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Momentary experiential avoidance: Within-person correlates, antecedents, and consequences and between-person moderators

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ABSTRACT

We used ecological momentary assessment to investigate momentary correlates, antecedents, and consequences of experiential avoidance (EA), and to explore whether depression and anxiety moderate these within-person relationships. Participants recorded their mood, thoughts, stress, and EA four times daily for one week. Baseline depression and anxiety were associated with EA. EA was lower when participants reported more positive mood and thoughts, and higher when participants reported more negative mood, negative thoughts, and stress. The EA-stress relationship was stronger for participants with higher depression. Lag analyses showed that negative mood, negative thoughts, and stress predicted subsequent EA. In turn, EA predicted subsequent negative mood, negative thoughts, and stress. The relationship between EA and subsequent negative thoughts was stronger for participants with higher anxiety. Participants with higher depression and anxiety had a less negative association between positive thoughts and subsequent EA. This study adds to a growing body of literature on the process of EA as it unfolds in vivo, in real-time. Findings highlight links between momentary negative internal experiences and EA (which may be especially strong for people with depression or anxiety) and suggest that certain positive subjective experiences may buffer against EA. Clinical implications and future research directions are discussed.

1. Introduction

"Psychological flexibility" encompasses a broad set of adaptive regulation and coping processes, all of which share in common a willingness to contact the present moment without judgement and to pursue behaviors that serve valued goals (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). One component of psychological (in)flexibility that has received significant attention in recent years is experiential avoidance (EA; Chawla & Ostafin, 2007). EA refers specifically to rigid attempts to alter the form, frequency, or intensity of unwanted internal experiences, such as negative thoughts or mood, physical pain, or bad memories (Hayes, Strosahl, & Wilson, 1999). EA has been linked cross-sectionally with a range of negative psychological and behavioral outcomes (Hayes et al., 2006), and research suggests that EA may prospectively predict worse mental health (Bond & Bunce, 2003). However, very few studies have explored *within-person* links between EA and negative outcomes, and even fewer have examined temporal relationships between such variables. For example, in what contexts are people most at risk for engaging in EA? What are the momentary, within-person effects of EA on later functioning? Further, only a handful of published studies have examined potential between-person moderators of these within-person relationships. Given the central role that EA appears to play in the development and maintenance of depressive and anxiety disorders in particular (e.g., Spinhoven, Drost, de Rooij, van Hemert, & Penninx, 2014), one would expect that symptoms of depression and anxiety are important moderating factors. However, such hypotheses remain largely unexplored. These gaps in the literature constitute impediments to a full understanding of EA.

1.1. Within-person correlates, antecedents, and consequences of EA

As noted, cross-sectional and longitudinal studies have established strong links between EA and a host of negative outcomes. For example, people who endorse higher EA are more likely to report greater symptoms of post-traumatic stress disorder in response to childhood maltreatment (Shenk, Putnam, & Noll, 2012), higher levels of depression and anxiety symptoms (Roemer, Salters, Raffa, & Orsillo, 2005), more delusions in response to life hassles (Goldstone, Farhall, & Ong, 2011), and worse mental health over time (Bond & Bunce, 2003). Higher EA is also associated with decreased levels of adaptive

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outcomes, such as positive affect, life satisfaction, happiness, and quality of life (Woodruff et al., 2014).

Although people certainly differ in their overall, global tendencies to use EA as a strategy to deal with aversive experiences, individuals also probably show within-person variations in whether and when they engage in EA. The previously-discussed studies conceptualize EA as a static, trait-level predisposition, rather than as a dynamic and ongoing process of responding to internal events. It would be informative to capture this process of EA as it unfolds naturally, in response to daily events and experiences, and to examine associations with clinically relevant outcomes. Traditional methods of assessing EA (e.g., via use of one-time, retrospective self-report measures) are inadequate for examining these questions because they preclude the ability to model within-person processes (i.e., relationships between variables that may fluctuate over time). Further, because they typically ask the respondent to recall subjective experiences over lengthy intervals, they introduce the potential for significant recall biases. Ecological momentary assessment (EMA; Stone & Shiffman, 1994), wherein respondents are assessed repeatedly, in vivo, as phenomena occur, is better-suited to examining these processes and to modeling temporal relationships between variables of interest. Further, this paradigm permits measurement of psychological events in an ecologically valid, real-world setting. Thus, EMA allows modeling of the process of EA - responding to unwanted internal states with efforts to diminish them - as it unfolds naturally, in real-time.

A small number of studies have begun to examine certain within-person correlates of EA, using EMA or daily diary techniques. For example, research has shown that EA is associated with anxiety during social interactions, particularly for individuals diagnosed with social anxiety disorder (Kashdan et al., 2013, 2014), and that EA of anxiety is linked with lower well-being (i.e., more negative mood, less positive mood, less enjoyment, less meaning in life) on a within-day basis (Machell, Goodman, & Kashdan, 2015). Momentary EA may also interfere with emotional reactivity to pleasant events among depressed veterans (Hershenberg, Mavandadi, Wright, & Thase, 2017) and is associated with more intense negative emotions and less intense positive emotions (O'Toole, Zachariae, & Mennin, 2017). Finally, momentary EA has been linked with lower within-day self-esteem (Udachina, Varese, Myin-Germeys, & Bentall, 2014; Udachina et al., 2009), more paranoia (Udachina et al., 2014), and more audiovisual hallucinations (Varese, Udachina, Myin-Germeys, Oorschot, & Bentall, 2011) among individuals with high trait-level paranoia and psychotic-spectrum disorders.

Also important are questions regarding momentary triggers for and consequences of EA. Theory of course suggests that *aversive* internal states (e.g., pain, negative images or memories) typically prompt EA (Hayes, 1994), suggesting that these experiences should precede efforts to avoid. Interestingly, research also suggests that EA can intensify the very experiences that one was trying to escape (Gross, 1998, 2002; Wegner, 1994; Wegner, Schneider, Carter, & White, 1987). In one study, for example, participants who suppressed anxious thoughts about an imminent painful stimulus subsequently experienced increased self-reported anxiety and increased frequency of anxious thoughts (Koster, Rassin, Crombez, & Naring, 2003). Aversive negative internal experiences might therefore serve as both triggers for and consequences of EA. Research also suggests that *positive* internal experiences might predict *lower* subsequent momentary EA. For example, the buffering effects of positive affect and cognitions against various negative outcomes are well established (Fredrickson, 1998; Lightsey, 1994). Positive mood and thoughts might serve a similar protective function against EA. Conversely, EA might lead to later decreases in positive mood and thinking. Research linking trait-level EA with lower daily experiences of positive affect and events, gratitude, life satisfaction, sense of meaning, and curiosity (Kashdan, Barrios, Forsyth, & Steger, 2006) suggests that *momentary* EA might also dampen subsequent positive internal experiences.

A few studies have attempted to model within-person, temporal relationships between EA and various outcomes as they occur in vivo. Among individuals high in paranoia, for example, EA has been shown to predict later decreases in self-esteem (Udachina et al., 2009, 2014) and increases in paranoia (Udachina et al., 2014). Shahar and Herr (2011) failed to find support for hypotheses that daily negative mood would predict subsequent EA and vice versa. However, these null findings could be explained by the study's long assessment intervals; participants only reported mood and EA once per day, and lagged effects might not persist over such lengthy periods.

