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The Association Between the Selection and Effectiveness of Emotion-Regulation Strategies and Psychopathological Features: A Daily Life Study



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Abstract

Emotion dysregulation is central to psychopathological conditions, including borderline personality disorder (BPD) and depression. However, the nature of emotion-regulation (ER) difficulties in the daily life of people with BPD or depressive features is still unclear. Therefore, in this study, we aimed to disentangle two different ER subprocesses in daily life, (a) selection of ER strategies and (b) the effectiveness of implementing strategies, in terms of their associations with subsequent emotional experience. We analyzed data from a three-wave, longitudinal, experience-sampling study of young adults with varying levels of psychopathological features (N = 202). BPD features were uniquely linked to the use but not altered effectiveness of several putatively adaptive and maladaptive ER strategies. Depressive features were uniquely associated with the use of putatively maladaptive strategies. These findings suggest that ER deficits in people with more BPD or depressive features may be primarily located in strategy selection rather than the implementation of those strategies.

Keywords

emotion-regulation strategies, borderline personality disorder features, depressive features, daily life, negative emotion, selection, implementation

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Optimal emotional functioning is key to psychological well-being, allowing people to respond appropriately to their changing environment (Kuppens & Verduyn, 2015). Therefore, it is perhaps unsurprising that several types of psychopathology are characterized by emotion dysregulation (Carpenter & Trull, 2013; Hofmann et al., 2012). This is the case for borderline personality disorder (BPD)—characterized by strong instability in several domains, including affect—and major depressive disorder (MDD)—often comorbid with BPD but specifically characterized by prolonged and persistent experiences of depressed mood (American Psychiatric Association, 2013). To understand the nature of emotion dysregulation in psychopathology, including BPD and depression, it is crucial to study emotion regulation (ER) in response to personally relevant daily contexts (Liu & Thompson, 2017). However, research investigating links

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between psychopathological features and emotion-regulatory processes in everyday life is scarce.

"Emotion regulation" refers to the processes through which people aim to influence their emotional states (Gross, 2015). Effective regulation processes are central to psychological well-being because they allow people to address unwanted emotional experiences. In line with this idea, traditional research that used global self-report questionnaires or lab tasks has linked BPD to greater use of putatively maladaptive strategies, such as rumination (e.g., Baer et al., 2012) and thought suppression (e.g., Cheavens et al., 2005), that are generally ineffective in improving one's mood (Webb et al., 2012). Moreover, BPD is linked to less use of putatively adaptive strategies (e.g., reappraisal and distraction) that are generally effective at improving short-term mood (Sauer et al., 2016). Likewise, meta-analyses have shown that depression is linked to more frequent use of ineffective strategies, such as rumination and suppression (Aldao et al., 2010), and with the less frequent use of more effective strategies, such as reappraisal and acceptance (e.g., Liu & Thompson, 2017).

Although such studies provide insight into ER processes at play in people with psychopathology, they have two important shortcomings. First, global self-reports tend to assess people's beliefs about how they typically regulate emotions, which may be distinct from their actual ER efforts in response to personally relevant everyday stressors (Koval et al., 2023; McMahon & Naragon-Gainey, 2020). Likewise, instructed ER use in the lab does not necessarily capture how people naturally regulate emotions (Liu & Thompson, 2017). It is important to complement lab and global-questionnaire studies with daily life research that repeatedly assesses ER in the moment in personally relevant contexts (Koval & Kalokerinos, in press).

Second, research tends to focus on difficulties in ER strategy employment in general. However, ER involves several stages (Gross, 2015), and research on psychopathology has focused primarily on the selection stage. To understand emotion dysregulation in psychopathology, we argue that it is necessary to examine not only differential strategy selection but also how effectively strategies are implemented.

Disentangling Selection and Effectiveness of ER Strategies

Studies that adopt a daily life approach to examine the selection or effectiveness of ER processes in BPD are rare. Two studies by Chapman and colleagues (2009, 2017) used a daily life approach and revealed that people with BPD (features) reported lower levels of negative emotion (NE; but unchanged levels of positive emotion [PE]) on days they were instructed to avoid NE (Chapman et al., 2017) and higher levels of PE on days they were instructed to suppress NEs as opposed to just observe their emotions (Chapman et al., 2009).

