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Who Disengages From Emotion and When? An EMA Study of How Urgency and Distress Intolerance Relate to Daily Emotion Regulation

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Abstract

Overreliance on disengagement emotion regulation strategies (e.g., emotion avoidance, emotion suppression) has been shown to relate to poor clinical outcomes. Two traits characterized by difficulties in goal-directed responses to emotion—urgency and distress intolerance—may help explain who is likely to disengage from emotion and when. These traits are associated with diverse forms of psychopathology and greater reliance on disengagement strategies. Gaps remain about how these traits relate to emotion regulation in daily life. The present study uses ecological momentary assessment (EMA) to determine the associations of urgency and distress intolerance with momentary high arousal negative affect and momentary attempts to regulate negative emotions. Participants (N = 101) were college students who endorsed at least weekly behaviors often characterized by emotion dysregulation (e.g., self-harm, binging/purging, alcohol/drug use). Participants completed trait measures at baseline and EMA surveys of momentary affect and emotion regulation, six times daily for 4 days. Results indicated that at certain levels, urgency and distress intolerance moderated the relationship between high arousal negative affect and disengagement from emotion: low urgency scores related to relatively greater disengagement from emotion following reported high arousal negative affect, whereas high distress intolerance scores related to relatively greater disengagement following high arousal negative affect. Findings support the role of both urgency and distress intolerance in the relationship between high arousal negative affect and disengagement, which implicates the utility of clinical interventions that focus on emotion regulation, especially during high arousal states.

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A full list of measures gathered in the larger study is shared online at osf.io/sqrf8. After data collection but before analyses, we preregistered our aims, hypotheses, and data analytic approach for this article at osf.io/u7x9f. Data, code, and other study materials can be accessed through our Open Science Framework (OSF) repository: osf.io/sqrf8.

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Keywords

arousal; distress intolerance; negative affect; self-regulation; urgency

Emotion regulation, defined as the effortful and automatic processes that modify the experience, valence, intensity, timing, and expression of affective states (Gross, 2015), has become a key area of focus across psychology. A large and growing literature demonstrates associations between difficulties with emotion regulation and transdiagnostic risk for psychopathology (Sheppes et al., 2015). One way to conceptualize difficulties with emotion regulation is through the overreliance on particular types of emotion regulation strategies. Commonly assessed types of emotion regulation strategies have been classified broadly into engagement versus disengagement strategies (King et al., 2018; Sheppes & Levin, 2013). Disengagement emotion regulation strategies lead to rapid changes during high arousal, require fewer cognitive resources, but are generally less effective in the long-term; engagement strategies lead to slow changes during high arousal, require more cognitive resources, and are generally effective in the long-term (for review see Sheppes, 2020). More use of disengagement strategies and less use of engagement strategies relate to mental health outcomes; in a meta-analysis, engagement strategies (acceptance, problem-solving, and reappraisal) were negatively associated with symptoms of anxiety and depression, whereas disengagement strategies (avoidance, rumination, and suppression) were positively associated with anxiety, depression, and substance and eating problems (Aldao et al., 2010). We acknowledge that no emotion regulation strategy is inherently disadvantageous or maladaptive (e.g., Aldao & Tull, 2015; Bonanno & Burton, 2013; Dixon-Gordon et al., 2015); however, we conceptualize the overreliance on disengagement strategies as important to study given the associations with psychopathology.

Individual Differences Relevant for Emotion Regulation: Urgency and Distress Intolerance

Two trait-like tendencies, negative urgency and distress intolerance, are characterized by difficulty engaging in goal-directed behavior during heightened emotion states. Negative urgency is defined as the tendency to react impulsively when experiencing negative affect (Cyders & Smith, 2008; although our focus here will be specifically on responses to negative emotion, we will refer to negative urgency simply as urgency for brevity throughout this article). Distress intolerance is defined as a trait-like tendency toward a reduced capacity to withstand negative psychological states (Simons & Gaher, 2005; Zvolensky et al., 2011). Both urgency (Cyders et al., 2007) and distress intolerance (Simons & Gaher, 2005; Zvolensky et al., 2011) are correlated with but distinct from tendencies toward negative affect, and distress intolerance is not merely pain sensitivity (for review, see Leyro et al., 2010). Although these two traits are conceptually similar, these traits can be differentiated based on qualitative content analysis and correlations (Juarascio et al., 2020). Whereas urgency is defined by a rash *behavioral* response to emotions (Cyders & Smith, 2008) and corresponds to difficulties resisting impulses and using emotion regulation strategies (Juarascio et al., 2020), distress intolerance is defined by a *cognitive* appraisal that one

cannot withstand emotions (Simons & Gaher, 2005) and corresponds to difficulties with emotional acceptance and tolerating internal states (Juarascio et al., 2020).

Both urgency (Berg et al., 2015) and distress intolerance (Leyro et al., 2010) are associated with diverse forms of psychopathology. In longitudinal research, urgency predicts the onset of many manifestations of psychopathology associated with difficulties with emotion regulation, including eating disorders (Pearson et al., 2012), nonsuicidal self-injury (Riley et al., 2015), substance abuse (Kaiser et al., 2016; Smith & Cyders, 2016), and depressive symptoms (Anestis et al., 2007). Although limited prospective work is available, distress intolerance cross-sectionally relates to mental health problems commonly associated with difficulties with emotion regulation, including substance use problems (Brown et al., 2005), disordered eating (Wade, 2007), and nonsuicidal self-injury (Nock & Mendes, 2008). Empirical work (urgency; King et al., 2018) and theory (distress intolerance; Leyro et al., 2010) suggest that both traits involve a tendency to use disengagement as opposed to engagement emotion regulation strategies. Despite their similarities, urgency and distress intolerance account for unique variance from one another in studies of psychopathology (e.g., Anestis et al., 2011; Cougle et al., 2012; Kaiser et al., 2012). These differentiated effects have led researchers to theorize the aforementioned distinction between urgency and distress intolerance based on their respective behavioral and cognitive underpinnings (e.g., Anestis et al., 2011; Kaiser et al., 2012). Additional work is needed to assess both traits conjointly to determine their shared and unique relationships with emotion regulation processes.

Emotion Regulation Strategy Use in Daily Life

Leaders across the field have called for research to assess the temporal dynamics of emotion regulation strategy use with ecologically valid measures (Aldao, 2013; Gross, 2015). Many studies have considered emotion regulation strategy selection in daily life using ecological momentary assessment (EMA; Brans et al., 2013; Brockman et al., 2017; Daros et al., 2020; Heiy & Cheavens, 2014; Lennarz et al., 2019). Findings from these studies have demonstrated that higher trait-like difficulty with emotion regulation is associated with multiple features in daily life: higher momentary negative affect, more desire to change emotions, more attempts to regulate emotion, higher disengagement relative to engagement emotion regulation strategy use, and lower effectiveness of emotion regulation (Daros et al., 2020).