1.2. Between-person moderators of within-person relationships

A number of the previously-discussed studies have examined the impact that more stable, person-level factors (e.g., psychiatric symptoms or diagnosis) have on within-person relationships between momentary EA and other relevant variables. Between-person variables may moderate observed within-person effects. For example, Kashdan et al. (2013, 2014), O'Toole et al. (2017), and Machell et al. (2015) tested the impact of social anxiety on these relationships. Udachina et al. (2009) examined the influence of paranoia and Varese et al. (2011) tested the role of psychosis. Finally, two studies examined the effect of probable depression diagnoses (Hershenberg et al., 2017) and symptoms of depression (Shahar & Herr, 2011).

Although EA is understood to be a *trans*-diagnostic construct, linked with both general psychological distress and a wide range of disorders and maladaptive behaviors (Chawla & Ostafin, 2007), EA is theorized to play a particularly important role in the onset and maintenance of depressive and anxiety disorders. Specifically, recent proposals suggest that high levels of neuroticism (as is common in depression and anxiety) yield tendencies to experience frequent negative mood, to evaluate those experiences as aversive, and to use avoidant coping strategies in response, thereby ultimately increasing these experiences (Barlow & Kennedy, 2016; Barlow, Sauer-Zavala, Carl, Bullis, & Ellard, 2014).

Longitudinal studies have documented the predictive role of EA in the development of depressive and anxiety disorders over time. For example, Spinhoven et al. (2014) demonstrated that trait-level EA prospectively predicts diagnoses of major depressive disorder, dysthymia, generalized anxiety disorder, and fear disorders (social anxiety disorder, panic disorder, agoraphobia) over a 2-year interval. EA has also been shown to predict development of depression symptoms in at-risk, community-dwelling women under stress (Shallcross, Troy, Boland, & Mauss, 2010), and reducing EA in the treatment of borderline personality disorder leads to subsequent improvement in depressive symptoms (Berking, Neacsiu, Comtois, & Linehan, 2009). Importantly, several empirically-supported treatments for anxiety and fear disorders (e.g., exposure therapy; Myers & Davis, 2007) and depression (e.g., behavioral activation; Jacobson, Martell, & Dimidjian, 2001) are based on the principle that patients engage in avoidant behaviors (escape from perceived threat, rumination) that ultimately perpetuate symptoms. Further, the unified treatment for depression and anxiety disorders developed by Barlow, Allen, and Choate (2004) largely aims to change patients' relationships to problematic (i.e., threatening, aversive, dysregulated) moods and thoughts and to prevent avoidance.

Given this body of literature, it is surprising that more work has not tested the role of depression and anxiety symptoms in moderating within-person relationships between EA and core aversive internal experiences such as negative mood, thoughts, and subjective stress. Theory suggests that people with higher levels of depression and/or anxiety symptoms would respond to such experiences with higher efforts to avoid, which may ultimately increase the experiences in the short-term and maintain depression and anxiety in the long-term. Interestingly, people with elevated symptoms of depression or anxiety might also engage in EA in response to *positive* mood or thoughts; patients with major depression (Beblo et al., 2012) and patients with

social anxiety disorder (Blalock, Kashdan, & Farmer, 2016) are more likely to attempt to suppress both positive and negative emotions than matched healthy controls. It is therefore possible that individuals experiencing symptoms of depression and/or anxiety might respond to momentary positive mood and thoughts with greater EA.

1.3. The current study

With this background in mind, we aimed to add to the small but growing body of literature examining the contexts in which EA unfolds naturalistically. The current work addressed methodological limitations of some earlier studies, such as the use of paper-and-pencil diaries (which introduces the potential for back-filling, front-filling, or other data-faking; Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002) and the inclusion of only one assessment per day (which can cause retrospective recall biases and makes it difficult to model lagged effects between momentary variables). We attempted to replicate previous findings regarding momentary correlates of EA in individuals with varying levels of depression and anxiety symptoms. We extended prior work by measuring generalized anxiety (as opposed to social anxiety specifically), by testing antecedents and consequences of momentary EA (rather than just concomitants), and by assessing links between momentary EA and perceived stress (an aversive experience that has also been linked with trait-level EA, but which has not been tested on a momentary basis; Bardeen, Fergus, & Orcutt, 2013). Finally, we conceptualized EA not only as an unwillingness to experience negative feelings and thoughts (e.g., Kashdan et al., 2014) but also as including *behavioral* avoidance (Gamez, Chmielewski, Kotov, Ruggero, & Watson, 2011; Glick, Millstein, & Orsillo, 2014; Rochefort, Baldwin, & Chmielewski, 2018). Hayes, Wilson, Gifford, Follette, and Strosahl (1996) define EA as anything one does to avoid unpleasant internal experiences, suggesting that cognitive, emotional, and behavioral control/avoidance are all relevant.

In the current study, we used an EMA paradigm to examine within-person correlates, antecedents, and consequences of EA, as well as to test the potential moderating role of depression and/or anxiety symptoms on these within-person relationships. Participants completed baseline measures of depression and anxiety, followed by 28 momentary assessments (4 per day) of mood, thoughts, perceived stress, and EA over the following week. We expected that: (a) negative internal experiences (negative mood, negative thoughts, stress) would be positively correlated with EA and positive internal experiences (positive mood, positive thoughts) would be negatively correlated with EA; (b) negative internal experiences would predict subsequent increases in EA and positive internal experiences would predict subsequent decreases in EA; (c) EA would predict subsequent increases in negative experiences and decreases in positive experiences; (d) relationships between negative internal experiences and EA would be stronger for participants with higher depression and anxiety symptoms; and (e) relationships between positive internal experiences and EA would be weaker (i.e., less strongly negative) for participants with higher depression and anxiety symptoms.

2. Method

2.1. Participants

Participants were 104 undergraduate students (81 women, 23 men; average age = 19.15 [*SD* = 1.12] years) at a private, mid-Atlantic, small liberal arts college. Sixty-four percent of our participants identified as Caucasian, 21.15% identified as Asian or Asian American, 9.62% identified as African American, and 2.88% indicated another race. The majority of the sample (89.42%) identified as non-Hispanic. For their participation, individuals received $10 for completing baseline measures and $0.50 for completing each momentary assessment. In addition, participants who completed at least 75% (21) of the momentary assessments earned a lottery entry into a drawing for one of 3 $50 prizes. Total potential compensation was therefore $24 if a participant did not win a lottery prize and $74 if s/he did.

2.2. Procedure

The Lafayette College Institutional Review Board approved all study procedures. After completing the informed consent process, participants completed baseline measures of depression and anxiety symptoms, as well as other measures that are not relevant to the present study. They also completed a one-item self-evaluation of effort on these scales. These procedures were completed in person. Study staff then showed participants how to complete EMA surveys. Using the SurveySignal web-based application (SurveySignal, Chicago, IL), participants received text messages with embedded links to a brief Qualtrics survey (Qualtrics, Provo, UT) four times per day for the following week. Texts were sent automatically, at quasi-random times (specifically, between 9:00AM and 10:00PM, at a minimum of 90 min apart). If participants did not respond within 30 min, they received a reminder text message. Participants had a total of 2 h to respond to each survey prompt; after this, the survey link was inactivated. Each EMA survey presented a series of questions about participants' current mood, thoughts, perceived stress, and EA. At the end of the week, participants returned to the lab to receive compensation and complete a one-item self-evaluation of effort on the EMA questions.