Very few studies have examined both the selection and effectiveness of ER in BPD. First, Southward and Cheavens (2020) used trait questionnaires and a written assignment to show that people with BPD reported both greater maladaptive-strategy use in the past month and lower quality of ER implementation than people with depression or control subjects. Second, Howard and Cheavens (2023) investigated interpersonal ER using a global self-report measure and showed that BPD features were unrelated to the frequency of interpersonal ER but related to lower perceived efficacy of interpersonal ER. However, neither of these studies used a daily life approach. To our knowledge, there is only one daily life study in this area, a small pilot study ($N = 8$; Southward et al., 2020) that revealed that people with BPD most frequently reported attempts at focusing on the emotion they were currently experiencing, problem-solving, experiential avoidance, and acceptance. The participants experienced an increase in NEs after acceptance and an increase in positive affect after experiential avoidance. This was surprising because it suggested that acceptance—a putatively adaptive strategy—was ineffective and that a putatively maladaptive strategy—experiential avoidance—might be effective for this group. However, these findings should be interpreted with caution because of the small sample and lack of control group.

For depression, research that has looked at ER strategy use in daily life is also sparse. Studies have shown that people with MDD were more likely to use rumination in daily life (Kircanski et al., 2015) and that for boys only, depressive symptoms were related to less frequent use of acceptance (Lennarz et al., 2019). To our knowledge, only two daily life studies looked at both ER strategy selection and effectiveness in relation to depression. Ruscio et al. (2015) found that people with depression reported higher levels of rumination after the occurrence of an event in daily life, which was related to a stronger subsequent increase in NE. Pasyugina et al. (2015) showed that average level of rumination but not the impact of rumination use on subsequent emotions predicted increases in depressive features in students. These daily life studies again confirm the well-established association between depression and rumination (Kovács et al., 2020) but also illustrate the lack of studies on other ER strategy use and its effectiveness in daily life.

Our Study

The goal of the current study was to better understand ER in people with BPD and depressive features by addressing two research questions. We investigated whether higher levels of psychopathological features (related to BPD and depression) were associated with differences in ER strategy (a) selection and (b) effectiveness. Although selection of ER strategies can be measured in different ways, we focused on average degree to which a strategy was used, in line with Koval et al. (2023). Furthermore, given that ER is almost always employed to reduce aversive emotional states in daily life (Kalokerinos et al., 2017; Riediger et al., 2009), we operationalized effectiveness of ER strategies in terms of their potential to decrease NEs and increase PEs. In addition, because depression often occurs comorbidly with BPD (Zimmerman & Mattia, 1999) but has a different emotion-dynamic signature (American Psychiatric Association, 2013; Houben et al., 2015), we examined whether the findings reflect transdiagnostic processes or are specific to either BPD or depressive features.

On the basis of previous research, we hypothesized that higher levels of psychopathological features would be associated with (a) increased selection of putatively maladaptive ER strategies (rumination, suppression) and decreased selection of putatively adaptive ER strategies (distraction, reappraisal), (b) less effective implementation of adaptive strategies (i.e., weaker subsequent improvements in emotions), and (c) more detrimental implementation of maladaptive strategies (i.e., stronger subsequent worsening of emotional states). For all hypotheses, when accounting for overlap between BPD and depressive features, we expected more pronounced effects for BPD features than for depressive features because BPD is more strongly associated with emotional dysregulation (Carpenter & Trull, 2013; Linehan et al., 2007).

Transparency and Openness

Preregistration

Neither the study design nor the analysis plan was preregistered.

Data, materials, code, and online resources

Data and code for all analyses are available at https://osf.io/ydt98. The Supplemental Material available online includes all variables collected in this study, additional details regarding our sample and analytic approach, descriptive statistics and correlations, supplemental analyses, more detailed results regarding our main analyses, and a systematic overview of all results.

Reporting

We report how we determined our sample size a priori and report all manipulations and all measures in the study. No data were excluded for any of the analyses.