Limited research, though, has considered how urgency and distress intolerance relate to momentary affect and emotion regulation in daily life. Some EMA work has focused on urgency but without regard to emotion regulation (cf. Sharpe et al., 2020; Sperry et al., 2018). More directly relevant work suggests that both urgency and distress intolerance predict greater momentary negative affect in EMA (King et al., 2018, 2021; Veilleux et al., 2018). Contrary to theory, EMA researchers have typically failed to find that impulsivity is more likely in response to negative emotions for those high on urgency (Feil et al., 2020; Sharpe et al., 2020).

To our knowledge, only one empirical study focuses on how urgency relates to daily emotion regulation, with findings that those high in urgency use more disengagement emotion regulation strategies relative to engagement strategies (King et al., 2018). Similarly with distress intolerance, as far as we know only a single study has considered how distress intolerance relates to emotion regulation in daily life, with findings that those high in distress intolerance report greater use of one form of disengagement emotion regulation, experiential avoidance (Veilleux et al., 2018). No study has jointly considered the related constructs of urgency and distress intolerance using EMA.

Evidence for the Role of Arousal

The choice and effectiveness of specific emotion regulation strategies are contingent on many factors, including emotional intensity and arousal (Sheppes, 2020; Young & Suri, 2020). Extensive work has documented that emotional intensity guides emotion regulation strategy selection and effectiveness (for review, see Sheppes & Gross, 2012). Evidence from EMA research highlights that people tend to use more emotion regulation strategies (of any form) during high-intensity emotions compared with low intensity emotions (Dixon-Gordon et al., 2015), but also that the choice of strategy differs depending on emotion intensity. For example, among adolescents, acceptance was more likely to be used with low-intensity negative emotions, whereas suppression, distraction, avoidance, rumination, problem-solving, and social support were more likely to be used with high-intensity negative emotions (Lennarz et al., 2019). Several laboratory psychophysiological studies have pointed to the relative reliance on disengagement over engagement emotion regulation strategies during high intensity emotions; people use the engagement strategy of reappraisal more often with low-intensity stimuli and the disengagement strategy of distraction with high-intensity stimuli (Shafir et al., 2015, 2016; Sheppes et al., 2011; Young & Suri, 2020). Although previous emotion regulation research has often failed to distinguish the arousal dimension from emotional intensity measures that incorporate valence (e.g., Sheppes et al., 2014), arousal is an important dimension in its own right. That is, disengagement strategies, such as distraction, are more likely to be chosen and effective in the short-term compared with engagement strategies, specifically during high arousal states (e.g., Fitzpatrick & Kuo, 2016; Langeslag & Surti, 2017). Disengagement strategies have also been shown to be more effective than engagement strategies for reducing physiological arousal during high intensity emotions (Shafir et al., 2015, 2016; Sheppes et al., 2011; Young & Suri, 2020).

For both urgency and distress intolerance, problematic responses to emotion may be particularly likely to arise during emotion states involving high physiological arousal. The impulsive behaviors associated with urgency have been shown to emerge in the context of both positive and negative emotions (Cyders & Smith, 2007), which suggests the import of arousal over valence as the trigger for problematic behavior. Consistent with this idea, laboratory-based work has indicated arousal predicts inhibitory control failure for those high in urgency (Pearlstein et al., 2019). Similarly, distress intolerance is operationalized across self-report and behavioral measures as sensitivity to or intolerance of distress, with distress defined as subjective unpleasantness accompanied by physiological arousal (McHugh et al., 2011). Those high in distress intolerance rely on strategies that provide immediate relief during high arousal states (Simons & Gaher, 2005). Furthermore, data and

theory indicate that engagement compared with disengagement emotion regulation strategies require more cognitive control (see Sheppes & Levin, 2013). In turn, urgency (e.g., Dekker & Johnson, 2018) and distress intolerance (Macatee et al., 2018) have been associated with difficulty exercising cognitive control during negative affect. Accordingly, one would expect that urgency and distress intolerance might intensify the use of disengagement emotion regulation strategies during high arousal negative affect.

The Present Study

Drawing on theory and research findings, the goal of the present study was to determine the associations of urgency and distress intolerance with momentary high arousal negative affect and the use of disengagement emotion regulation strategies in daily life. The first aim was to assess the relationship between high arousal negative affect and disengagement emotion regulation strategy use within-subject over the study window. We hypothesized that participants would rely on disengagement emotion regulation strategies more during periods of greater high arousal negative affect. Given the importance of arousal, the second aim was to consider the interactions of urgency and distress intolerance with high arousal negative affect states in relation to disengagement emotion regulation strategy use. We hypothesized that the interactions between urgency and high arousal negative affect, and distress intolerance and high arousal negative affect, would both relate to greater likelihood of disengagement emotion regulation strategy use.

Method

Preregistration

Data were collected as part of a larger EMA study of emotion and behavior among college students. A full list of measures gathered in the larger study is shared online at osf.io/sqrf8 (Pearlstein et al., 2022). After data collection but before analysis, we preregistered our aims, hypotheses, and data analytic approach for this article at osf.io/u7x9f. No data were accessed or analyzed prior to preregistration. Below, we report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Participants and Procedure

All materials and procedures were approved by the Institutional Review Board at the University of California, Berkeley. A total of 881 potential participants from an undergraduate research pool at a Northern California public university completed a brief screener to assess the self-reported frequency of engagement in multiple behaviors that are often tied to difficulties with emotion regulation (nonsuicidal self-injury, binge eating, purging, reckless driving, running on roofs, getting drunk, driving while intoxicated, illegal drug use, prescription drug use to get high, uncontrolled anger or aggression, and risky sex) in the past week. Response options were *Not at all, Once, 2–3 times, 4–6 times,* and *Daily or more often.* Potential participants were invited to the full study if they had engaged in self-harm one or more times, got drunk four or more times, or engaged in any of the other behaviors two or more times in the past week. Of the 275 invited, 122 enrolled and 108 completed the study. We excluded data from one participant who answered over half (4 of

7) attention check items (e.g., “Please select ‘Almost never’ for this question”) incorrectly; raising this threshold to 2 of 7 incorrect answers did not affect model results and so two relevant participants were retained, resulting in 107 participants with full data. We could not analyze six participants’ data because of insufficient EMA completion: they completed four or fewer surveys, none of which were consecutive, therefore lagged relationships could not be assessed. Removal of these six participants resulted in a final dataset of 2,496 observations across 101 participants.