2.3. Measures

2.3.1. Baseline measures

We used the 20-item Center for Epidemiologic Studies Depression Questionnaire (CESD; Radloff, 1977) to assess symptoms of depression. This self-report measure, designed for use in community samples, has good reliability (e.g., coefficient alphas and Spearman-Brown split-half reliability coefficients in the 0.85 to 0.90 range, test-retest reliability over 2-week to 12-month intervals ranging from 0.48 to 0.67) and validity (e.g., correlations with clinician-administered ratings of depression in the 0.69 to 0.75 range, correlation with self-report measure = .70; Radloff, 1977). We used the Generalized Anxiety Disorder 7-item Scale (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006) to assess symptoms of anxiety. This is also a self-report measure designed for use in primary care settings, with strong documented reliability (coefficient alpha = .92, one-week test-retest reliability = 0.83) and validity (intraclass correlation = 0.83; Spitzer et al., 2006). Higher scores on both scales reflect more severe symptoms. Scale items for both the CESD and the GAD-7 were highly inter-correlated in our sample (Cronbach's alphas = .92 and .89, respectively), reflecting good measure reliability.

Participants also answered a one-item self-assessment question about their effort and honesty in completing the questionnaires. Instructions underscored the importance of preserving the scientific validity of the study, and participants were asked, “To what extent did you pay careful attention to the survey questions and answer questions honestly?” Response choices ranged from 1 (*I paid careful attention and answered all questions honestly, to the best of my ability*) to 5 (*I did not pay particularly close attention and/or there were multiple items where I did not answer honestly*).

2.3.2. EMA measures

Mood. At each momentary assessment, participants specified the extent (1 = *not at all*, 6 = *a lot*) to which they were currently feeling depressed (*sad, lonely*), anxious (*jittery, nervous*), angry (*angry, hostile*), and positive moods (*happy, excited*). We averaged ratings for depressed, anxious, and angry moods to yield one score reflecting negative mood. Similarly, we averaged scores on the two positive mood items to yield an overall measure of positive mood. Items were drawn from the Positive and Negative Affect Schedule–Expanded Form (PANAS-X;

Watson & Clark, 1994) and from previous studies (Wenze, Gunthert, & Forand, 2007; Wenze, Gunthert, & German, 2012). All items have been used successfully in a number of EMA studies (Fichman, Koestner, Zuroff, & Gordon, 1999; Gunthert, Cohen, & Armeli, 2002; Wenze et al., 2007, 2012).

Thoughts. Participants specified the extent (1 = *not at all*, 6 = *a lot*) to which they currently endorsed 6 items assessing negative automatic thoughts ("I'm no good," "My life is a mess" [depressed]; "Something awful will happen," "I can't stop worrying" [anxious]; "I want to get revenge," "This person is a loser" [angry]) and 2 items assessing positive automatic thoughts ("Life is running smoothly," "I'm a lucky person"). As with mood items, we averaged endorsement of depressed, anxious, and angry thoughts to yield one score reflecting negative thinking, and we averaged scores on the two positive thought items to yield an overall measure of positive thinking. Items were drawn from the Automatic Thoughts Questionnaire (Hollon & Kendall, 1980), the Hostile Automatic Thoughts Scale (Snyder, Crowson, Houston, Kurylo, & Poirier, 1997), the anxiety scale of the Cognition Checklist (Beck, Brown, Steer, Eidelson, & Riskind, 1987), the Positive Automatic Thoughts Questionnaire (Ingram & Wisnicki, 1988), and previous EMA studies (Wenze et al., 2007).

Experiential Avoidance. Participants specified the extent (1 = *strongly disagree*, 6 = *strongly agree*) to which they currently agreed with 6 statements reflecting various aspects of EA. Items were developed based on the subscales of the Multidimensional Experiential Avoidance Scale (MEAQ; Gamez et al., 2011). Recent work suggests that the MEAQ is a better measure of EA than more widely-used scales, such as the Acceptance and Action Questionnaire-II (AAQ-II, Bond et al., 2011; Rochefort et al., 2018). We selected items (one from each subscale) that were judged to be most applicable to a momentary assessment strategy, combined items if necessary, and/or adapted items for momentary use: "I'm avoiding doing something because it might make me feel badly" (Behavioral Avoidance subscale, EA1), "I really wish I could have no painful feelings or thoughts" (Distress Aversion subscale, EA2), "I'm procrastinating" (Procrastination subscale, EA3), "I'm trying to distract myself from something or not think about it" (Distraction & Suppression subscale, EA4), "I'm 'turning off my emotions'" (Repression & Denial subscale, EA5), "I'm facing bad feelings head on in order to work towards my goals" (Distress Endurance subscale, EA6; reverse scored).

Perceived stress. Participants answered the question, "How stressful is your life right now?" Response choices ranged from 1 (*not at all*) to 6 (*extremely*).

2.3.3. Follow-up self-assessment

Upon returning to the lab at the end of the study week, participants again completed a one-item self-assessment of their effort and honesty in responding, this time regarding their responses to the EMA surveys.

2.4. Overview of data analyses

We conducted three sets of analyses to investigate the correlates, antecedents, and consequences of momentary EA, as well as the moderating effect of depression and anxiety symptoms on these relationships: (a) concurrent analyses in which, for example, negative mood was used to predict EA at the *same* assessment, (b) lag analyses in which negative mood was used to predict EA at the *next* assessment, and (c) lag analyses in which EA was used to predict *negative mood* at the next assessment. Because of the nested structure of our data (28 momentary assessments at level 1 nested within each participant at level 2), we used multilevel modeling for all of these analyses. At level 1, for example, we can estimate each participant's own unique relationship between negative mood and EA. At level 2, we can examine cross-level interactions to estimate how depression or anxiety symptoms (both of which are between-subjects variables) affect this within-subject relationship. Level 1 predictors are person-centered and level 2 predictors are grand mean-centered for ease of interpretation. We used HLM 6.01 software for multilevel modeling analyses and R version 3.4.4 and SPSS version 25 for other (preliminary and descriptive) analyses.

3. Results

3.1. Preliminary analyses

Per Kashdan et al. (2014), we first sought to determine whether our momentary measure of EA constituted a single latent factor that was conceptually distinct from our momentary measure of negative mood. We ran exploratory factor analyses (EFAs) using target rotation on a subset of the covariance matrix of the data containing only the items underlying the EA and negative mood factors. The covariance matrix we used depended on the level we considered, but both can be obtained in R using the mcfa.input() function of Huang (2017). At the between-person level we obtained loadings on the EA factor of 0.86, 0.70, 0.68, 0.97, 0.60, and −0.19 for EA1-6, respectively, while the negative mood items *sad*, *lonely*, *angry*, *hostile*, *jittery*, and *nervous* had loadings of 0.26, 0.26, −0.16, −0.24, 0.04 and 0.14, respectively. Similarly, the negative mood items loaded on the negative mood scale with loadings of 0.67, 0.59, 1.05, 1.05, 0.71 and 0.67, while EA1-6 loaded at 0.12, 0.09, 0.01, 0.01, 0.24 and −0.26, respectively. At the within-person level, we obtained loadings on the EA factor of 0.62, 0.40, 0.49, 0.67, 0.42, and −0.06 for EA1-6, respectively, while the negative mood items *sad*, *lonely*, *angry*, *hostile*, *jittery*, and *nervous* had loadings of 0.19, 0.22, −0.14, −0.12, 0.07 and 0.15, respectively. Similarly, the negative mood items loaded on the negative mood scale with loadings of 0.56, 0.32, 0.85, 0.69, 0.21 and 0.32, while EA1-6 loaded at 0.05, 0.19, −0.04, 0.12, 0.11, and −0.10, respectively. These results suggest that item EA6 does not load cleanly on either factor. We therefore eliminated item EA6 and re-ran EFAs using EA items 1–5. We note that EA6 was the only reverse-coded item in our momentary assessments; this may explain low factor loadings.

