Title
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Permalink
https://escholarship.org/uc/item/5hr8b7w9

Journal
Emotion, 17(8)

ISSN
1528-3542

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Publication Date
2017-12-01

DOI
10.1037/emo0000279

Peer reviewed

Trait acceptance predicts fewer daily negative emotions through less stressor-related rumination

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Abstract

People who are more accepting of their thoughts and feelings experience fewer negative emotions. Although several studies document the connection between acceptance and negative emotions, little, if any research, sheds light on how being receptive to one's internal experience results in less negativity in everyday life. In a daily diary study ($N = 183$), we found that people who were more accepting of their thoughts and feelings experienced fewer daily negative emotions, and this association was partly explained by less daily stressor- related rumination. The strength of this mediational pathway differed depending upon the average perceived severity of daily stressors. When daily stressors were perceived to be more demanding, trait acceptance predicted a stronger inverse association with rumination, and rumination predicted a stronger positive association with negative emotions. These results shed light on one way acceptance of internal experience predicts less negativity, as well as the moderating role of perceived daily stress.

Keywords

acceptance; emotion regulation; rumination

Introduction

People differ in how receptive they are to their thoughts and feelings. For instance, when anxiety surfaces, some people evaluate this experience as 'bad' or inappropriate, whereas others allow their feelings to be as they are without evaluation. Acceptance is the tendency to be receptive to one's thoughts and emotions. People high in trait acceptance relate to their thoughts and feelings non-judgmentally, rather than resisting their internal experience. Psychometric work on acceptance reveals that it is distinct from other personality constructs (e.g. openness to experience) and is a correlate of traits relevant to emotional well-being

(Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). For example, acceptance is positively associated with emotional intelligence, negatively with neuroticism, and has a near zero association with openness to experience (Baer, et. al., 2006). In studies featuring cross-sectional and daily diary designs, trait acceptance consistently predicts fewer negative emotions (e.g. Kashdan, Barrios, Forsyth, & Steger, 2006; Shallcross, Ford, Floerke, & Mauss, 2013). Providing support that acceptance actually causes these reductions in negativity, experimental work suggests that acceptance can be manipulated and decreases negative emotions (Levitt, Brown, Orsillo, & Barlow, 2004).

Although several studies document that people higher on acceptance feel fewer daily negative emotions, little, if any research, sheds light on how, in the context of everyday life, being receptive to one's internal experience results in less negativity. Some researchers have speculated that one way acceptance decreases negativity is by reducing rumination (Shallcross, Troy, & Mauss in press; Shallcross, et. al., 2013; Segal, Williams, & Teasdale, 2002). Rumination is a maladaptive cognitive process whereby individuals repetitively focus on their negative feelings, as well as the meaning, causes and consequences of these emotions (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). As some researchers have argued, rumination may be a cognitive strategy people maladaptively use in the attempt to avoid unwanted internal experience (Liverant, Kamholz, Sloan, & Brown, 2011), or, for those people high in intolerance to ambiguity, to seek emotional clarity (Vine, Aldao, & Nolen-Hoeksema, 2014). However, in reality, rumination perpetuates and even magnifies negative emotions (Puterman, DeLongis, & Pomaki 2010; Lavallee & Campbell, 1995; Wood, Saltzberg, Neale, Stone, & Rachmiel, 1990). Thus, for people with a tendency to be more receptive to their internal experience (i.e. higher on trait acceptance), the urge to avoid their negative states may be lower and this may short-circuit rumination. Moreover, because people higher in trait acceptance engage with their emotional experience, they have the space and practice to understand their emotions and thus may ruminate less. In sum, people higher in acceptance may be less likely to get "caught up" in their stressful experiences, and may ultimately feel fewer negative emotions.

