The indirect effects of state experiential avoidance on trait experiential avoidance and negative affect in the moment

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Abstract

Because experiential avoidance is considered by some to be the root of most forms of psychopathology, it is often a primary intervention and research target. Yet, the current literature is limited by its assessment and conceptualization of experiential avoidance as a trait variable. Little attention is paid to how it operates as a context-dependent state-based factor. Further, more information is needed to determine how experiential avoidance relates to affective states in specific contexts. Links have been established between experiential avoidance and negative affect intensity in the contextual behavior science (CBS) literature. Studying more specific elements of state-based experiential avoidance as potential mediators of negative affect is an important next step. Thus, the overarching goal of the present study was to measure the indirect effect of state experiential avoidance on the relationship between trait experiential avoidance and dimensions of negative affect following exposure to several challenging tasks. Participants ($N = 160$) in the current study completed both the cold pressor test and Trier Social Stress Test (TSST) in a counterbalanced order. Non-parametric bootstrapping analyses revealed a significant indirect effect of state experiential avoidance on negative affect for the TSST condition. As predicted, these effects were strongest under interpersonal contexts rather than when physiological discomfort was evoked. Implications for conceptualizing experiential avoidance as state and trait and how these relate to CBS interventions are proposed.

Keywords Experiential avoidance · Negative affect · State · Trait · Cold pressor · Social stress

Introduction

Experiential avoidance refers to the broad tendency to behave in ways that reduce contact with aversive private experiences even when doing so results in pervasive and lasting psychological harm (see Hayes et al., 1996 for an original definition). Hayes and colleagues proposed experiential avoidance is better understood in terms of its function – negative reinforcement, or escape/avoidance – rather than its form (i.e., diagnostic classifications). Considered the crux of most harmful psychological outcomes, the avoidance of unwanted private events through strategies such as suppression may produce short-term relief, but paradoxically increase suffering over time (Hooper et al., 2012;

Riley, 2014). Importantly, there is emerging evidence that experiential avoidance predicts emotional disorders when assessed longitudinally in both adult and adolescent samples (Moroz & Dunkley, 2019; Sharp et al., 2015; Shimoda et al., 2018; Spinhoven et al., 2014). This may provide further support for the paradoxical effects of experiential avoidance. Its converse, experiential acceptance, also appears to be a prospective predictor of pro-social behaviors in adolescents across a one-year duration (Ciarrochi et al., 2011). Experiential avoidance is linked with cravings (Shorey et al., 2017) and abuse of substances (Buckner et al., 2015; Levin et al., 2012a, 2012b; Stotts et al., 2015), and may help account for the comorbidities between emotional difficulties and substance use (Bordieri et al., 2014; Buckner et al., 2014). Experiential avoidance is also associated with other behavioral excesses including non-suicidal self-injury (Anderson & Crowther, 2012), mediating the effect of negative emotions on emotional eating (Litwin et al., 2017), and could potentially explain problematic pornography usage (Levin et al., 2019, 2012a, 2012b; Wetterneck et al., 2012). Thus, it may

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play an important role in a range of problematic behaviors in a variety of contexts.

Experiential avoidance and affect

In psychological disorders and problems centered around persistent emotion dysregulation, the intensity of affective states may be exacerbated through overuse of experiential avoidance (Levin et al., 2018; Luoma et al., 2020). Indeed, experiential avoidance appears to aid in explaining the relationship between negative affect and emotional eating (Litwin et al., 2017), smoking and nicotine withdrawal (Farris et al., 2015) and the propensity to engage in problem behaviors (Kingston et al., 2010). It may also play a role in maintaining disorders of negative affect/emotionality (Spinhoven et al., 2014). For example, there is evidence that experiential avoidance mediates the effects of borderline personality disorder (BPD) symptoms on reductions in positive affect following a mood induction task (Jacob et al., 2013). Research also indicates that experiential avoidance predicts greater negative affect following a delay-discounting task (Salters-Pedneault & Diller, 2013). Negative affect and experiential avoidance are both important components of major depressive disorder (MDD) and BPD (Cheavens & Heiy, 2011). However, the extent to which experiential avoidance and negative affect overlap or represent unique processes is not as thoroughly understood (Karekla & Panayiotou, 2011). More research is needed to address this gap.