At the between-person level, we obtained loadings on the EA factor of 0.88, 0.71, 0.69, 0.99 and 0.61 for items EA1-5, respectively, while the negative mood items *sad*, *lonely*, *angry*, *hostile*, *jittery*, and *nervous* had loadings of 0.27, 0.27, −0.15, −0.23, 0.04 and 0.16, respectively. Similarly, the negative mood items loaded on the negative mood scale with loadings of 0.66, 0.57, 1.05, 1.05, 0.7 and 0.6, while EA1-5 loaded at 0.09, 0.07, −0.01, −0.02, and 0.22, respectively. At the within-person level, we obtained loadings on the EA factor of 0.63, 0.40, 0.49, 0.67 and 0.42 for EA1-5, respectively, while the negative mood items *sad*, *lonely*, *angry*, *hostile*, *jittery*, and *nervous* had loadings of 0.19, 0.22, −0.14, −0.12, 0.07 and 0.15, respectively. Finally, the negative mood items loaded on the negative mood scale with loadings of 0.56, 0.32, 0.85, 0.69, 0.21 and 0.32, while EA1-5 loaded at 0.04, 0.18, −0.05, 0.11, and 0.11, respectively. Although the factor solutions are not as clean at the within-person level as at the between-person level, the overall pattern suggests the existence of two factors at both level 2 and level 1 of our dataset. Importantly, there are no established factor retention criteria for multilevel EFA (Schweig, 2013).

To further explore the differentiation of EA and negative mood, we again use the between- and within-person confirmatory factor analysis (CFA) suggested by Huang (2017) in R using the **lavaan** package (Rosseel, 2012). In this framework, we run two CFAs at each level; one uses a single factor combining EA and negative mood, while the second separates them. We report the standard fit statistics for both the one- and two-factor models at both levels, both showing that separating these factors is the better fit. For the within-person level, the RMSEA improves from .125 to .088, the CFI improves from .592 to .803, the TLI improves from .501 to .755, and the SRMR improves from .092 to .066. For the between-person level, the RMSEA improves from .251 to .161, the CFI improves from .673 to .868, the TLI improves from .6 to .835, and the SRMR improves from .104 to .095. In sum, then, both the EFA loadings and these CFA fit statistics support the use of EA items 1–5 as a single factor, and the fact that EA can be meaningfully measured

separately from the negative mood scale. In all subsequent analyses, we use the mean of EA items 1–5 as our indicator of momentary EA.

Per Huang (2017) the between-person reliability of our momentary measures was high (negative mood = .92, positive mood = .89, negative thoughts = .91, positive thoughts = .77, EA = .90). The within-person reliability was lower (negative mood = .67, positive mood = .73, negative thoughts = .72, positive thoughts = .61, EA = .67). However, these results should be interpreted with caution for a number of reasons. Experts note that acceptable reliability standards may vary depending on the level of analysis (e.g., within vs. between-person; Bonito, Ruppel, & Keyton, 2012) and high reliability estimates are not necessarily good if the measure in question is intended to tap into multiple aspects of a construct (Crutzen & Peters, 2017). In the current study, momentary items were specifically chosen to represent breadth of relevant concepts (e.g., behavioral avoidance, distress aversion, suppression, etc. as facets of EA; depressed, angry, and anxious moods as facets of negative emotion). We did not conceptualize these as unidimensional constructs. We would anticipate, for example, that participants who tend to engage in EA will on average use more types of EA over the study week (meaning that momentary items will hang together and reliability will be high at the between-person level). At the within-person level, however, a participant who engages in one or two types of EA *in the moment* will probably not simultaneously use other avoidance strategies, especially if the strategy employed is successful. For more on this issue, see Coyne and Gottlieb (1996).

Consistent with previous studies (Kashdan et al., 2006, 2013), we calculated the intraclass correlation coefficient (ICC) for all momentary variables to reflect the proportion of total variance at the between and within-subjects levels. For negative mood, an ICC of 0.56 indicated that 56% of the observed variation was due to differences between participants; 44% was therefore due to within-person variation. For positive mood, 29% of observed variation was due to differences between participants and 71% was due to within-person variation. For negative thoughts, 68% of observed variation was due to differences between participants and 32% was due to within-person variation. For positive thoughts, 53% of observed variation was due to differences between participants and 47% was due to within-person variation. For EA, 66% of observed variation was due to differences between participants and 34% was due to within-person variation. For stress, 51% of observed variation was due to differences between participants and 49% was due to within-person variation.

3.2. Descriptive analyses

All consented participants completed all study procedures. Participants completed an average of 23.67 (84.54%; $SD = 4.55$; range = 10–28) EMA surveys over the course of the week, and a total of 2462 surveys. Per expert guidelines indicating that longitudinal data from participants with 5 observations or more can be included in EMA analyses (Bolger & Laurenceau, 2013), we did not exclude any participants from analysis. Neither depression symptoms nor anxiety symptoms were associated with number of assessments completed ($r = -0.05$, $p = .65$ and $r = -0.04$, $p = .69$, respectively). The average amount of time it took participants to begin a survey after receiving a text alert was 20.68 min ($SD = 26.34$) and the average amount of time participants spent on EMA surveys was 177.66 s (2.96 min; $SD = 512.85$ s). Neither participant response delay nor time spent on surveys changed as the study week progressed ($b_{10} = 0.07$, $p = .29$ and $b_{10} = -0.97$, $p = .55$, respectively).

The average score on the self-assessment of effort on baseline measures was 1.07 ($SD = 0.25$; range = 1–2). The average score on the self-assessment of effort on EMA surveys was 1.42 ($SD = 0.69$; range = 1–5); because only five participants rated themselves higher than a 2 (*3*, n = 4; *5*, n = 1), we proceeded with analyses using the full dataset. A summary of results when we eliminated EMA data for participants who scored higher than a 2 is footnoted below.

Table 1
Means and standard deviations of baseline measures and aggregated momentary variables.

Variable	*M(SD)*	*N(%)*
Depression Symptoms (CESD)	17.35 (11.18)	
Possible major depressive disorder[a]		50 (48.08%)
Anxiety Symptoms (GAD-7)	6.76 (5.02)	
Possible generalized anxiety disorder[b]		27 (25.96%)
Momentary Variables		
Negative Mood	1.73 (0.63)	
Positive Mood	3.04 (0.69)	
Negative Thoughts	1.75 (0.74)	
Positive Thoughts	3.18 (0.94)	
Experiential Avoidance	2.47 (0.96)	
Perceived Stress	3.03 (0.99)	

CESD indicates Center for Epidemiologic Studies Depression Scale (Radloff, 1977); GAD-7 indicates Generalized Anxiety Disorder 7-item Scale (Spitzer et al., 2006); mood items were derived from the Positive and Negative Affect Schedule–Expanded Form (PANAS-X; Watson & Clark, 1994) and from previous studies (Wenze et al., 2007; Wenze et al., 2012); thoughts items were derived from the Automatic Thoughts Questionnaire (Hollon & Kendall, 1980), the Hostile Automatic Thoughts Scale (Snyder et al., 1997), the anxiety scale of the Cognition Checklist (Beck et al., 1987), the Positive Automatic Thoughts Questionnaire (Ingram & Wisnicki, 1988), and previous EMA studies (Wenze et al., 2007); experiential avoidance items were derived from the Multidimensional Experiential Avoidance Scale (MEAQ; Gamez et al., 2011); perceived stress was based on the question, "How stressful is your life right now?" Momentary variables were scored on *1* to *6* Likert-type scales.