In light of the current literature, we hypothesized that one way trait acceptance reduces negativity is through less rumination about everyday stressors. We further hypothesized that the proposed mediational pathway will be more pronounced in those with greater perceived daily stress, given work showing that acceptance is particularly adaptive during stressful periods of life (Shallcross, Troy, Boland, & Mauss, 2010). Higher trait acceptance forecasted fewer depressive symptoms months later for women who had experienced higher perceived cumulative stress from acute events (e.g. change of residence, death of a family member), but not for women with lower cumulative stress (Shallcross, et. al., 2010). We propose that although the negative emotional spillover from rumination will be greater when encountering higher perceived daily stress, the tendency to be accepting of one's internal experience will be more effective at curbing rumination, thus ultimately translating to fewer negative emotions. Understanding if the proposed associations depends upon context is important, given that context may influence the adaptiveness of emotion regulation (e.g. Troy, Shallcross, & Mauss, 2013) and reflects an important current direction in affective science (Aldao, 2013; Shallcross, Troy, & Mauss, in press).

To test these hypotheses, we utilized data from a larger investigation that featured a seven-day diary study, in which participants reported on their daily stressors, coping responses, and emotions. Before completing the diary, participants filled out a battery of individual difference measures. A unique feature of this dataset is that participants were originally recruited because they were either high or low in chronic stress, providing important variability in daily stress and emotionality. Formally, we tested the following hypotheses:

H1: Rumination in response to daily stressors will mediate the link between trait acceptance and daily negative emotions.

H2: Perceived daily stress will moderate the trait acceptance – stressor-related rumination – daily negative emotions associations. Under higher perceived daily stress, compared to lower levels, trait acceptance will predict a stronger inverse association with rumination, and rumination will predict a stronger positive association with negative emotions.

Methods

Participants

Participants were 183 females (mean age = 41.9 years, SD = 5.1), who identified as Caucasian (76.5%), 11.5% Asian (11.5%), African-American (3.3%), Hispanic/Latino (4.4%), and more than one race (4.4%). To be eligible for this study, all participants had to be ages 20 to 50, female, premenopausal, have a BMI of less than 40 and be English-speaking. Individuals were classified as "high stress" if they cared for a child with autism spectrum disorder and reported a score of >= 13 on the Perceived Stress Scale (PSS). Individuals were classified as "low stress" if they cared for a neuro-typical child and reported a score of <= 19 on the PSS. Exclusion criteria included: major chronic disease (e.g. autoimmune disorders), current or history of substance dependence, bipolar disorder, post-traumatic stress disorder, presence of a vasovagal reflex, smoking, and medications that affect the immune system. Low stress mothers were screened out for the presence of major depression or anti-depressant use; high stress mothers were not excluded if they experienced major depression or used anti-depressants. The two groups (high stress mothers $n = 92$, low stress mothers $n = 91$) were matched on use of hormonal contraception.

Procedure

Individuals were recruited with flyers posted in the community and online. Participants received $75.00 for completing the baseline laboratory visit, which included questionnaires, a set of cognitive tasks, and physiological measures not relevant to the current investigation. For the diary portion of the study, participants were emailed a link to a questionnaire at 7:00pm for seven consecutive days, and were asked to complete it as close to bedtime as possible. Participants received $35.00 for this study portion.

Materials

Baseline Questionnaire

Acceptance: Acceptance was measured using the non-judging subscale from the Five Factor Mindfulness Questionnaire (FFMQ), which assesses the tendency to be accepting or

receptive to one's thoughts and feelings (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Participants indicated their agreement or disagreement on a 5-point scale from 1 (*Never or very rarely true*) to 5 (*Very often or always true*) with eight items such as "I tell myself I shouldn't be feeling the way I'm feeling" (reverse-coded) and "I think some of my emotions are bad or inappropriate and I shouldn't feel them," (reverse-coded) (Cronbach's α = .91). The subscale has a unidimensional factor structure, good convergent validity (Baer, et. al., 2006), and has been used to measure acceptance of internal experience (e.g. Shallcross, et. al., 2013). This variable was centered around the mean.

Daily diary questionnaires

Daily negative emotions: The modified Differential Emotions Scale (mDES) measured the extent to which people experienced emotions (Fredrickson, Tugade, Waugh, & Larkin, 2003). We adapted this scale to be suitable for nightly assessment. Participants indicated on a 5-point scale (0 = *Not at all*, 4 = *Extremely*) the extent to which they experienced 10 negative emotions, including anger, shame, contempt, disgust, embarrassment, guilt, hatred, sadness, fear, and anxiety (Cronbach's α = .83). We applied a square root transformation to this variable to resolve skew.