One conceptualization for the relationship between experiential avoidance and affective states is that chronic avoidance numbs the experience and expression of positive emotions (Kashdan et al., 2013). Specifically, this may occur through narrowing contact with events that would elicit positive affective states (Goodman et al., 2019). While experiential avoidance may successfully attenuate negative affect momentarily, it also likely restricts contact with valuable sources of positive affect (Machell et al., 2015). Such a conceptualization appears warranted given evidence that experiential avoidance is a key mechanism for the impact of emotion regulation strategies on daily negative and positive experiences (Kashdan et al., 2006). Negative affect may intensify in the long-run due to a chronic unwillingness to contact any source of possible adversity (Kashdan et al., 2013; Luoma et al., 2020). Moreover, it may ultimately limit opportunities for the experience of positive emotions and thus reduce quality of life (Pavlacic et al., 2021).

State and trait experiential avoidance

Although experiential avoidance has been widely studied, it is frequently conceptualized and measured as a trait or dispositional factor. Less attention is paid to how experiential avoidance may work as a state-based variable. In other words, researchers have focused on the general tendency to engage in experiential avoidance rather than studying the function of experiential avoidance behavior in the moment. Machell et al. (2015) studied state experiential avoidance through administering a daily diary in which participants reported daily experiential avoidance, positive and negative affect, and enjoyment of daily events/meaning in life. They found reported daily experiential avoidance was associated with greater negative affect, reduced positive affect, and lower meaning in life/enjoyment of events and further was a stronger predictor of well-being than the traditional trait-based measure, the AAQ. Their research group propose that studying experiential avoidance as a state may yield valuable information related to context, enhancing accuracy given its proximity to more immediately occurring events. It may also be subject to less reporting biases (e.g., recall biases).

The Acceptance and Action Questionnaire (AAQ) in particular has been criticized for problems with internal consistency and while the AAQ-II was an improvement in this regard, it has also been criticized for issues with discriminant validity from neuroticism and negative emotionality (Gámez et al., 2014; Rochefort et al., 2018; Tyndall et al., 2019; Wolgast, 2014). Some researchers have made strides toward capturing the relationship between experiential avoidance and specific contexts through wording the AAQ/AAQ-II items to target specific contexts (e.g., AAQW; Palmeira et al., 2016). However, as these measures are based on conceptualizing experiential avoidance as a trait, adopting a state-based measure could help to further parse the ways it accounts for changes in negative affect. Machell et al. (2015) found state-based measurement of daily experiential avoidance, measured using ecological momentary assessment (EMA), had better predictive ability than trait experiential avoidance. This was true for predicting reductions in positive affect and decreased meaning in life as well as showing a stronger link with increased negative affect. They encourage scholars working in this literature to begin to measure and conceptualize state experiential avoidance to further corroborate how it relates to psychopathology in context.

While attempts such as EMA may improve the way we conceptualize, study, and measure experiential avoidance, using methods outside of self-report such as behavior analogue tasks may enhance this understanding as well. Some examples of tasks that have been used to evoke experiential avoidance include induction of panic symptoms through inhaling carbon dioxide-enriched air (Feldner et al., 2003; Karekla et al., 2004), aversive imagery content (Cochrane et al., 2007), working memory tasks (López et al., 2010), social stress measured by the Trier Social Stress Test (TSST; Brown, 2018), sorting colored straws, and the cold pressor test (Zettle et al., 2012). Participants in these studies have generally been split into high and low experiential avoidance

groups based on the AAQ/AAQ-II. Overall higher avoiders have evidenced more difficulties completing these tasks and report stronger emotional and physical discomfort as a result. While these studies represent an important attempt to measure experiential avoidance using contextually-specific tasks and outside of self-report, there is a need to further determine the role of experiential avoidance across different contexts (i.e., social and physical). Studying this relationship may help confirm whether experiential avoidance represents a broad, functional class of behaviors, relatively independent of context, or if clinicians would be better suited tailoring interventions to the context one's clients tend to avoid most frequently and pervasively. Additionally, as many of these prior studies cited use the AAQ/AAQ-II whose psychometric properties have been questioned, it is worth noting that measurement choice could potentially impact the results. As such, for the purposes of the present study, it was decided to include the MEAQ alongside the AAQ-II to bolster the results and highlight any potential measurement differences that may occur.