[a] Using a cutoff score of 16 or greater (Radloff, 1977).

[b] Using a cutoff score of 10 or greater (Spitzer et al., 2006).

Table 1 presents the means and standard deviations of all study variables, and Table 2 presents inter-correlations between study variables. We used a hierarchical linear modeling (HLM) technique to calculate means and standard deviations for momentary variables; this approach accounts for the multilevel nature of the dataset (Bryk & Raudenbush, 1992). The average CESD and GAD-7 scores in our sample are similar to what have been noted in other college samples (e.g., 16.77 in Carleton et al., 2013 and 7.01 in Choueiry et al., 2016, respectively). Consistent with previous studies (Fortney et al., 2016; Radloff, 1991; Regestein et al., 2010), these scores are higher than is typical for older, community-dwelling samples (e.g., 8.39 in Carleton et al., 2013 and 2.95 in Lowe et al., 2008, respectively).

3.3. Intercept analyses

The level-1 within-person intercept reflects each participant's average level of a specified outcome variable over the course of the study period. This within-person intercept can then be modeled at level 2 as a function of relevant between-person variables (i.e., depression or anxiety symptoms). In our sample, negative mood, positive mood, negative thoughts, positive thoughts, stress, and EA varied as a function of depression ($b_{01} = 0.03$, $b_{01} = -0.03$, $b_{01} = 0.04$, $b_{01} = -0.04$, $b_{01} = 0.04$, $b_{01} = 0.05$ respectively; all $p < .001$) and anxiety symptoms ($b_{01} = 0.07$, $b_{01} = -0.06$, $b_{01} = 0.10$, $b_{01} = -0.10$, $b_{01} = 0.08$, $b_{01} = 0.10$ respectively; all $p < .001$). Participants with higher levels of depression and participants with higher levels of anxiety reported more negative mood, less positive mood, more negative thoughts, less positive thoughts, more stress, and more EA.[1]

[1] In order to examine whether depression and anxiety symptoms are *independently* related to level 1 variables, we re-ran these analyses, including depression and anxiety as simultaneous level 2 predictors. Negative thoughts and negative mood varied as a function of both depression ($b_{01} = 0.02$, $p = .003$ and $b_{01} = 0.02$, $p = .01$, respectively) and anxiety symptoms ($b_{02} = 0.06$, $p = .002$ and $b_{02} = 0.03$, $p = .04$, respectively). Positive mood and EA varied as a function of depression ($b_{01} = -0.02$, $p = .003$ and $b_{01} = 0.05$, $p < .001$, respectively) but not anxiety ($b_{02} = -0.02$, $p = .19$ and $b_{02} = 0.03$, $p = .28$,

Table 2
Inter-correlations between study variables.

	CESD	GAD-7	Negative Mood	Positive Mood	Negative Thoughts	Positive Thoughts	EA	Perceived Stress
CESD	–	.76***	.59***	-.45***	.63***	-.50***	.63***	.41***
GAD-7		–	.56***	-.41***	.64***	-.54***	.53***	.42***
Negative Mood			–	-.17†	.83***	-.21*	.66***	.51***
Positive Mood				–	-.32**	.70***	-.21*	-.05
Negative Thoughts					–	-.39***	.73***	.52***
Positive Thoughts						–	-.27**	-.22*
EA							–	.59***
Perceived Stress								–

CESD indicates Center for Epidemiologic Studies Depression Scale; GAD-7 indicates Generalized Anxiety Disorder 7-item Scale.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3
Concurrent Multilevel Regressions: Within-Person Relationships Between Level 1 Predictors and EA and Effects of Depression and Anxiety Symptoms on these Relationships.

	Level 2 Predictor: Depression Symptoms	Level 2 Predictor: Anxiety Symptoms
Negative Mood Predicting EA		
Average Within-Person Slope (b_{10})	.457*** (*SE* = .052)	.459*** (*SE* = .051)
Effect of Level 2 Predictor on this Slope (b_{11})	-.004 (*SE* = .004)	-.013 (*SE* = .009)
Positive Mood Predicting EA		
Average Within-Person Slope (b_{10})	-.087*** (*SE* = .019)	-.086*** (*SE* = .019)
Effect of Level 2 Predictor on this Slope (b_{11})	.001 (*SE* = .002)	.006 (*SE* = .004)
Negative Thoughts Predicting EA		
Average Within-Person Slope (b_{10})	.571*** (*SE* = .049)	.572*** (*SE* = .049)
Effect of Level 2 Predictor on this Slope (b_{11})	-.006 (*SE* = .004)	-.014 (*SE* = .009)
Positive Thoughts Predicting EA		
Average Within-Person Slope (b_{10})	-.147*** (*SE* = .030)	-.147*** (*SE* = .030)
Effect of Level 2 Predictor on this Slope (b_{11})	.002 (*SE* = .003)	.000 (*SE* = .006)
Stress Predicting EA		
Average Within-Person Slope (b_{10})	.215*** (*SE* = .023)	.216*** (*SE* = .024)
Effect of Level 2 Predictor on this Slope (b_{11})	.004* (*SE* = .002)	.002 (*SE* = .004)

* $p < .05$. ***$p < .001$.

3.4. Slope analyses

Concurrent Analyses (Correlates of EA). To investigate the within-person relationship between, for example, negative mood and EA (and the effect of depression symptoms on this relationship), we conducted analyses in which negative mood was used to predict EA at level 1, and differences in these slopes were predicted as a function of depression at level 2. As indicated in Table 3, participants were more likely to report EA when they were experiencing higher negative mood, negative thoughts, and stress. They were *less* likely to report EA when they were experiencing higher positive mood and thoughts. In other words, across the sample as a whole, higher levels of EA were associated with higher negative mood, negative thoughts, and stress, and lower positive mood and positive thoughts. The relationship between stress and EA was moderated by baseline depression symptoms; participants who were higher in depression had an even stronger within-person association between stress and EA. Anxiety did not similarly moderate the relationship between stress and EA. Neither depression nor anxiety significantly moderated any other within-person concurrent relationships.

Lag Analyses (Antecedents of EA). As noted previously, we were also interested in modeling the within-person *precursors* of EA, to better understand the potential antecedent effects of our level 1 variables on subsequent EA. Such lag analyses speak to temporal sequence and directionality in a way that concurrent analyses cannot (i.e., negative mood could cause EA or EA could cause negative mood). In a sample level 1 regression equation modeling an antecedent lag effect, negative mood at time j-1 is used to predict EA at time j. We control for EA at time j-1 to account for any carryover from one assessment to the next. We can therefore model *change* in EA from assessment j-1 to assessment j as a function of negative mood at assessment j-1. At level 2, we can predict differences in this lagged relationship as a function of depression or anxiety symptoms.

As shown in Table 4, across the sample as a whole, negative mood, negative thoughts, and stress significantly predicted subsequent increases in EA. In other words, these variables served as antecedents to EA. Positive mood and thoughts were only marginally associated with subsequent EA across the sample as a whole. Despite the lack of significant within-person effects for positive thoughts, however, both depression and anxiety moderated the relationship between positive thinking and subsequent EA; participants with higher baseline depression symptoms and participants with higher baseline anxiety symptoms experienced a *significantly less negative* association between positive thoughts and next-assessment EA.[2]

Lag Analyses (Consequences of EA). Finally, we were interested in modeling the within-person *consequences* of EA. In this case, for example, we used EA at time j-1 to predict negative mood at time j, controlling for negative mood at time j-1. This allows us to examine change in negative mood from assessment j-1 to assessment j as a function of EA at assessment j-1. At level 2, we again predict differences in this lagged relationship as a function of depression or anxiety symptoms.