Ethical approval

The study was approved by the Ethical Board of KU Leuven (S54567) in accordance with the Declaration of Helsinki.

Method

Participants

Participants were 202 students commencing their first year at a Belgian university or higher education institute, which typically involves many challenges. Participants were prescreened on depressive symptoms and included via a stratified-sampling approach (Ingram & Siegle, 2009). This resulted in a sample with varying levels of depressive and BPD features allowing us to adopt a dimensional approach to psychopathology (Kotov et al., 2017). The sample scored higher than the average Dutch-speaking Belgian population on both BPD- and depressive-features measures (Schotte & De Doncker, 1996; Schotte et al., 1998; Wu et al., 2016); around 30% of the sample scored high and 6% scored very high on both BPD and depressive features (Gotlib et al., 1995; Radloff, 1977; Schotte & De Doncker, 1996; Schotte et al., 1998).

The average age of the total sample was 18.32 years (SD = 0.96), and sex assigned at birth was female for 55% of the sample. Participants all completed at least upper secondary education. Most reported a European background (96%) and Belgian nationality (93%). For more detailed information about the sample, see the Supplemental Material.

Procedure

This was a three-wave longitudinal study. Waves 2 (N = 191) and 3 (N = 178) were 4 and 12 months after Wave 1, respectively.[1] In each wave, participants completed cross-sectional self-report questionnaires alongside other tasks not relevant for the current report (see the Supplemental Material). Participants also completed an experience-sampling-method (ESM) protocol, during

which they carried a smartphone throughout their everyday lives. The ESM protocol was conducted using the custom-built ESM software MobileQ (Meers et al., 2020; https://mobileq.org), installed on research-dedicated Motorola Defy Plus smartphones. The smartphones were programmed to signal participants with a survey 10 times daily for 7 days between 10 a.m. and 10 p.m. according to a stratified random-interval scheme. On average, participants had an average compliance rate of 86.78% (*SD* = 10.30%) in Wave 1, 87.66% (*SD* = 9.38%) in Wave 2, and 88.14% (*SD* = 9.13%) in Wave 3.

Measures

Center for Epidemiologic Studies–Depression Scale. The Center for Epidemiologic Studies–Depression (CES-D) Scale (Radloff, 1977) is a valid 20-item self-report questionnaire that assesses the frequency of depressive symptoms during the past week (e.g., "In the past week, I felt depressed") on a scale from 0 (*rarely or none of the time*) to 3 (*most or all of the time*). The average of all CES-D items was used as a measure of depressive features. Internal consistency was good at Wave 1 (α = .88), Wave 2 (α = .92), and Wave 3 (α = .88).

Assessment of DSM-IV Personality Disorders BPD scale. The BPD scale of the Assessment of DSM-IV Personality Disorders (Schotte et al., 1998) comprises 10 self-report trait items that assess the nine diagnostic criteria for BPD of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013). Suicidality and self-harm are assessed using separate items. Each item is rated on a scale from 1 (*totally disagree*) to 7 (*totally agree*). A dimensional BPD score is obtained by taking the average across all trait items. Internal consistency was acceptable in Wave 1 (α = .69), Wave 2 (α = .74), and Wave 3 (α = .75).

NEs and PEs (ESM). Participants rated the degree to which they were currently experiencing five NEs (sad, angry, anxious, depressed, stressed) and three PEs (happy, relaxed, and cheerful) on a continuous slider scale from 0 (*not at all*) to 100 (*very much*). Scores were averaged to form composite NE and PE; there were good to excellent reliability estimates for NE in Wave 1 (within participants: ω = .73; between participants: ω = .93), Wave 2 (within participants: ω = .73; between participants: ω = .94), and Wave 3 (within participants: ω = .71; between participants: ω = .95) and for PE in Wave 1 (within participants: ω = .74; between participants: ω = .91), Wave 2 (within participants: ω = .68; between participants: ω = .88), and Wave 3 (within participants: ω = .69; between participants: ω = .85), following the approach by Geldhof et al. (2014).