The final sample (N = 101) identified as cis female (77.2%), cis male (21.8%), and genderqueer or gender nonconforming (1.0%). Regarding sexuality, participants identified as: asexual (five), bisexual (17), gay or lesbian (three), heterosexual/straight (71), pansexual (two), do not know (one), or prefer not to answer (two). Participants self-reported their race and ethnicity as: Asian (43), Black/African American (four), Native Hawaiian/Pacific Islander (one), White (28), Other/Multiple Races (17), and Hispanic or Latinx (19). The average age of the sample was 20.4 (SD = 2.15) years; the range was 18 to 30 years. Using the MacArthur Scale of subjective social status (Adler et al., 2000), participants ranked where they stand in their community on a 1–10 scale (M = 6.0; SD = 1.8).

The full study included baseline questionnaires followed by EMA surveys. Baseline questionnaires were completed on Qualtrics. During the Thursday through Sunday after completion of the baseline, participants received six surveys each day for 4 days on their smartphones using LifeData EMA software. Surveys were quasi-randomized between the hours of 10:00 a.m. and 11:59 p.m. such that surveys were at least 110 minutes apart. Participants had 90 minutes to respond to each survey, and one reminder notification was sent if they had not completed the survey within the first 45 minutes. On average, participants responded to the survey in 16 minutes and 46 seconds.

Measures

Data were gathered via the baseline survey and EMA surveys.

Baseline—At baseline, participants completed questionnaires to index urgency and distress intolerance. We also assessed other symptoms and affective measures not included here.

Urgency—Participants completed the Negative Urgency subscale of the Urgency, Premeditation (lack of), Perseverance (lack of), Sensation Seeking, and Positive Urgency scale (UPPS-P) Impulsive Behavior Scale, which is designed to measure the tendency to act rashly in response to negative emotions (Whiteside & Lynam, 2001). Sample items include: “When I am upset I often act without thinking” and “I often get involved in things I later wish I could get out of.” Response options ranged from 1 = *I disagree a lot* to 5 = *I agree a lot.* The subscale score is a mean of 12 items. Urgency demonstrates relative stability over time, as indicated by genetic contributions (Carver et al., 2011) and a test–retest reliability of .62–.81 (Cyders & Smith, 2008).

Distress Intolerance—Distress intolerance was measured using the 15-item Distress Tolerance Scale, which is designed to assess ability to tolerate emotional distress (DTS; Simons & Gaher, 2005). Participants are instructed: “Think of times that you feel distressed

or upset. Select the answer that best describes your beliefs about feeling distressed or upset." Participants then answer items such as "I'll do anything to stop feeling distressed or upset" on a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Total scores were a mean of four subscale scores (Tolerance, Appraisal, Absorption, and Regulation), which were each means of relevant items. For ease of interpretation across trait measures, we reversed-scored totals such that higher scores reflect inability to tolerate distress. This trait demonstrates relative stability over time, as indicated by genetic contributions (Amstadter et al., 2012) and test–retest reliability ranging from .67 to .78 (Simons & Gaher, 2005).

Ecological Momentary Assessment—Participants completed each of the following EMA items to index momentary experiences of affect and emotion regulation in each survey. All EMA items in the larger study are available at osf.io/sqrf8.

Negative Affect Items.: Participants were asked to "Please rate each of the following emotions based on how you are CURRENTLY feeling" for 10 specific negative emotion items at each time point, each rated on a 7-point range slider from *Not at all* to *Extremely.* Participants rated the following: Anxious/Worried, Afraid/Scared, Angry/Frustrated, Sad/Unhappy, Ashamed, Guilty, Embarrassed, Dull/Sluggish, Lonely, and Self-Critical. As recommended during revisions, we performed confirmatory factor analyses based on prior work and theory to identify the factor structure of negative affect. Based on these results, momentary high arousal negative affect was measured as the mean of three high arousal negative emotions at each timepoint: Anxious/Worried, Afraid/Scared, and Angry/Frustrated.

Emotion Regulation Strategy Use.: Participants were asked: "Since the last time point, which of these things did you do to manage your emotions or change how you were feeling? Please select all that apply," followed by a list of specific emotion regulation strategies (adapted from Heiy & Cheavens, 2014). To capture use of disengagement strategies, we created a dichotomous variable where a "1" was an endorsement of any of the three following strategies: *found an activity to keep yourself busy and distracted*; *controlled your feelings by not expressing them*; and *ignored or suppressed your feelings.*

Analysis

All analyses were conducted in R Version 3.6.0 (R Foundation for Statistical Computing, Vienna Austria).

At each timepoint, EMA surveys asked about emotions "right now" and emotion regulation strategies engaged in "since the last timepoint." Therefore, momentary emotion variables were all lagged by one observation, so that models assess emotion regulation strategy use within the time since the last survey, predicted by emotion at the last survey ($t - 1$). Because of the disproportionate time lag overnight, emotion regulation since the last survey (the night before) was coded as missing for the first survey of each day.

For modeling, we partitioned our momentary high arousal negative affect variable into two variables: between-person means (i.e., the mean per person) and within-person mean-centered values (i.e., changes in high arousal negative affect relative to their average).

Urgency and distress tolerance scores were scaled based on the grand mean for ease of interpretation.

To predict the use of disengagement emotion regulation strategies (a repeated EMA measure nested within individuals) we relied on parallel generalized linear mixed models. The mixed models were conducted stepwise to examine each added effect. The first model, the baseline model, partitioned the variance of our outcome, disengagement strategy use, into fixed and random effects.

$$\begin{aligned} &\text{Level 1: } Disengage_{ti} = B_{0i} + e_{ti} \\ &\text{Level 2: } B_{0i} = g_{00} + u_{0i} \end{aligned} \quad \text{Model 1:}$$

We then added both the fixed effect of high arousal negative affect at the between-person level (*HANbp* below) to see whether those experiencing more high arousal negative affect disengage more, and the fixed effect of high arousal negative affect at the within-person level (*HANwp* below) to see whether disengagement is used more in moments of high arousal negative affect.

$$\begin{aligned} &\text{Level 1: } Disengage_{ti} = B_{0i} + B_{1}(HANwp_{ti}) + e_{ti} \\ &\text{Level 2: } B_{0i} = g_{00} + g_{01}(HANbp_{i}) + u_{0i} \end{aligned} \quad \text{Model 2:}$$

