination. These factors may be important for future research to address in delineating the *role* of rumination in depression (Smith & Alloy, 2009). A final limitation is that the level of rumination may have had an influence on depression *via* other pathways than its impact on mood, which were not assessed in the current study. Future studies are required to investigate the roles of other deleterious consequences of rumination on increasing depressive symptoms.

CONCLUSION

The aim of the present experience sampling study was to distinguish between how much people ruminate and the impact of rumination, and examine the unique prospective relations with depressive symptoms. We found no evidence that the impact of rumination (on either NA or PA) was related to increases in depression. However, we did find that one's level of rumination in daily life is related to increases in depressive symptoms. Thus, simply engaging in rumination more may make one vulnerable to adverse consequences such as increased depressive symptoms. Our findings suggest that in the context of treating depressive symptoms, it may be important to intervene at the beginning of the ruminative process to prevent the deleterious effects of ruminative thinking.

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