Emotion regulation (ESM). Participants rated the degree to which they used each of the six following ER strategies (adapted from Brans et al., 2013) on continuous slider scales from 0 (*not at all*) to 100 (*very much*): "Since the last beep, have you ruminated about something in the past?" and "Have you ruminated about something in the future?" (averaged to form a single rumination score); "Have you distracted yourself from your feelings?" (distraction); "Have you looked at the cause of your feelings from another perspective?" (reappraisal); "Have you suppressed the expression of your emotions?" (expressive suppression); "Have you talked to others about your emotions?" (social sharing).

Data analytic strategy

We fit linear mixed-effects models with ESM surveys (N = 34,660) nested within waves (N = 3) nested within people (N = 202). The momentary predictors were centered within persons and within waves. BPD and depressive features were aggregated to the person level and grand-mean centered. Next, all variables were also standardized to aid in model convergence.

We ran three sets of analyses (selection, effectiveness for NE, and effectiveness for PE). For each set, a separate model was estimated for each ER strategy, resulting in a total of 15 models. To correct for five tests in each set, we used a Bonferroni-corrected α of .01.

In the selection models, we tested the association between mean ER endorsement and BPD features (Model A), depressive features (Model B), and both sets of features (Model C). The NE-effectiveness models tested whether the association between ER strategy endorsement and subsequent NE (correcting for lagged NE) was moderated by either BPD features (Model A), depressive features (Model B), and both sets of features simultaneously (Model C). Effectiveness Models D through F replicated effectiveness Models A through C but modeled change in PE. For supplemental selection models, a visual representation of the effectiveness models, and more detail about the data analytic approach, see the Supplemental Material.

Results

For descriptive statistics for all variables, see Tables S1 and S2 in the Supplemental Material. For within-persons, between-waves, and between-persons correlations, see Tables S3 through S5 in the Supplemental Material.

Selection models

As shown in Table 1, in Models A and B, when BPD and depressive features were entered as separate

Table 1. Overview of All Selection Models Predicting Endorsement of Emotion-Regulation Strategies From BPD Features Only (Model A), Depressive Features Only (Model B), and BPD and Depressive Features Simultaneously (Model C)

	Models A & B (separate predictors)			Model C (simultaneous predictors)		
Outcome/predictors	Estimate (*SE*)	95% CI	*p*	Estimate (*SE*)	95% CI	*p*
Rumination (outcome)						
BPD features	**0.28 (0.04)**	**[0.21, 0.36]**	**< .001**	**0.17 (0.05)**	**[0.07, 0.27]**	**.001**
Depressive features	**0.29 (0.04)**	**[0.21, 0.37]**	**< .001**	**0.18 (0.05)**	**[0.09, 0.28]**	**< .001**
Distraction (outcome)						
BPD features	**0.28 (0.04)**	**[0.20, 0.36]**	**< .001**	**0.23 (0.05)**	**[0.13, 0.33]**	**< .001**
Depressive features	**0.22 (0.04)**	**[0.14, 0.30]**	**< .001**	0.08 (0.05)	[–0.02, 0.18]	.133
Reappraisal (outcome)						
BPD features	**0.18 (0.04)**	**[0.11, 0.26]**	**< .001**	**0.17 (0.05)**	**[0.07, 0.26]**	**.001**
Depressive features	**0.13 (0.04)**	**[0.05, 0.21]**	**.001**	0.02 (0.05)	[–0.08, 0.12]	.679
Expressive suppression (outcome)						
BPD features	**0.24 (0.04)**	**[0.17,0.32]**	**< .001**	**0.16 (0.05)**	**[0.06,0.26]**	**.002**
Depressive features	**0.24 (0.04)**	**[0.16,0.32]**	**< .001**	**0.13 (0.05)**	**[0.03,0.23]**	**.009**
Social sharing (outcome)						
BPD features	0.09 (0.03)	[0.02, 0.15]	.011	0.10 (0.04)	[0.01, 0.18]	.023
Depressive features	0.04 (0.03)	[–0.02, 0.11]	.207	–0.02 (0.04)	[–0.11, 0.06]	.624

Note: Results that are significant using a corrected α of $p < .01$ after applying a Bonferroni correction for multiple testing are in bold. For clarity, only the relevant coefficients of the selection models are depicted here. For a more detailed table including all predictors in selection Models A through C, see Table S6 in the Supplemental Material available online. BPD = borderline personality disorder; CI = confidence interval.

predictors, both were significantly positively associated with all ER strategies, except social sharing. When BPD and depressive features were entered simultaneously (Model C), effects of both remained positive but decreased in size, suggesting the absence of statistical suppression effects.