Perceived daily stress: Participants described the most stressful situation of their day ("Please describe, in as many words as you would like, the situation in your life that caused you the most stress today."). Afterwards, participants indicated the stressfulness of the situation ("How stressful was this situation, today, at its peak?") on a visual analog scale that ranged from 0 = *Not at all* to 100 = *Extremely*. This item was averaged across the week, resulting in a measure of average perceived daily stress. This variable was centered around the mean.

Rumination in response to daily stressor: This one-item measure "I am unable to stop thinking about the situation" assessed how much participants repetitively thought about the daily stressor that day. Participants indicated the extent to which they ruminated on a 5-point scale (0 = *Not at all*, 4 = *A lot*). This item was adapted from previous daily diary research (Puterman, Delongis, & Pomaki, 2010).

Results

Overview of data analytic strategy and descriptive analyses

Given the data were nested, we used multilevel modeling, specifically multilevel structural equation modeling (MSEM). In the current study, the Level 1 data were the day-level data, and the Level 2 data were the person-level data. We used maximum likelihood estimation in the software program Mplus. The daily stressors were first reviewed by three judges and coded for characteristics not relevant to the current paper[1]. Instances in which the participant

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[1]The characteristics included objective controllability of the daily stressor, type of stress (an event, a thought, a chronic stressor), and objective severity of the daily stressor. Given that our hypothesis posits that the proposed mediational pathway depends upon average perceived daily stress, we did not view controllability or stressor-type as relevant to the current paper. We elected not to use the objective severity ratings as a moderator, given the body of literature suggesting that the *perception* of stress is more relevant for emotional well-being and health than objectively what may have taken place.

provided no or not enough information regarding whether a stressor occurred or what happened were removed. Given that the current paper's focus is on people's reactions to daily stressors, we also filtered out the 30 instances in which participants reported that no stressor took place. Last, we only retained daily diary entries that were logged at bedtime that day or before noon the next day. The final data set was comprised of 1,122 daily observations.

Descriptive information about the variables and their intercorrelations across the entire sample are presented in Table 1. Level 1 variables included in Table 1 were aggregated across the week for each individual. The intraclass correlation for negative emotions was .40, suggesting that 40% of the variability in negative emotions was due to differences between participants and 60% of the variability was due to differences from day to day within people. The intraclass correlation for rumination was .30, suggesting that 30% of the variability in rumination was due to differences between participants and 70% was accounted for by within person variability.

Does rumination, in response to daily stressors, mediate the link between trait acceptance and daily negative emotions?

To examine this hypothesis, we tested whether the effect of trait acceptance on daily emotionality was significantly mediated by its effect on rumination. The structure of the data reflected a 2-1-1 (X-M-Y) study design (i.e. how the data were collected), in which the independent variable (X; trait acceptance) was measured once as a Level 2 variable, the mediator (M; rumination experienced in response to a daily stressor) was repeatedly measured as a Level 1 variable, and the outcome (Y; daily negative emotionality) was repeatedly measured as a Level 1 variable. Because trait acceptance (a Level 2 variable) can only explain between-person variance in an outcome (e.g. daily negative emotionality), the mediating variable must also operate at the between-person level of analysis (Preacher, Zyphur, & Zhang, 2010). Analytically, this translated to running a statistical model where the a path, b path, and the indirect effect all existed at the between-person level of analysis. The a path (the effect of X on M) tested the between-person relation involving trait acceptance and daily rumination. The b path (the effect of M on Y) tested the between-person relation involving the between-person component of daily rumination and daily negative emotionality, with trait acceptance as a covariate in the model (for more information on the separation of the between and within components in MSEM, please see Preacher, et. al., 2010). The indirect effect tested whether the between-person component of rumination explained the relation involving trait acceptance and daily negative emotionality.