As shown in Table 5, across the sample as a whole, EA predicted

(*footnote continued*)
respectively). Positive thoughts varied marginally as a function of depression ($b_{01} = -0.02$, $p = .09$) and significantly as a function of anxiety ($b_{02} = -0.07$, $p = .004$). Stress did not vary as a function of depression ($b_{01} = 0.02$, $p = .14$) but varied marginally as a function of anxiety ($b_{02} = 0.05$, $p = .06$).

[2] We re-ran this analysis, including depression and anxiety as simultaneous level 2 predictors. Depression did not moderate the relationship between positive thinking and subsequent EA ($b_{11} = -0.001$, $p = .75$) but anxiety did ($b_{12} = 0.01$, $p = .04$).

Table 4
Lagged Multilevel Regressions: Within-Person Relationships Between Level 1 Predictors and Subsequent EA and Effects of Depression and Anxiety Symptoms on these Relationships.

	Level 2 Predictor: Depression Symptoms	Level 2 Predictor: Anxiety Symptoms
Negative Mood Predicting Subsequent EA		
Average Within-Person Slope (b_{10})	.095** (*SE* = .032)	.095** (*SE* = .034)
Effect of Level 2 Predictor on this Slope (b_{11})	.002 (*SE* = .002)	.003 (*SE* = .005)
Positive Mood Predicting Subsequent EA		
Average Within-Person Slope (b_{10})	-.030† (*SE* = .017)	-.028† (*SE* = .017)
Effect of Level 2 Predictor on this Slope (b_{11})	-.002 (*SE* = .002)	.004 (*SE* = .004)
Negative Thoughts Predicting Subsequent EA		
Average Within-Person Slope (b_{10})	.138** (*SE* = .039)	.138** (*SE* = .039)
Effect of Level 2 Predictor on this Slope (b_{11})	.001 (*SE* = .003)	.002 (*SE* = .005)
Positive Thoughts Predicting Subsequent EA		
Average Within-Person Slope (b_{10})	-.040† (*SE* = .020)	-.038† (*SE* = .019)
Effect of Level 2 Predictor on this Slope (b_{11})	.003* (*SE* = .002)	.013** (*SE* = .004)
Stress Predicting Subsequent EA		
Average Within-Person Slope (b_{10})	.060** (*SE* = .019)	.061** (*SE* = .020)
Effect of Level 2 Predictor on this Slope (b_{11})	.003 (*SE* = .002)	.000 (*SE* = .003)

† $p < .10$. * $p < .05$. ** $p < .01$. ***$p < .001$.

Table 5
Lagged Multilevel Regressions: Within-Person Relationships Between EA and Subsequent Level 1 Predictors and Effects of Depression and Anxiety Symptoms on these Relationships.

	Level 2 Predictor: Depression Symptoms	Level 2 Predictor: Anxiety Symptoms
EA Predicting Subsequent Negative Mood		
Average Within-Person Slope (b_{10})	.066** (*SE* = .025)	.064** (*SE* = .023)
Effect of Level 2 Predictor on this Slope (b_{11})	.000 (*SE* = .002)	.004 (*SE* = .005)
EA Predicting Subsequent Positive Mood		
Average Within-Person Slope (b_{10})	-.028 (*SE* = .037)	-.028 (*SE* = .037)
Effect of Level 2 Predictor on this Slope (b_{11})	-.002 (*SE* = .003)	-.004 (*SE* = .005)
EA Predicting Subsequent Negative Thoughts		
Average Within-Person Slope (b_{10})	.056** (*SE* = .018)	.054** (*SE* = .018)
Effect of Level 2 Predictor on this Slope (b_{11})	.002 (*SE* = .001)	.009** (*SE* = .003)
EA Predicting Subsequent Positive Thoughts		
Average Within-Person Slope (b_{10})	-.056 (*SE* = .035)	-.061† (*SE* = .034)
Effect of Level 2 Predictor on this Slope (b_{11})	-.002 (*SE* = .003)	.003 (*SE* = .007)
EA Predicting Subsequent Stress		
Average Within-Person Slope (b_{10})	.099* (*SE* = .039)	.107** (*SE* = .041)
Effect of Level 2 Predictor on this Slope (b_{11})	.006† (*SE* = .003)	.004 (*SE* = .007)

† $p < .10$. * $p < .05$. ** $p < .01$.

subsequent increases in negative mood, negative thinking, and stress. EA was not associated with subsequent positive mood or positive thinking. Anxiety moderated the relationship between EA and subsequent negative thoughts, such that participants with higher baseline anxiety symptoms experienced an even stronger increase in negative thinking following EA.[3,4]

3.5. Supplemental analyses

To account for potential testing effects, in which levels of momentary variables might change over the course of the study period in response to repeated questioning, we conducted a series of analyses in which assessment number (1–28) was used to predict each of our daily variables. Reported levels of negative mood, negative thoughts, and stress were unrelated to signal number, but reported levels of positive mood, positive thoughts, and EA decreased as the study week progressed ($b_{10} = -0.02$, $b_{10} = -0.02$, $b_{10} = -0.01$, respectively; all $p < .01$). The first two of these relationships were moderated by baseline depression ($b_{11} = -0.001$ and $b_{11} = -0.001$, respectively; all $p < .05$) and anxiety ($b_{11} = -0.001$ and $b_{11} = -0.002$, respectively; all $p < .05$); participants with higher baseline depression and anxiety symptoms were even more likely to report less positive mood and thoughts as the study week progressed. Importantly, however, including assessment number as a covariate in relevant analyses did not significantly change any previously-described results.

We also re-ran all analyses involving negative mood and negative

[3] As noted previously, we excluded EMA data for the 5 participants who rated their effort on EMA surveys at a 3 or higher and re-ran analyses. Results were similar for all analyses, with one exception: the moderating role of depression symptoms on the relationship between positive thoughts and next-assessment EA became marginally significant ($b_{11} = 0.003$, $SE = 0.002$, $p = .08$). Given that the regression coefficient is nearly identical to the original analysis, the change in p-value probably reflects a reduction in power caused by eliminating responses.

[4] Given the large number of analyses conducted, we applied a Bonferroni correction to the previously described intercept and slope analysis results. This is a robust method of reducing risk of Type I error when multiple tests are run. However, this procedure comes at the cost of increasing risk of Type II error (Nakagawa, 2004), so results should be interpreted with caution. Alpha was set at 0.004 (0.05/12) for the 12 analyses with EA as the outcome variable and 0.017 (0.05/3) for each of the 3 analyses with negative mood, positive mood, negative thoughts, positive thoughts, and perceived stress as the outcome variables. Intercept analysis results remained unchanged. Concurrent multilevel regression results (Table 3) remained unchanged with one exception: depression symptoms no longer significantly moderated the link between stress and EA. For lagged multilevel regressions testing the relationships between level 1 predictors and subsequent EA (Table 4), negative mood no longer significantly predicted subsequent EA, and depression no longer significantly moderated the link between positive thoughts and subsequent EA. Other results remained unchanged; negative thoughts and stress predicted subsequent EA and anxiety symptoms moderated the link between positive thoughts and subsequent EA.