In the Model C for rumination and suppression, significant positive effects were still found for both BPD and depressive features. However, the decreased coefficients of both features suggested shared variance between the two types of features in predicting ER strategy use, indicative of a partial transdiagnostic association between psychopathological features and rumination/suppression use. However, in addition, both BPD and depressive features explained a unique significant portion of variance, suggesting specific effects of BPD and depressive features on rumination and suppression use.

For distraction and reappraisal selection in Model C, BPD features remained statistically significant and of a similar magnitude to Model A, whereas the effect of depressive features became nonsignificant.

Effectiveness models

Results from effectiveness Models A through C, which examined change in NE, are shown in Table 2, and those from Models D through F, which examined change in PE, are in Table 3. Of all interaction effects of interest, only four were significant (using our corrected α of $p < .01$): For the models with the features entered separately, both BPD and depressive features interacted with distraction and reappraisal in predicting change in NE.

When decomposing these interactions using simple slopes (see Fig. 1), we found the same pattern for all four interactions: Momentary distraction and reappraisal were associated with larger subsequent increases in NE among participants with lower levels of both types of features (see Table 2). Visual inspection of Figure 1 suggests that this interaction is driven by differences among participants with high versus low features at low levels of strategy use. Specifically, at low levels of distraction and reappraisal, participants with higher depressive and BPD features showed higher levels of NE than participants with lower levels of features. In contrast, at high levels of strategy use, all participants (regardless of their level of features) showed similarly high levels of NE.

However, these interaction effects were no longer statistically significant when both features were entered as simultaneous predictors (see Model C in Table 2). For a summary of the findings across all models, see Table S13 in the Supplemental Material.

Discussion

In a three-wave ESM study, we investigated the associations between BPD and depressive features, on the one

Table 2. Overview of All Effectiveness Models Predicting Negative Emotion From the Interaction Between BPD Features and Emotion-Regulation Strategies (Model A), the Interaction Between Depressive Features and Emotion-Regulation Strategies (Model B), and Both Interactions Simultaneously (Model C)

Strategy × Psychopathology interaction	Models A & B (separate predictors)			Model C (simultaneous predictors)		
	Estimate (*SE*)	95% CI	*p*	Estimate (*SE*)	95% CI	*p*
Rumination ×						
BPD Features	0.01 (0.01)	[–0.01, 0.03]	.192	0.02 (0.01)	[–0.01, 0.04]	.157
Depressive Features	0.00 (0.01)	[–0.02, 0.02]	.698	–0.01 (0.01)	[–0.03, 0.02]	.511
Distraction ×						
BPD Features	**–0.03 (0.01)**	**[–0.06, –0.01]**	**.004**	–0.02 (0.02)	[–0.05, 0.01]	.182
Depressive Features	**–0.03 (0.01)**	**[–0.06, –0.01]**	**.004**	–0.02 (0.01)	[–0.05, 0.01]	.182
Reappraisal ×						
BPD Features	**–0.04 (0.01)**	**[–0.06, –0.02]**	**< .001**	–0.03 (0.01)	[–0.06,–0.01]	.018
Depressive Features	**–0.03 (0.01)**	**[–0.05, –0.01]**	**.004**	–0.01 (0.01)	[–0.04, 0.02]	.464
Expressive Suppression ×						
BPD Features	–0.01 (0.01)	[–0.03, 0.02]	.494	0.00 (0.02)	[–0.03, 0.04]	.802
Depressive Features	–0.02 (0.01)	[–0.04, 0.01]	.194	–0.02 (0.02)	[–0.05, 0.01]	.236
Social Sharing ×						
BPD Features	–0.02 (0.01)	[–0.04, –0.00]	.038	–0.01 (0.01)	[–0.04, 0.02]	.431
Depressive Features	–0.02 (0.01)	[–0.05, –0.00]	.024	–0.02 (0.01)	[–0.05, 0.01]	.195