Last, we added the random effect for the within-person association between high arousal negative affect and disengagement, to see whether individuals differ in how much they disengage in response to high arousal negative affect.

$$\begin{aligned} &\text{Level 1: } Disengage_{ti} = B_{0i} + B_{1i}(HANwp_{ti}) + e_{ti} \\ &\text{Level 2: } B_{0i} = g_{00} + g_{01}(HANbp_{i}) + u_{0i} \\ &\qquad\quad B_{1i} = g_{10} + u_{1i} \end{aligned} \quad \text{Model 3:}$$

Finally, we constructed parallel models to test the interactions of urgency and distress tolerance with high arousal negative affect. That is, one model tested whether the within-person link between high arousal negative affect and disengagement varied as a function of urgency.

$$\begin{aligned} &\text{Level 1: } Disengage_{ti} = B_{0i} + B_{1i}(HANwp_{ti}) + e_{ti} \\ &\text{Level 2: } B_{0i} = g_{00} + g_{01}(Urgency_{i}) + u_{0i} \\ &\qquad\quad B_{1i} = g_{10} + g_{11}(Urgency_{i}) + u_{1i} \end{aligned}$$

Another model tested whether the link between high arousal negative affect and disengagement varied as a function of distress intolerance.

$$\begin{aligned} &\text{Level 1: } Disengage_{ti} = B_{0i} + B_{1i}(HANwp_{ti}) + e_{ti} \\ &\text{Level 2: } B_{0i} = g_{00} + g_{01}(Distress\ Intolerance_{i}) + u_{0i} \\ &\qquad\quad B_{1i} = g_{10} + g_{11}(Distresss\ Intolerance_{i}) + u_{1i} \end{aligned}$$

For the two interaction models above, we included within-person (but not between-person) effects of high arousal negative affect because our focus was on a temporally dynamic process which occurs within individuals.

Because data were collected prior to defining hypotheses, a priori power analyses were not conducted. However, post hoc power curves (available at osf.io/sqrf8) were estimated to assess whether our sample size and sampling frequency would be adequate to detect Level 1 effects in our multilevel models (MLMs; Kleiman, 2021). With our actual sample size (N = 101) and responses per participant (M = 24.7), we are powered at the >.8 level to detect medium effect sizes and greater but not well-powered (<.5 level) to detect small effect sizes. To determine power for Level 2 effects, we relied on research using simulations to determine the adequate sample size for mixed models. Sample sizes greater than 50 (the present study N = 101) were shown to yield unbiased estimates, variance, and standard errors (Maas & Hox, 2005). Given our Level 1 and Level 2 sample sizes and ICCs, Monte Carlo simulations suggest we are also sufficiently powered (>.8 level) to identify cross-level effects (Mathieu et al., 2012). However, more recent work has suggested that larger samples (i.e., 100 individuals with at least 50 observations each) are needed for unbiased estimates in multilevel logistic regression (Moineddin et al., 2007). Small effects within the results should be interpreted with caution given our sample size limitations.

The data analytic plan above deviates from the preregistration (osf.io/u7x9f) in the following ways. First, we removed trait emotion dysregulation as measured by the Difficulties with Emotion Regulation Scale (DERS) from the main article based on reviewer feedback and to narrow the article's focus to our core hypotheses about urgency and distress intolerance. We have included our preregistered analyses including the DERS in online supplemental materials. Second, we removed the rumination EMA item (thought over and over again about the situation or your feelings) from our measure of disengagement during revision per reviewer suggestions because this strategy does not clearly cohere empirically or conceptually with our other disengagement items (distract, ignore, or suppress). Rumination may reflect a tendency toward overengagement as opposed to disengagement. Because we believe rumination remains an important strategy to consider in relation to key study variables, models using rumination are presented in the online supplemental materials. Third, we changed the operationalization of disengagement strategies from the number of disengagement strategies selected to a binary variable of disengagement strategy use; because of our item phrasing, the number of regulation strategies selected reflects greater diversity of strategy use rather than a count of attempts to regulate within the EMA window. Fourth, whereas our aim was to assess the role of arousal, the included items more specifically reflect high arousal negative affect, thus we shifted this language for the article. Furthermore, because we derived high arousal negative affect from a subset of negative affect items, we no longer control for negative affect in our models to reduce the risk of overcontrol per reviewer suggestions.

We conducted the following additional analyses that were not included in the preregistration. First, as was recommended by reviewers, we performed factor analyses to identify the structure of negative affect. Second, to probe for the specificity of effects, Model 3 was repeated with negative affect overall and low arousal negative affect in place of

high arousal negative affect (see the online supplemental materials). Third, because the disengagement strategies were only modestly correlated (*r*s = .26–.69), we also examined each disengagement strategy separately (see the online supplemental materials).

Results

Descriptive information and bivariate correlations of baseline measures and EMA variables are shown in Table 1. We considered potential covariates, including age, gender, time of day and the day of the week that surveys were completed. Neither age nor gender were related to outcome variables and were not included in subsequent analyses (*r*s < .14, *p*s > .17). In repeated measures correlations, time of day was significantly correlated with disengagement strategy use ($r = -.08$, $p = .001$), but not with high arousal negative affect ($r = -.02$, $p = .44$). The study was designed so that all participants completed EMA on a Thursday through Sunday to minimize day of week effects. Models with time of day and linear time across the study period as covariates were conducted and results were not substantially different (see the online supplemental materials); simplified models excluding time variables are presented here.

Factor Structure of Negative Affect

We conducted between-person confirmatory factor analyses to evaluate the structure of negative affect in our sample to determine which facets of negative affect to consider in analyses. The best-fitting model evaluated was a three-factor solution including high arousal negative affect (Anxious/Worried, Afraid/Scared, and Angry/Frustrated), low arousal negative affect (Sad/Unhappy, Dull/Sluggish, Lonely), and self-conscious negative affect (Ashamed, Embarrassed, Guilty, and Self-critical), as evidenced by $\chi^2(35) = 265.72$, $p < .001$; comparative fit index (CFI) = .98; standardized root mean square residual (SRMR) = .03; and root mean square error of approximation (RMSEA) = .06. This model appeared to have better fit than the model including a single factor for negative affect, $\chi^2(32) = 653.45$, $p < .001$; CFI = .94; SRMR = .04; and RMSEA = .10, and the two-factor solution including only high arousal negative affect and low arousal negative affect, with the self-conscious emotions loading on the low arousal negative affect factor, $\chi^2(31) = 613.08$, $p < .001$; CFI = .94; SRMR = .09; and RMSEA = .05. The article's primary aims and hypotheses use high arousal negative affect. Given that self-conscious emotions appear separable from the other low arousal negative affect items, we considered parallel models using low arousal negative affect (without the self-conscious emotion items). Post hoc analyses consider low arousal negative affect to determine the specificity and robustness of effects. Models including negative affect overall are included in the online supplemental materials.