Results revealed that the direction of the a path (i.e. the relation between trait acceptance and daily rumination, unstandardized beta = −.04, SE = .01, $p < .001$,) was significant, suggesting that higher trait acceptance was related to less rumination to daily stressors, on average. The b path (i.e. the relation between the between-person component of daily rumination and daily negative emotionality, unstandardized beta = .16, SE = .03, $p < .001$; with trait acceptance as covariate in the model, unstandardized beta = −.01, SE = .003, $p < .001$) was also significant, suggesting that people who ruminated more experienced higher daily negative emotions. Further as hypothesized, we observed a significant indirect effect of

trait acceptance on daily negative emotions through average levels of rumination, in response to daily stressors (indirect effect = −.01, SE = .002, p = .001)[2]. Because rumination and negative emotions were measured concurrently, the possibility of an alternative causal sequence existed, whereby trait acceptance lowered negative emotions, which in turn lowered rumination. We ran the alternative model[3] and also found support for this causal order.

To test whether the proposed mediational pathway (i.e. trait acceptance – stressor-related rumination – daily negativity) differed depending upon average perceived daily stress[4], we conducted a set of moderated mediation[5] models. In addition, because the models are overidentified, we provide level-specific fit indices (Ryu & West, 2009). Given the hypothesized mediational pathway existed at the between-person level of analysis, we were only able to consider perceived daily stress as a moderator aggregated across the week. Because a unified method to examine a quantitative moderator in a 2-1-1 mediation model does not yet exist in print (K. J. Preacher, personal communication, May 10, 2016), we combined the methods discussed in the existing literature on multilevel modeling and moderated mediation (Preacher, Rucker, & Hayes, 2007; Preacher, Zyphur, & Zhang, 2010; Preacher, Zhang, & Zyphur, 2016). Specifically, to evidence moderated mediation, we tested whether the a path (trait acceptance – stressor-related rumination) was moderated by average perceived daily stress, by including average perceived daily stress, as well as the product term of average perceived daily stress and trait acceptance, in the model. The average perceived daily stress term was centered around the mean of the sample (M = 57.34), with 1 SD above the mean corresponding to a raw value of 73.77 and 1 SD below the mean corresponding to a raw value of 40.91. In the sample, the range of average perceived daily stress was 12.17 to 96.83. Results indicated that average perceived daily stress and acceptance significantly predicted rumination in expected opposing directions (unstandardized beta = .02, SE = .003, p < .001 and unstandardized beta = −.04, SE = .01, p < .001, respectively). Further, we discovered evidence for a moderation effect of trait acceptance on rumination (the a path) by average perceived daily stress such (unstandardized beta of interaction term = −.001, SE = .000, p = .04), such that the association was stronger at higher levels of perceived daily stress (1 SD above the mean = 73.77, unstandardized beta = −.05), compared to lower levels of perceived daily stress (1 SD below the mean = 40.91, unstandardized beta = −.02). According to level-specific fit indices, fit of the between-group

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[2]Because the sample was comprised of two separately recruited groups (high and low stress mothers), we conducted a multiple groups analysis to test whether the results differed depending upon membership in one of the two groups. We found there were no significant differences between the two groups in the a path (unstandardized beta = −.002, SE = .02, p = .90), the b path (unstandardized beta = −.06, SE = .07, p = .41), and the indirect effect (−.009, SE = .005, p = .07).

[3]In the alternative causal model, the a path (i.e. the relation between trait acceptance and negative emotionality, unstandardized beta = −.02, SE = .003, p < .001) was significant, as was the b path (i.e. the relation between negative emotionality and rumination, unstandardized beta = 1.48, SE = .34, p < .001, with trait acceptance in the model, unstandardized beta = −.01, SE = .01, p = .20). We also observed a significant indirect effect of trait acceptance on rumination, in response to daily stressors, through negative emotionality (indirect effect = −.03, SE = .008, p < .001). We discuss this finding, further, in the discussion.

[4]When running these models with objective severity of the daily stressors as the moderator, we found that objective severity did not moderate either the a path (unstandardized beta of interaction term = −.03, SE = .02, p = .17) or the b path (unstandardized beta of interaction term = −.04, SE = .04, p = .42) in the proposed mediation model.

[5]According to Preacher, Rucker and Hayes (2007), moderated mediation effects can occur in the following ways: "1.) The independent variable (X) functions as a moderator of the b_1 path. 2.) Some fourth variable (W) affects the a_1 path. 3.) W affects the b_1 path. 4.) W affects a_1 whereas yet another variable (Z) affects b_1. 5.) W affects both a_1 and b_1. (p. 193)". We hypothesized moderation mediation taking place in the fifth way (i.e. average perceived daily stress affects both a_1 and b_1).

model ranged between acceptable ($SRMR_{BETWEEN}$ = .07) and poor[6] (RMSEA = .18, CFI = .83).