Note: Results that are significant using a corrected α of $p < .01$ after applying a Bonferroni correction for multiple testing are in bold. For clarity, only the relevant coefficients are depicted here. For a more detailed table including all predictors in effectiveness Models A through C, see Table S10 in the Supplemental Material available online. BPD = borderline personality disorder; CI = confidence interval.

hand, and the selection and effectiveness of several ER strategies, on the other hand. When considered separately, both BPD and depressive features predicted greater endorsement of all strategies except social sharing. When overlap between the two sets of features was corrected for, results remained the same for BPD features, but depressive features were associated only with greater selection of maladaptive strategies (i.e., rumination and suppression). Regarding effectiveness, there was no consistent evidence that either set of psychopathological features was associated with altered strategy effectiveness in terms of subsequent changes in PEs or NEs.

The selection of ER strategies in daily life

We hypothesized that both depressive and BPD features would be characterized by higher levels of maladaptive-strategy use and lower levels of adaptive-strategy use. These hypotheses were partially confirmed for BPD features. Participants with higher levels of BPD symptoms showed unique positive associations with both rumination and suppression—strategies that have been labeled maladaptive and linked to negative outcomes—but unexpectedly, also reappraisal and distraction—strategies that have been labeled adaptive because of their links with positive outcomes. This was not in line with previous research that has linked BPD mainly to increased endorsement of maladaptive ER strategies and reduced endorsement of adaptive ER strategies (see Sauer et al., 2016). Moreover, as hypothesized, overall, more specific effects were found for BPD features compared with depressive features, although the results were not always in the expected direction.

In contrast, as hypothesized, depressive features were uniquely linked to higher levels of rumination and expressive suppression, both putatively maladaptive strategies. This finding is in line with previous studies (Aldao et al., 2010; Kovács et al., 2020; Olatunji et al., 2013; Ruscio et al., 2015). The hypothesized association with weaker putatively adaptive ER use was not confirmed.

Effectiveness of ER strategies in daily life

We found only four interactions, which showed that people with more BPD and depressive features exhibited higher NE than people with lower levels of features at very low levels of distraction and reappraisal use but similar levels of NE at high levels of distraction and reappraisal use. This finding is in line with the idea that higher NE at high ER levels reflects the use of distraction in response to increased NE rather than the "harmful" effects of using distraction or reappraisal. Overall, these effectiveness models, as operationalized in this study, suggest that people with high levels of BPD or depressive features are not more or less effective in the use of any ER strategy than people low in these features.

Table 3. Overview of Effectiveness Models Predicting Positive Emotion From the Interaction Between BPD Features and Emotion-Regulation Strategy (Model D), the Interaction Between Depressive Features and Emotion-Regulation Strategy (Model E), and Both Interactions Simultaneously (Model F)

Strategy × Psychopathology interaction	Models D & E (separate predictors)			Model F (simultaneous predictors)		
	Estimate (*SE*)	95% CI	*p*	Estimate (*SE*)	95% CI	*p*
Rumination ×						
BPD Features	−0.00 (0.01)	[−0.02, 0.02]	.915	0.00 (0.01)	[−0.02, 0.02]	.903
Depressive Features	−0.00 (0.01)	[−0.02, 0.01]	.776	−0.00 (0.01)	[−0.03, 0.02]	.757
Distraction ×						
BPD Features	0.01 (0.01)	[−0.01, 0.03]	.192	0.02 (0.01)	[−0.00, 0.04]	.070
Depressive Features	0.00 (0.01)	[−0.02, 0.02]	.998	−0.01 (0.01)	[−0.04, 0.01]	.219
Reappraisal ×						
BPD Features	0.02 (0.01)	[0.00, 0.03]	.045	0.02 (0.01)	[−0.00, 0.04]	.073
Depressive Features	0.01 (0.01)	[−0.00, 0.02]	.109	−0.00 (0.01)	[−0.02, 0.01]	.641
Expressive Suppression ×						
BPD Features	0.01 (0.01)	[−0.01, 0.02]	.443	0.02 (0.01)	[−0.00, 0.04]	.060
Depressive Features	−0.01 (0.01)	[−0.02, 0.01]	.388	−0.02 (0.01)	[−0.04, 0.00]	.056
Social Sharing ×						
BPD Features	0.01 (0.01)	[−0.00, 0.03]	.130	0.01 (0.01)	[−0.01, 0.02]	.542
Depressive Features	0.01 (0.01)	[−0.00, 0.03]	.113	0.01 (0.01)	[−0.01, 0.03]	.379