Predicting Individual Differences in Disengagement From High Arousal Negative Affect

To examine variation in disengagement in response to high arousal negative affect, both within- and between-individuals, we built three models (Models 1-3 defined in Analysis section above), iteratively adding fixed and random effects. For each adjustment to the model, we used likelihood ratio tests for model comparison to the previous version. For each updated version of the model, model comparison demonstrated that the random intercept variance and within-person residuals were significantly reduced ($p < .05$) and Akaike

information criterion (AIC) and Bayesian information criterion (BIC) values favored the newer model.

Our first baseline MLM partitioned the fixed and random effects of disengagement to examine the variance accounted for by individual differences (between-person differences in disengagement) compared with the within-person variance (how one's tendency to disengage varies across time). The intraclass correlation (ICC) reflects the proportion of variance explained by the Level 2 units, in this case individual differences. In this case, only 26% of the variance in disengagement is between-person (ICC = .26) which means that the within-person variance is large: people vary moment to moment in their tendency to disengage. Full results are listed as Model 1 in Table 2.

Second, we added fixed effects of high arousal negative affect as predictors of disengagement to our MLM, both within-person (person mean-centered) and between-person (overall mean), using our two high arousal negative affect variables (see Model 2 in Table 2). Both the fixed within-person and between-person effects of high arousal negative affect were significant predictors of disengagement: participants with greater average high arousal negative affect disengaged more overall, and when individuals experienced high arousal negative affect they were more likely to disengage.

Third, we added the random effect of within-person high arousal negative affect and found that participants differed significantly in their within-person link between high arousal negative affect and disengagement (Model 3 in Table 2). After the addition of this random effect, the average fixed effect of within-person high arousal negative affect was no longer significant. This means that, on average, there was not a within-person association between high arousal negative affect and disengagement; however, people significantly vary such that some people do disengage differentially based on their level of high arousal negative affect. This variation in the within-person relationship between affect and disengagement is what we seek to understand as a function of urgency and distress intolerance. Full model estimates, fit indices, and model comparisons for each iterative step are presented in Table 2.

Does the Within-Person Link Between High Arousal Negative Affect and Disengagement Vary as a Function of Urgency or Distress Intolerance?

Our primary hypotheses were that individuals with heightened levels of urgency and distress intolerance may be more likely to disengage from their emotions in the face of high arousal negative affect. To test these hypotheses, we estimated two parallel MLMs. In the first, we estimated a generalized linear mixed model predicting momentary disengagement by three fixed effects: baseline urgency, momentary within-person high arousal negative affect, and Urgency × Within-Person High Arousal Negative Affect. We also included a random intercept per individual and a random slope for high arousal negative affect. We then estimated a second parallel model with distress intolerance in place of urgency. Potential multicollinearity was examined with variance inflation factors and values for all independent variables were below suggested cutoffs (VIFs < 3.0; Dixon-Gordon et al., 2015). Full model results are presented in Table 3 for the urgency interaction and Table 4 for the distress intolerance interaction.

It is important to note that research suggests that we cannot rely on traditional *p* values to detect the presence of interactions in nonlinear models (such as the logistic models estimated here) because the significance of an interaction depends on levels of all other variables in the model (Ai & Norton, 2003; Halvorson et al., 2021; McCabe et al., 2020). Therefore, rather than presenting *p* values, we relied on visual tools to examine the significance of simple slopes at varying levels of high arousal negative affect and urgency in Figure 1, and high arousal negative affect and distress intolerance in Figure 2 (see McCabe et al., 2018). The marginal effects plots in Figures 1 and 2 show the values of urgency and distress tolerance, given the covariate values in the present sample, for which the effect is significant based on confidence intervals (where confidence intervals do not include zero).

Whereas the main effects of urgency and distress intolerance were not significantly related to disengagement strategy use (see Tables 3 and 4), the interaction effects were significant for certain values of urgency and distress tolerance in our sample. Counter to hypotheses, the direction of effects was not consistent. As shown in the fitted data plot in Figure 1, for those with higher levels of urgency (2 *SD*s above the mean), high arousal negative affect was not related to likelihood of using disengagement strategies ($b = 0$; $OR = 1$). Rather, this effect is driven by those with lower urgency scores. At the mean urgency score, 1 *SD* increase in within-person high arousal negative affect was related to a marginally greater likelihood of disengaging ($OR = 1.04$); at lower levels of urgency (2 *SD*s below the mean), 1 *SD* increase in high arousal negative affect had a greater effect on disengagement ($OR = 1.07$). This effect of high arousal negative on disengagement was significant and positive when urgency was close to the mean (including .70 *SD*s above the mean) or lower, which encompasses urgency scores of over 75% of our participants. That is, for people close to the mean or below the mean in baseline urgency, high arousal negative affect is often followed by disengagement, whereas for people more than .7 *SD*s above mean urgency, high arousal negative affect is not significantly related to disengagement.

In contrast, greater baseline distress intolerance was related to more momentary reliance on disengagement following the presence of high arousal negative affect and less reliance on disengagement in the absence of high arousal negative affect. The interaction effect plotted in Figure 2 shows that this relationship is positive at the mean value of distress intolerance and greater. At the mean value of distress intolerance, 1 *SD* increase in within-person high arousal negative affect was related to a minimal increase in likelihood of disengaging ($OR = 1.03$); at high levels of distress intolerance (2 *SD*s above the mean), high arousal negative affect was more likely to be followed by disengaging from emotion ($OR = 1.08$). Specifically, the interaction effect is significant and positive for those whose distress intolerance score is .4 standard deviations below the mean or greater, which is the case for more than 65% of participants in the present study.