In a separate model, we tested whether the *b* path (stressor-related rumination and daily negativity) was moderated by average perceived daily stress. To test moderated mediation, we included average perceived daily stress, average daily rumination, the product term of average perceived daily stress and average daily rumination, and trait acceptance in the model. Results indicated that average perceived daily stress (unstandardized beta = .006, SE = .001, *p* < .001), rumination (unstandardized beta = .10, SE = .03, *p* = .001), and trait acceptance (unstandardized beta = −.012, SE = .002, *p* < .001) significantly predicted negative emotions in the expected directions. Further, there was evidence for a moderation effect of rumination on negative emotions (the *b* path) by average perceived daily stress (unstandardized beta of interaction term = .003, SE = .001, *p* = .007), such that the association was stronger at higher levels of stress (1 SD above the mean = 73.77, unstandardized beta = .15), compared to lower levels of perceived daily stress (1 SD below the mean = 40.91, unstandardized beta = .05). Fit of the between-group model ranged between acceptable (CFI = .95, $SRMR_{BETWEEN}$ = .07) and mediocre (RMSEA = .10).

Discussion

The purpose of this paper was to examine how, in the context of everyday life, people higher in acceptance experience fewer negative emotions. In line with others' speculations (e.g. Shallcross, et. al., 2013), we hypothesized that rumination may be a potential mechanism. Rumination, the tendency to perseverate on the antecedents and consequences of negative experiences and emotions (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008), is theorized to result from maladaptive attempts to escape unwanted emotional experience (Liverant, Kamholz, Sloan, & Brown, 2011), and has been shown to predict worsening mood (Puterman, et. al., 2010, Wood, et. al., 1990). In this study, we discovered that individuals higher on acceptance engaged less in these harmful cognitions about their daily stressors and this predicted less negativity. To our knowledge, this is the first study to provide evidence for a pathway through which trait acceptance may predict less daily negativity.

Further, we discovered that these effects were more pronounced during periods of high perceived daily stress. That is, although the negative emotional spillover from rumination was greater when encountering more demanding daily stressors, people higher in acceptance experienced less rumination in this context, thus ultimately translating to fewer negative emotions. We wonder why there might be a stronger inverse connection between trait acceptance and rumination during a period of high perceived stress. Perceived stress is defined as a state in which the environmental demands tax or exceed one's capacity to adapt or cope (Lazarus & Folkman, 1984), and thus, we reason that during these stressful periods the most upsetting thoughts and feelings emerge. Periods of high stress, then, reflect a

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[6]We acknowledge that these fit indices appear to contradict each other, and the results for the *a* path should be interpreted with caution. However, we should also note that research on fit index behavior in MSEM is relatively sparse. Some research has shown that the chi-square test statistic, which is included in the calculation of the RMSEA fit index and the CFI fit index, may show inflated Type I error rates even when the analysis model matches the data-generating model (Schweig, 2014). Importantly, no studies to date have explored the applicability of conventional cutoff values as used in single-level SEM (e.g., Hu & Bentler, 1998) to MSEM. As such, we believe the values of these indices should be interpreted with caution as well.

context whereby having the tendency to be more accepting of internal experience may be particularly useful for curbing rumination. Further, during periods of high perceived stress, why might greater stressor-related rumination be more positively associated with negative emotions? We speculate that if the object of rumination is more overwhelming (as is the case with high perceived daily stress), then the process of turning it over in one's mind will naturally result in more negative emotions. In sum, these results suggest that during a period of high perceived daily stress, people higher in acceptance may be at an advantage.