(footnote continued)
Finally, for lagged multilevel regressions testing the relationships between EA and subsequent level 1 predictors (Table 5), EA no longer significantly predicted subsequent stress and anxiety symptoms no longer significantly moderated the link between EA and subsequent negative thoughts. Other results remained unchanged; EA predicted subsequent negative mood and negative thoughts.

thoughts, examining the components (i.e., depressed, angry, anxious mood/thoughts) separately. This allowed a more fine-grained understanding of the relationship between various negative mood states and thought patterns and EA. When entered as simultaneous predictors of EA, depressed and anxious mood - but not angry mood - predicted concurrent EA (both $p < .001$). Similarly, depressed and anxious thoughts - but not angry thoughts - predicted concurrent EA (both $p < .001$). When entered as simultaneous predictors of next-assessment EA, and controlling for previous EA, none of the mood states predicted subsequent EA (all $p > .10$). Anxious thoughts – but not depressed or angry thoughts – predicted subsequent EA ($p < .01$). Lastly, controlling for previous mood states, EA significantly predicted subsequent depressed and anxious mood (both $p < .01$) but not subsequent angry mood ($p > .10$). Similarly, EA significantly predicted subsequent depressed and anxious thoughts (both $p < .01$) but not subsequent angry thoughts ($p > .10$). None of these relationships were significantly moderated by depression or anxiety (all $p > .05$).

4. Discussion

The present study examined the process of EA as it unfolds naturally, in real time. We used experience sampling to measure mood, thoughts, perceived stress, and EA over the course of a week. We modeled within-person relationships between these variables and tested the moderating role of depression and anxiety symptoms on these relationships. Hypotheses regarding momentary correlates, antecedents, and consequences of EA were largely supported, but evidence in favor of the moderating role of depression and anxiety on these processes was less consistent. Our findings are broadly consistent with a small but growing body of literature conceptualizing EA as a fluid process that can be measured on a within-person, within-day basis (e.g., Hershenberg et al., 2017), as well as previous work showing that such EA can be distinguished from certain negative momentary moods (i.e., anxiety; Kashdan et al., 2014). This study addresses several methodological limitations of previous work (see Introduction section) and extends prior work in ways that we discuss below.

4.1. Correlates, antecedents, and consequences of EA

Across the sample, negative mood, negative thoughts, stress, and EA were strongly intertwined. Higher levels of EA were associated with more negative mood, negative thoughts, and stress at the same time point. These variables also predicted subsequent increases in EA and, in turn, EA predicted subsequent increases in negative mood, negative thoughts, and stress. These findings are consistent with our hypotheses and suggest that, in line with prior theoretical and experimental work (e.g., Gross, 1998, 2002; Hayes, 1994; Kashdan et al., 2013; Kashdan et al., 2014; O'Toole et al., 2017; Wegner, 1994; Wegner et al., 1987), EA is closely linked with aversive internal experiences. The current findings extend previous research in a number of ways. First, we demonstrated that naturally-occurring *behavioral and psychological* efforts at avoidance are linked with a *broad range* of negative subjective states; previous work has tended to define EA more narrowly (e.g., as unwillingness to experience negative feelings and thoughts; Kashdan et al., 2014) and/or to examine efforts to avoid particular states (e.g., anxiety; Machell et al., 2015) in specific contexts (e.g., social interactions; Kashdan et al., 2013). Further, we demonstrated that EA can serve as both a trigger for and a consequence of negative mood, negative thoughts, and stress (whereas previous work has primarily examined concurrent relationships only; e.g., Hershenberg et al., 2017; O'Toole et al., 2017).

Conversely, in the current study, higher levels of EA were associated with *lower* positive mood and positive thoughts across our sample as a whole; as hypothesized, when participants were feeling good or thinking positively, they were less likely to engage in EA, and vice versa. These findings are consistent with - and extend - prior work showing links between certain aspects of momentary EA and reduced levels of other positive outcomes, including well-being (Machell et al., 2015), reactivity to pleasant events (Hershenberg et al., 2017), intense positive emotions (O'Toole et al., 2017), and self-esteem (Udachina et al., 2009, 2014), Positive mood and thoughts were only marginally associated with lower levels of EA at the next assessment, however, suggesting that any momentary buffering effects of a positive mindset against EA are fleeting. It may be that, for the average person, positive feelings or thoughts are unlikely to trigger EA in the moment, but do not necessarily protect against it in the short-term future. Research demonstrating the protective effects of a positive mindset (e.g., Fredrickson, 1998; Lightsey, 1994) might not extend to EA, or might play out on a different time frame than what we captured with our momentary assessments. Alternatively, these null findings could be due to the fact that positive mood and thoughts were assessed using only 2 items each.

On a related note, across the sample as a whole, EA was not associated with subsequent positive mood or thoughts; contrary to our expectations, engaging in EA did not predict a later decrease in these outcomes. Again, this could have to do with our choice of assessment intervals or perhaps with the (limited) items we used to assess positive mood and thinking. Future work using different sampling windows and an expanded repertoire of momentary items will further elucidate these relationships.

Of note, supplemental analyses exploring relationships between EA and specific negative moods/thoughts revealed links between EA and depressed/anxious mood/thoughts, but not angry mood/thoughts. Research suggests that although negative emotions are often accompanied by efforts to *avoid* associated threats (Mansell, Harvey, Watkins, & Shafran, 2008), anger instead typically triggers an *approach* motivational tendency (i.e., in order to resolve an externally or internally-caused obstruction to attaining a goal; Carver & Harmon-Jones, 2009). This characterization is consistent with our findings and suggests that anger and angry thoughts are less aversive momentary experiences than depressed or anxious emotions or thoughts. Our finding that anxious *thoughts* (but not depressed thoughts or any specific negative mood states) predicted EA longitudinally may be explained by our choice of momentary items; these likely tapped into feelings of fear and alarm, experiences that are presumably particularly aversive. Alternatively, EA may be more of a cognitive (vs. emotional, physiological, or behavioral) process, akin to worry (Borkovec, 2002), that therefore has stronger relationships to anxious thoughts than moods. Future studies should aim to better understand and differentiate between these processes.

4.2. Moderating role of depression and anxiety symptoms

As discussed previously, we were not only interested in examining within-person relationships between in vivo EA, mood, thoughts, and stress, but also in testing the moderating role of two key between-person factors – depression and anxiety symptoms – on these within-person relationships. Although previous work has examined the impact of other person-level factors (e.g., social anxiety [Kashdan et al., 2013, 2014; O'Toole et al., 2017; Machell et al., 2015]; paranoia [Udachina et al., 2009]; psychosis [Varese et al., 2011]), depression and generalized anxiety have been largely ignored (for exceptions, see Hershenberg et al., 2017 and Shahar & Herr, 2011). We failed to find support for many of our hypotheses regarding the moderating role of symptoms of depression and anxiety, but several were supported.