Post Hoc Assessment of the Specificity of Effects: Considering Low Arousal Negative Affect

We conducted parallel models to our interaction models to determine the robustness and specificity of effects. Tables 5 and 6 show the interaction model results using low arousal negative affect, urgency, and distress intolerance, respectively, and their interaction to predict

overall disengagement strategy use. The fixed effect for low arousal negative affect parallels the fixed effect of high arousal negative affect in direction and significance; when people experience higher low arousal negative affect (within-person), they disengage more. To probe these similarities in effects across affect models, a comparison of AIC values across models was performed to identify meaningful differences. Based on the absolute differences between AIC values (Burnham & Anderson, 2004), the high arousal negative affect model for urgency is meaningfully improved compared with the models using low arousal negative affect (ΔAIC = 8.89). For distress intolerance, the high arousal negative affect model appears meaningfully improved compared with the low arousal negative affect models (ΔAIC = 10.61). Model comparisons suggest that the high arousal negative affect models have relatively improved fit compared with the low arousal negative affect models.

Discussion

The present study considered how urgency and distress intolerance relate to momentary negative affect and emotion regulation strategy use. Participants with greater high arousal negative affect used disengagement emotion regulation strategies more often, and when participants experienced momentary increases in high arousal negative affect, they were more likely to rely on disengagement strategies. Both urgency and distress intolerance correlated with high arousal negative affect, and neither trait related to disengagement strategy use when controlling for momentary high arousal negative affect. Post hoc analyses revealed a similar pattern of results for low arousal negative affect; however, the high arousal negative affect models obtained better fit compared with the low arousal negative affect models. Examination of the interactions of urgency and distress intolerance with momentary high arousal negative affect in relation to disengagement emotion regulation strategy use highlights differential patterns that offer a novel contribution to the field. Strengths of the study included assessment of two traits that involve responses to negative emotions and are highly correlated with emotion-related psychopathologies, as well as the use of EMA to assess momentary affect and emotion regulation strategy use to examine how these processes unfold over time in daily life.

Consistent with hypotheses and replicating previous EMA work, urgency and distress intolerance correlated with momentary high and low arousal negative affect in daily life. Although both of these traits have been distinguished from negative affect in multiple laboratory studies (Cyders & Smith, 2007; Simons & Gaher, 2005) and have been shown to predict key outcomes above and beyond the role of neuroticism (King et al., 2021; Marshall-Berenz et al., 2010), both have also been shown to correlate with increased experiences of negative affect in EMA research (King et al., 2021; Veilleux et al., 2018). We also extended findings from laboratory work suggesting greater use of disengagement strategies during high arousal negative affect across participants (Sheppes, 2020).

Urgency and distress intolerance did not relate to the overall likelihood of using disengagement emotion regulation strategies. However, an examination of simple slopes suggests that links between these traits and high arousal negative affect relate to disengagement emotion regulation strategy use differentially across levels of these traits after controlling for covariates. Specifically, urgency appears to moderate the link between

high arousal negative affect and disengagement only at lower levels of the trait; however, at a high level of urgency, urgency does not moderate this effect. In other words, the relationship between greater high arousal negative affect and greater use of disengagement emotion regulation emerges as significant for those at the mean and low levels of urgency when adjusting for covariates. This finding indicates that for those higher in urgency, disengagement is unrelated to their level of high arousal negative affect, whereas those lower in urgency use more disengagement during high arousal negative affect. Intriguingly, the pattern for distress intolerance is the inverse; distress intolerance appears to moderate the relationship between high arousal negative affect and disengagement only at higher levels of the trait. The simple slope of high arousal negative affect on disengagement is significant and positive for those with heightened distress intolerance after adjusting for covariates. Those high in distress intolerance are more likely to disengage during heightened levels of high arousal negative affect.

This differential effect suggests unique pathways by which urgency and distress intolerance relate to difficulties with emotion regulation, although the magnitude of effects are small. Contrary to hypotheses, findings suggest that those high in urgency do not use more disengagement emotion regulation strategies during states of high arousal negative affect. One explanation for this finding would be that those high in urgency use more disengagement strategies regardless of high arousal negative affect; however, urgency did not correlate with overall disengagement strategy use. It is also possible that people high in urgency are more likely to regulate high arousal negative affect with behaviors commonly tied to the trait such as excessive drinking, drug use, or nonsuicidal self-injury that would not have been self-reported as one of the emotion regulation strategies assessed. For example, although some may characterize these behaviors as a form of emotion regulation like distraction, it is conceivable that participants would not have endorsed our item, “Found an activity to keep yourself busy and distracted,” regarding these problematic behaviors. Because the specific items to assess emotion regulation may not have captured those behaviors, future work is needed to consider whether these behaviors emerge more in heightened emotion or arousal states for those high in urgency. On the other hand, higher distress intolerance is related to more frequent disengagement emotion regulation strategy use during greater high arousal negative emotions. Consistent with hypotheses, these findings cohere with prior work and theory that those high in distress intolerance attribute high arousal states as being too difficult to withstand.

Despite the study’s strengths, there are some notable limitations. First, although we attempted to model the role of arousal specifically, it is possible that our EMA measures conflated emotional arousal with emotional intensity. We operationalized high arousal states as the sum of self-rated high arousal negative emotions (anxious/worried, afraid/scared, and angry/frustrated). Recent meta-analytic work, though, suggests that these subjective emotion ratings show limited correspondence with psychophysiological indicators of arousal (Siegel et al., 2018). Furthermore, our post hoc analyses demonstrate a similar pattern of results for low arousal negative affect, and additional work is needed to confirm differentiated effects for arousal using more direct indices of autonomic nervous system reactivity. Second, participants were primarily cis-gendered women undergraduates within a developmentally diverse though restricted age range (18–30) at a large public university in California, which

represents a relatively narrow cross-section of the population. Additional work is needed to ensure that these findings generalize. Third, the frequency and total number of EMA assessments were limited: emotion regulation processes likely unfold more rapidly than our temporal resolution (six surveys each day); also, our study period was 4 days, so patterns may not generalize. Fourth, unmeasured external factors could easily shape emotion regulatory demands, resources, and choices during the study window. Some research suggests that levels of urgency and distress intolerance fluctuate over time (Littlefield et al., 2016; Sperry et al., 2018), suggesting that future work should consider both trait-level measures and momentary measures of these constructs. In addition, an intriguing idea that we were unable to examine in our data is the extent to which contextual factors (e.g., controllability of a situation) impact strategy selection and potentially interact with urgency and distress intolerance. Finally, statistical power may have limited our ability to detect small effects.