Understanding if the mediation pathway (i.e. trait acceptance – stressor-related rumination – daily negative emotions) depends upon context is important, particularly given that this area of research reflects an important current aim in affective science (e.g. Aldao, 2013). Previous research has shown that the link between trait acceptance and future depressive symptoms depends upon levels of perceived cumulative stress from major life events (Shallcross, et. al., 2010), and the current results resonate with this idea. We add to the literature, by showing that in the context of periods of high perceived daily stress, trait acceptance may also be its most valuable. The broader notion that acceptance may be more useful if flexibly implemented echoes other research, also. When faced with the task of identifying which emotion regulation strategies would be used in response to 8 emotion-eliciting situations, people who demonstrated more variability in their use of acceptance showed less psychopathology, suggesting that acceptance is most adaptive if used flexibly (Aldao & Nolen-Hoeksema, 2012).

We also found support for an alternative causal sequence amongst the variables trait acceptance, rumination, and negative emotions; specifically, daily negative emotions significantly mediated the association between trait acceptance and daily rumination. Others have found that there is a natural positive feedback between negative emotions and rumination that unfolds throughout the day (Moberly & Watkins 2008; Puterman et al, 2010); thus, our findings are not surprising. Our study is limited by the cross-sectional nature of our evening assessments, and thus we propose future studies to directly examine the unfolding of the rumination-negative emotion cycle throughout the day within the context of acceptance by employing ecological momentary assessments throughout the day (Shiffman, Stone, & Hufford, 2008).

In the current paper, the sample was comprised of caregiving mothers, some of whom cared for a child with autism and some of whom cared for a neuro-typical child. An advantage of this sample was that there was meaningful variability in the extent to which participants' daily lives were distressing. For example, the range of average perceived daily stress scores ranged from 12.17 to 96.83, with a mean of 57.34 (scale: 0 = *not at all* to 100 = *extremely*). Even so, the extent to which the central findings generalize to people experiencing life-threatening situations (e.g. war), or among other populations (e.g. males, adolescents, older adults), remains a limitation of the study.

We discovered the explanatory role of rumination in the connection between higher trait acceptance and less negativity, but researchers have also suggested other ways acceptance reduces negative emotions. People higher in acceptance may feel fewer negative emotions through increased understanding of their emotions, which in turn may lead to greater greater

self-compassion and behavioral flexibility (Shallcross, et. al., 2013). Given the link between trait acceptance and less engagement in poor health behaviors, like smoking (Adams, Tull, & Gratz, 2012), these behavioral strategies may also be worthwhile contendors for examination. Future studies, employing daily diary approaches, provide useful contexts for these research directions.

In addition, although we discovered that trait acceptance alleviated distress by predicting less daily rumination, it is beyond the scope of this study to speak to whether this tendency could be adopted by anyone and operate similarly. Important next steps in this research include translating these hypotheses into an experimental context, so that acceptance is manipulated directly with instructions (e.g. "Allow yourself to accept your emotions without trying to get rid of them"), just as others have done (Campbell-Sill, Barlow, Brown, & Hofmann, 2006: p. 1256). For instance, in the face of an aversive experience, do induced efforts at acceptance reduce rumination, and in turn, decrease negative emotionality? Moreover, more intensive, long-term interventions solely aimed at increasing people's trait levels of acceptance would be useful to verify that the findings discovered here are robust. If evidence is found that acceptance can be increased and implemented on a daily basis, there would be clear clinical implications, particularly given that rumination is considered a transdiagnostic factor in multiple types of psychopathology (Nolen-Hoeksema & Watkins, 2011). The aim to cultivate acceptance would be a critical goal, particularly for clients encountering periods of high stress, with the result being fewer perseverating thoughts and less negativity.

Conclusion

The current study provides more evidence for the critical role of the individual difference, acceptance, in daily emotional experience. In this study we showed that trait acceptance predicted less negativity in individuals by reducing the extent to which they perseverated on stressful experiences, and that this effect was qualified by perceived daily stress.

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Table 1

Descriptives and Intercorrelations.

Variables	Mean	SD	1	2	3	4
1. Daily Negativity	.51	.37	--	.51***	.53***	−.44***
2. Perceived Daily Stress	57.34	16.43	.51***	--	.36***	−.20*
3. Daily Rumination	.97	.78	.53***	.36***	--	−.34***
4. Trait Acceptance	28.97	6.29	−.44***	−.20*	−.34***	--

Note.

*
$p < .05$;

**
$p < .01$;

***
$p < .001$.