First, participants who were higher in depression were even more likely than the average participant to endorse engaging in EA when they reported high levels of stress. Feeling strained, pressured, or tense may be particularly aversive for those with elevated symptoms of depression, and these individuals might respond in part with attempts to avoid. This interpretation fits with research demonstrating that depressed individuals report more subjective stress (Kuroda, 2016), endorse lower self-efficacy for dealing with stress (Bandura, 1997), and

are more likely to use maladaptive coping strategies (e.g., Aldao, Nolen-Hoeksema, & Schweizer, 2010). Alternatively, this finding may reflect the fact that depressed individuals' efforts at avoidance are less successful than those of non-depressed participants. In other words, perhaps people with elevated symptoms of depression are ineffective at avoiding or suppressing aversive internal states, resulting in subjective feelings of stress. Prior work has underscored the fact that, in certain contexts, avoidance or suppression of negative mood or thoughts may be adaptive (e.g., when preparing for an exam or awaiting medical results; Folkman & Moskowitz, 2004); if depressed individuals are less able to avoid when it's healthy to do so, they may be missing out on an important protective factor, thereby ultimately increasing subjective stress. Of note, this interpretation fits with research demonstrating that depression is associated with less effective coping strategies in general (Aldao et al., 2010; Endler & Parker, 1990; Garnefski, Legerstee, Kraaij, van den Kommer, & Teerds, 2002), and less effective effortful suppression in particular (Wegner, 1994; Wenzlaff & Wegner, 2000). Either way, this finding highlights one context in which those with more symptoms of depression are particularly likely to report higher levels of EA: during subjective experiences of stress.

We also found that anxiety moderated the relationship between EA and subsequent negative thoughts such that, compared with participants with lower baseline anxiety, participants with higher anxiety symptoms experienced an even stronger increase in negative cognitions following EA. This suggests that EA is a particularly robust trigger for negative thinking for individuals with elevated anxiety. As with depression, anxiety is associated with deficits in coping self-efficacy (Bandura, 1997) and greater use of maladaptive cognitive coping strategies (Garnefski et al., 2002). Perhaps high-anxiety participants attempted to avoid unpleasant internal states but were unsuccessful in doing so, ultimately resulting in later elevations in negative thinking. It is unclear why this interpretation would not also hold for negative mood, however.

Interestingly, despite a lack of within-person effects, participants with higher depression symptoms and participants with higher anxiety symptoms experienced a *significantly less negative* association between positive thoughts and next-assessment EA than participants with lower depression or anxiety symptoms. This suggests that positive cognitions do not have a buffering effect against EA for those high in depression or anxiety. This is broadly consistent with other lines of research indicating that individuals with higher levels of depression or anxiety symptoms may be less reactive to positive mood (Carl, Fairholme, Gallagher, Thompson-Hollands, & Barlow, 2014) and thoughts (Wenze et al., 2007) than individuals who are lower in such symptoms. Our study extends these findings to reveal that, on a momentary basis, positive thoughts do not protect against EA for those experiencing symptoms of depression or anxiety.

It is possible that some of our hypotheses regarding between-person moderators of within-person relationships were not supported because we assessed symptoms of depression and anxiety, rather than neuroticism. As noted previously, neuroticism has been more consistently and directly linked with negative mood, negative evaluations of such moods, and use of avoidant coping strategies in response (Barlow & Kennedy, 2016; Barlow et al., 2014). Alternatively, it might be that our use of a non-clinical sample underlies our failure to find support for some hypotheses. Most observed effects were in the expected direction; if we had had a more severely ill sample, some or all of these results might have been statistically significant.

Despite the fact that the current sample was not a clinical one, our findings suggest some applications in treatment settings. Clinicians could provide targeted education to clients about specific negative repercussions of EA (e.g., elevated negative thoughts for clients with high levels of anxiety) and the contexts in which it is most likely to occur (e.g., when under stress, for those high in depression). EMA could be utilized to track patients' moods, thoughts, stress, and EA between sessions, and ecological momentary intervention (EMI; Heron & Smyth, 2010) approaches could be useful to defuse or prevent EA.

4.3. Limitations and future research directions

Strengths of this study include an EMA design, a high rate of compliance with momentary surveys, a large number of individual data points, and a fairly racially diverse sample. Study limitations should not be overlooked, however. As discussed, our sample was non-clinical and consisted primarily of American female college students, raising concerns about generalizability of our findings. Recent research has underscored the problems associated with drawing universal conclusions about human behavior from college student samples (and from Western, Educated, Industrialized, Rich, and Democratic [WEIRD] populations more broadly; Henrich, Heine, & Norenzayan, 2010). We relied on self-report measures for our assessment of depression and anxiety symptoms, which introduces the potential for self-presentation and/or retrospective recall biases. With specific respect to the GAD-7, it is possible that this scale places too much emphasis on worry versus other symptoms of anxiety. For example, Beard and Bjorgvinsson (2014) found that the GAD-7 was strongly correlated ($r = 0.70$) with the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) in a general sample. It will be important to replicate the current study using other well-established measures of anxiety severity. Although momentary items were drawn from validated scales, reliability was lower at the within-person than the between-person level, and assessments were necessarily brief (i.e., to minimize participant burden and maximize data quality; Wilhelm & Schoebi, 2007). Of particular concern might be our assessment of momentary positive mood, which was limited to 2 items. Consistent with previous work (e.g., Wenze et al., 2007; Wenze et al., 2012), we chose “happy” and “excited” in order to tap into low-arousal and high-arousal positive mood states. Although these items were inter-correlated, recent work suggests that our approach may not adequately assess positive mood or differentiate between discrete positive emotional states (e.g., Shiota et al., 2017). The same may hold for our assessment of positive thoughts. On a final note, the large number of analyses conducted in this study elevated risk for Type I error (see footnote 4); findings must be replicated in other samples.

Future studies should continue to explore other momentary correlates, antecedents, and consequences of EA – as well as between-person moderators of these within-person relationships - in clinical samples, using interview-based measures of depression and anxiety and more momentary items to assess diverse mood states, thoughts, stressors, and other experiences. Neuroticism should be assessed in future work and tested as a between-person moderator (Barlow & Kennedy, 2016; Barlow et al., 2014). Finally, other potential momentary triggers for/consequences of EA, such as physical pain, dissociation, and unpleasant memories should be tested, and additional important vulnerability factors, such as pessimism, anhedonia, perfectionism, and rumination, should be explored on a momentary basis.

4.4. Conclusion

This study adds to a growing body of literature on the momentary correlates, antecedents, and consequences of EA as individuals engage in their typical daily routines. Negative mood, negative thoughts, and stress were positively linked with EA, both concurrently and in lag analyses, while positive mood and positive thoughts were negatively associated with concurrent EA. Participants who were higher in depression had particularly strong links between EA and stress, and significantly less negative links between positive thoughts and subsequent EA. Participants who were higher in anxiety had particularly strong links between EA and subsequent negative thoughts, and significantly less negative links between positive thoughts and subsequent EA. Our findings are broadly consistent with previous theoretical and experimental work and extend prior research by illuminating in greater detail

the complex interplay between moods, thoughts, stress, and EA on a momentary, in vivo basis. Further, this work is one of the first studies to examine the impact of depression symptoms - and the first to examine the impact of generalized anxiety symptoms - on these relationships. Although our sample was sub-syndromal, the current findings may have clinical utility. Clients – particularly those with elevated symptoms of depression or anxiety - might benefit from psychoeducation about specific triggers for EA, as well as adverse consequences. EMA and EMI paradigms could be useful in treatment to track momentary triggers for EA and to deliver targeted, just-in-time interventions in those contexts where EA is most likely to occur. For example, if daily assessments indicate that interpersonal stress or anxious mood is strongly linked with EA for a particular client, and that efforts at avoidance further exacerbate subsequent aversive internal states, mobile technology could be harnessed to prompt the client to engage in coping strategies (e.g., cognitive reappraisal, acceptance exercises) when they report stress or anxiety, potentially neutralizing EA and its negative sequelae before it even occurs.

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