In conclusion, this study offers important insights into the nature of how two traits that involve response to negative affect relate to emotion regulation strategy use in daily life. The findings extend the growing body of literature using EMA to assess momentary affect and emotion regulation by considering daily affective processes in relation to urgency and distress intolerance. Findings support the role of high arousal negative affect in disengagement emotion regulation strategy use, which implicates the utility of clinical interventions that focus on emotion regulation, especially during high arousal states (e.g., Dialectical behavior therapy; Linehan, 1993). Urgency and distress intolerance have been robustly associated with psychopathology, making it critically important to understand how these traits relate to emotion and emotion regulation in daily life.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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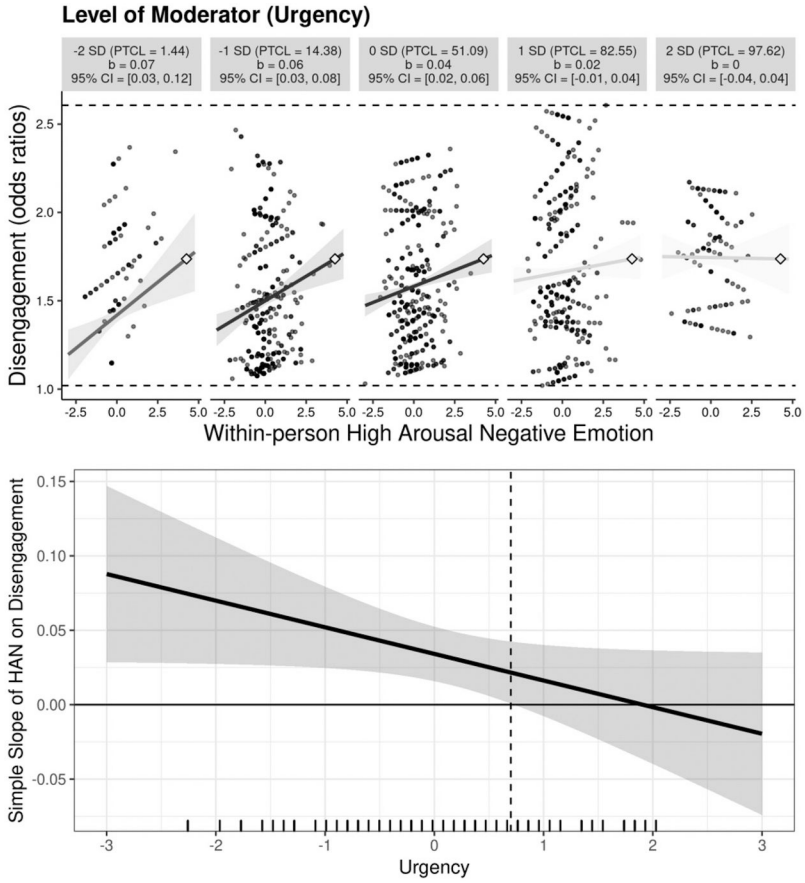

Figure 1. Plot of Two-Way Interaction Effect (Urgency × High Arousal Negative Affect) on Disengagement Strategy Use and Corresponding Marginal Effects Plot

Note. Adjusted for covariates (see Table 3), the simple slope of high arousal negative affect on disengagement is significant and positive when urgency is 0.7 *SD*s away from the mean or lower (where shaded 95% confidence intervals do not include 0); 75.8% of observations in the sample were within this region. Plots generated with interActive (McCabe et al., 2018). PTCL = percentile.

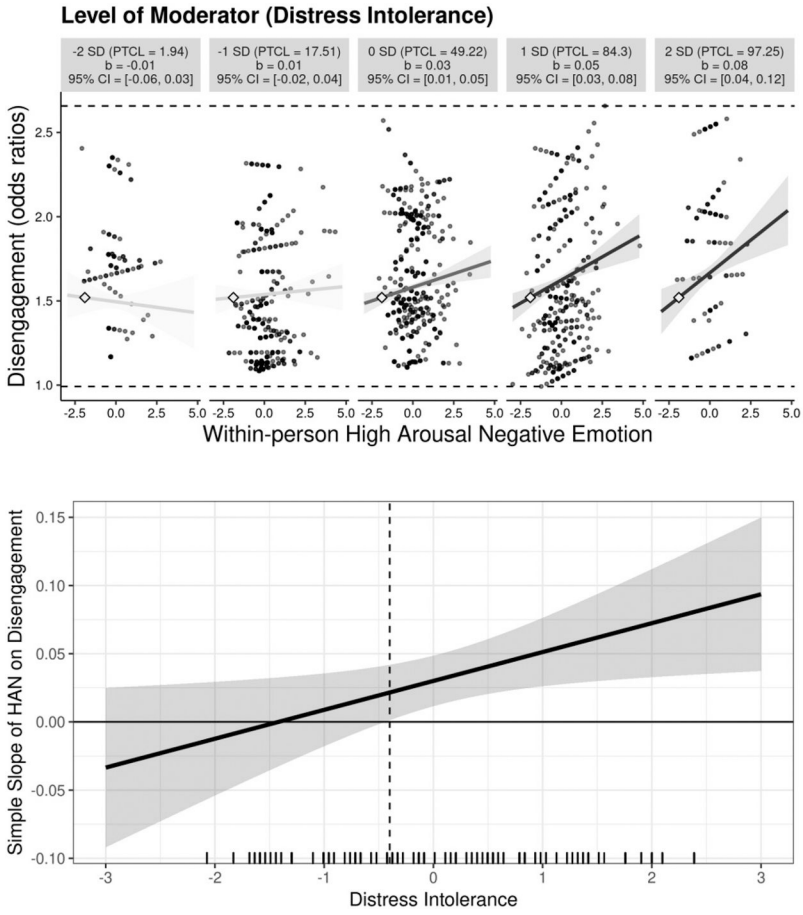

Figure 2. Plot of Two-Way Interaction Effect (Distress Intolerance × High Arousal Negative Affect) on Disengagement Strategy Use and Corresponding Marginal Effects Plot

Note. Adjusted for covariates (see Table 4), the simple slope of high arousal negative affect on disengagement is significant and positive when distress intolerance is −0.4 *SD*s below from the mean or greater (where shaded 95% confidence intervals do not include 0); 64.79% of observations in the sample were within this region. Plots generated with interActive (McCabe et al., 2018). PTCL = percentile.