Note: For clarity, only the relevant coefficients are depicted here. For a more detailed table including all predictors in effectiveness Models D through F, see Table S12 in the Supplemental Material available online. BPD = borderline personality disorder; CI = confidence interval.

Implications for understanding emotion dysregulation in psychopathology

BPD features were uniquely linked to a higher use of putatively maladaptive but also adaptive ER strategies. This suggests that people with BPD features might be attempting to regulate their emotions more often in general, using both putatively adaptive and maladaptive strategies, although they exhibit no altered effectiveness, in terms of changes in PE and NE, at implementing these strategies to improve affect. This could be explained in different ways.

First, the surprisingly high use of adaptive strategies may contradict previous studies that have assessed trait ER with global self-report scales because we studied ER use at a moment-to-moment level. Perhaps people with elevated BPD features may only briefly attempt to unsuccessfully employ these strategies and instead rely more heavily on maladaptive strategies. Global self-reported ER may not capture more fleeting momentary use of adaptive ER strategies. To explore this idea, further research should examine the duration of each ER strategy.

Second, the relatively high endorsement of not just one but most ER strategies could reflect erratic trial-and-error behavior in an attempt to regulate emotions, indicating problems with the selection of the appropriate ER strategy. In future research, it will be necessary to further investigate the triggering factors of strategy selection, the role of strategy switching, and how goals precipitate strategy use in BPD.

Depressive features were uniquely associated with the use of more putatively maladaptive ER strategies but not altered effectiveness. This suggests that the emotion dysregulation among people with high levels of depressive features is mostly characterized by the selection of ER strategies that do not help to improve mood rather than less effective implementation of ER strategies.

Limitations

There are some limitations of the current research, which we hope will be addressed in future studies. First, we used a dimensional approach to psychopathology (Kotov et al., 2017), but generalizability to clinical populations should be investigated. Likewise, it is not clear whether these findings generalize to other ER strategies beyond those assessed in this study. Second, we operationalized ER selection by looking at the degree to which each ER strategy was used. Therefore, we potentially conflate different aspects of ER selection, such as the (relative) frequency and duration of strategy use and the degree of effort, and future research should disentangle different aspects of selection. Third, people with higher levels of psychopathology might have a different understanding of what the use of each ER strategy entails, although all participants were briefed in the same way. Fourth, to understand the effectiveness