Table 1

Means, Standard Deviations, Alphas, and Bivariate Correlations of Study Measures (N = 101)

Variable	*M*	*SD*	α	1	2	3	4	5	6
1. Urgency	2.90	0.87	0.87						
2. Distress intolerance	2.85	0.88	0.93	.49** [.33, .63]					
3. High arousal negative affect (within-person)	0.00	0.00		.04 [−.16, .23]	.19 [−.00, .37]				
4. High arousal negative affect (between-person)	2.58	1.08		.29** [.10, .46]	.36** [.18, .52]	.03 [−.16, .23]			
5. Low arousal negative affect (within-person)	−0.00	0.00		−.05 [−.24, .15]	.04 [−.15, .24]	.17 [−.03, .35]	−.01 [−.21, .18]		
6. Low arousal negative affect (within-person)	2.77	1.10		.35** [.16, .51]	.33** [.14, .49]	.23* [.04, .41]	.81** [.74, .87]	.03 [−.16, .23]	
7. Disengagement	0.44	0.26		.11 [−.08, .30]	−.02 [−.22, .17]	.09 [−.11, .28]	.33** [.14, .49]	.02 [−.17, .22]	.40** [.22, .55]

Note. Variables 1 and 2 collected at baseline; 3–7 collected during ecological momentary assessment (EMA). Values in square brackets indicate the 95% confidence interval for each correlation. During EMA. disengagement emotion regulation strategies were endorsed an average of 725 times (48.1%).

* $p < .05$.

** $p < .01$.

Table 2

Predicting Momentary Disengagement Strategy Use From High Arousal Negative Emotion

Effect	*OR*	95% CI	*p*
Model 1			
Fixed effects			
Intercept	1.55	[1.47, 1.64]	
Random effects			
Intercept	1.28	[1.23, 1.35]	
Residual	1.54	[1.51, 1.56]	
Fit indices: AIC = 1,769.25, BIC = 1,784.97, log likelihood = −881.63			
Model 2			
Fixed effects			
Intercept	1.25	[1.10, 1.43]	.001
High arousal negative affect (within-person, $t - 1$)	1.03	[1.00, 1.05]	.02
High arousal negative affect (between-person, $t - 1$)	1.09	[1.03, 1.14]	.001
Random effects			
Intercept	1.26	[1.21, 1.32]	
Residual	1.54	[1.51, 1.56]	
Fit indices: AIC = 1,756.95, BIC = 1,783.14, log likelihood = −873.47			
Comparison with Model 1: $p < .0,001$			
Model 3			
Fixed effects			
Intercept	1.25	[1.10, 1.43]	.001
High arousal negative affect (within-person, $t - 1$)	1.03	[0.99, 1.06]	.10
High arousal negative affect (between-person, $t - 1$)	1.09	[1.03, 1.14]	.001
Random effects			
Intercept	1.26	[1.22, 1.32]	
High arousal negative affect (within-person, $t - 1$)	1.10	[1.07, 1.16]	
Residual	1.52	[1.50, 1.55]	
Fit indices: AIC = 1,747.08, BIC = 1,783.74, log likelihood = −866.54			
Comparison with Model 2: $p = .03$			

Note. OR = odds ratios; AIC = Akaike information criterion; BIC = Bayesian information criterion. Values in square brackets indicate 95% confidence intervals.

Table 3

Predicting Momentary Disengagement Strategy Use by High Arousal Negative Affect, Urgency, and High Arousal Negative Affect × Urgency

Effect	*OR*	95% CI	*p*
Fixed effects			
Intercept	1.55	[1.47, 1.64]	.00
High arousal negative affect (within-person, $t-1$)	1.03	[1.00, 1.07]	.05
Urgency	1.05	[0.99, 1.11]	.10
High Arousal Negative Affect × Urgency	0.97	[0.94, 1.00]	
Random effects			
Intercept	1.28	[1.23, 1.34]	
High arousal negative affect (within-person, $t-1$)	1.09	[1.06, 1.15]	
Residual	1.52	[1.50, 1.55]	

Note. *OR* = odds ratios. Values in square brackets indicate 95% confidence intervals. Akaike information criterion (AIC) = 1,754.54, Bayesian information criterion (BIC) = 1,796.45, log likelihood = −869.27.

Table 4

Predicting Momentary Disengagement Strategy Use by High Arousal Negative Affect, Distress Intolerance, and High Arousal Negative Affect × Distress Intolerance

Effect	*OR*	95% CI	*p*
Fixed effects			
Intercept	1.55	[1.47, 1.64]	.00
High arousal negative affect (within-person, $t-1$)	1.03	[1.00, 1.07]	.10
Distress intolerance	1.05	[0.99, 1.11]	.82
High Arousal Negative Affect × Distress Intolerance	0.97	[0.94, 1.00]	
Random effects			
Intercept	1.28	[1.23, 1.35]	
High arousal negative affect (within-person, $t-1$)	1.10	[1.07, 1.16]	
Residual	1.52	[1.50, 1.55]	

Note. OR = odds ratios. Values in square brackets indicate 95% confidence intervals. Akaike information criterion (AIC) = 1759.02, Bayesian information criterion (BIC) = 1,800.93, log likelihood = −871.51.

Table 5

Predicting Momentary Disengagement Strategy Use by Low Arousal Negative Affect, Urgency, and Low Arousal Negative Affect × Urgency

Effect	*OR*	95% CI	*p*
Fixed effects			
Intercept	1.55	[1.47, 1.64]	.00
Low arousal negative affect (within-person, $t-1$)	1.04	[1.01, 1.06]	.002
Urgency	1.05	[0.99, 1.10]	.11
Low Arousal Negative Affect × Urgency	0.97	[0.95, 1.00]	
Random effects			
Intercept	1.28	[1.23, 1.34]	
Low arousal negative affect (within-person, $t-1$)	1.01	[1.00, 1.53e35]	
Residual	1.53	[1.51, 1.56]	

Note. OR = odds ratios. Values in square brackets indicate 95% confidence intervals. Akaike information criterion (AIC) = 1,763.43, Bayesian information criterion (BIC) = 1,805.33, log likelihood = −873.71.

Table 6

Predicting Momentary Disengagement Strategy Use by Low Arousal Negative Affect, Distress Intolerance, and Low Arousal Negative Affect × Distress Intolerance

Effect	*OR*	95% CI	*p*
Fixed effects			
Intercept	1.55	[1.47, 1.64]	.00
Low arousal negative affect (within-person, $t-1$)	1.03	[1.01, 1.06]	.01
Distress intolerance	1.01	[0.95, 1.06]	.82
Low Arousal Negative Affect × Distress Intolerance	1.01	[0.99, 1.04]	
Random effects			
Intercept	1.28	[1.23, 1.35]	
Low arousal negative affect (within-person, $t-1$)	1.04	[1.01, 1.13]	
Residual	1.53	[1.51, 1.56]	

Note. *OR* = odds ratios. Values in square brackets indicate 95% confidence intervals. Akaike information criterion (AIC) = 1,769.63, Bayesian information criterion (BIC) = 1,811.53, log likelihood = −876.81.