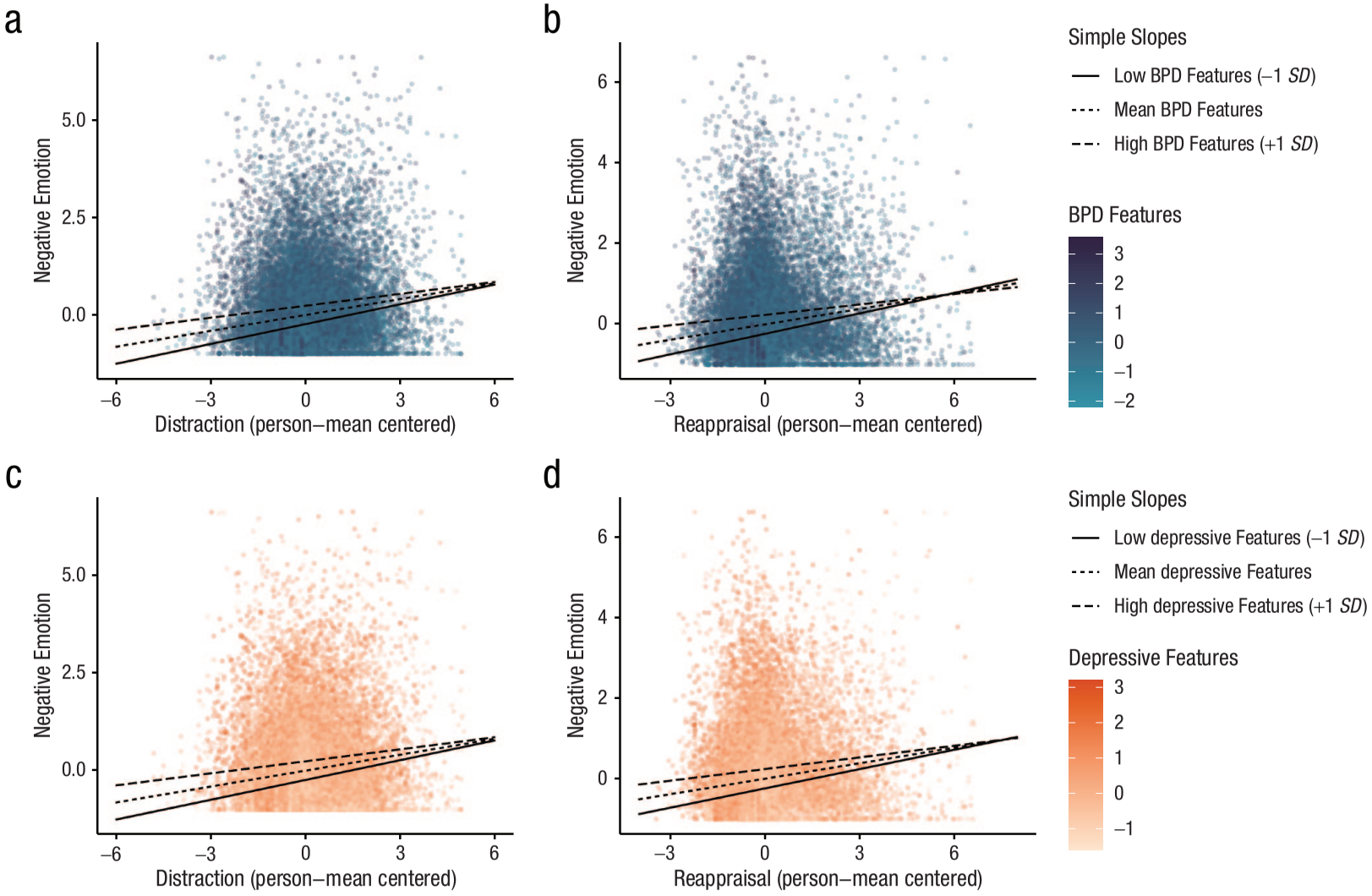


Fig. 1. Simple slopes of significant interactions between psychopathological features and strategies in predicting negative affect in effectiveness Models A and B. (a) Borderline personality disorder (BPD) features with distraction. (b) BPD features with reappraisal. (c) Depressive features with distraction. (d) Depressive features with reappraisal. All simple slopes for low and high features for all four interactions were significant at $p < .001$ (for more details, see the Supplemental Material).

of ER strategies, researchers should look beyond associations with changing emotions to also directly assess self-reported emotion goal fulfilment (Aldao et al., 2015). Last, despite our large sample size and many repeated measurements per person, it is unclear whether our sample has sufficient power to detect, especially, cross-level interaction effects. Future replication studies are needed to further establish our conclusions.

Conclusions

First, we showed that BPD features are uniquely linked to a higher self-reported tendency to select both putatively adaptive and maladaptive ER strategies but not altered effectiveness of these strategies. Second, we found that depressive features are uniquely associated with the selection of putatively maladaptive strategies in daily life. These findings suggest that deficits may be primarily located in strategy selection rather than the implementation of those strategies and highlight the importance of assessing ER outside the lab and across multiple stages.

Transparency

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Author Contribution(s)

M. Houben and E. K. Kalokerinos made equal contributions.
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Declaration of Conflicting Interests

The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Open Practices

This article has received the badges for Open Data and Open Materials. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges



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Note

1. There was also a survey 12 months after Wave 3, but because experience sampling was not conducted at this wave, it was not included in this research.

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