Aims and hypotheses

There is evidence that experiential avoidance, measured as a trait, is associated with negative affect intensity (Shahar & Herr, 2011) which suggests these two constructs may overlap. Additionally, it appears associated with other outcomes that may be related to negative affect such as daily drinking (Luoma et al., 2020), problem behaviors such as internet overuse and non-suicidal self-injury (Kingston et al., 2010), and longitudinally associated with emotional disorders (Spinhoven et al., 2014), indicating experiential avoidance behaviors might have a common underlying function. However, less is understood regarding the relationship between state experiential avoidance and affective states. While there have been attempts to assess experiential avoidance as a state (Kashdan et al., 2014), it is not clear how state experiential avoidance functions in relation to trait experiential avoidance and negative affect. There is evidence that behavior analogue tasks may have some utility in understanding how experiential avoidance functions in response to induction of physical discomfort (e.g., Zettle et al., 2012), but these studies have yet to evaluate how state experiential avoidance is associated with both trait experiential avoidance and negative affect intensity. Additionally, how experiential avoidance operates in contexts of social discomfort compared to physical discomfort is not as well understood.

As such, the purpose of the current study was to analyze the differential effects of experiential avoidance, measured as state and trait, on the experience of affective states following exposure to two behavior analogue tasks. Trait experiential avoidance is ostensibly more shaped

up through a long learning history of reinforcement trials for engaging in avoidance behavior, and as such, this variable was considered more of a removed, vulnerability factor (Kashdan et al., 2006). Therefore, it was hypothesized that trait experiential avoidance would operate as a distal risk factor (Little et al., 2007) for the likelihood of relying on state experiential avoidance in the moment. Thus, individuals with a history of chronic and pervasive use of experiential avoidance would default toward state experiential avoidance when faced with conditions that evoke a stronger likelihood of intense negative affect. We expected that there would be a relationship between trait experiential avoidance and negative affective states following exposure to each task given the prior literature cited above. However, it was hypothesized that this relationship would be mediated by state (context-dependent) experiential avoidance.

We were interested in investigating if mood and discomfort induction tasks featuring different elements of discomfort were more strongly associated with certain domains of negative affect. It was hypothesized that trait experiential avoidance would be significantly correlated with state negative affect dimensions following exposure to both the cold pressor test and the Trier Social Stress Test (TSST). As context is likely an important factor in determining engagement in experiential avoidance in the moment (Kashdan et al., 2014), it was predicted that the relationship between trait experiential avoidance and negative affect following these tasks would be mediated by state experiential avoidance. While trait and state experiential avoidance are conceptually similar constructs, state experiential avoidance was considered a mechanism by which trait experiential avoidance would impact negative affect intensity. Items from the state measure were specifically designed to capture in the moment experiential avoidance and administered with each task, while the trait-based measure was completed earlier on in the study. As such they were considered distinct constructs. Moreover, we were interested in investigating if these effects held across conditions of physical and emotional discomfort or if state-based experiential avoidance more strongly predicted negative affect under certain contextual conditions. Given the literature supporting the relationship between experiential avoidance and social discomfort/anxiety (Asher et al., 2021), it was hypothesized that state experiential avoidance would have a stronger effect on dimensions of negative affect under contexts that involve interpersonal demands and discomfort. Thus, we predicted that state experiential avoidance following the TSST would have a more salient effect on negative affect in the moment after completing the TSST in comparison to the cold pressor test.

Method

Participants

An a priori statistical power analysis was conducted using G*Power 3.0 software (Faul et al., 2007) to determine that 160 participants were required to reach a medium effect size. Therefore, 160 undergraduate participants were recruited to participate in the current study through convenience sampling. Instructors who agreed to participate in the recruitment process showed a recruitment slide or had a research assistant visit their classroom to read a recruitment script and pass out handouts. The script stated that the investigators were examining the physical and psychological effects of two stressful tasks that involved physical and social discomfort. Interested potential participants contacted the investigators through the study email available on the handouts or by telephone.

Based on the Zettle et al. (2012) study and other cold pressor literature, participants were excluded if they reported any of the following medical conditions: Raynaud's disease, schizophrenia, urticaria (hives), stroke, history of abnormal screening electrocardiogram, history of heart disease, history of stroke, currently using a pacemaker, and untreated high blood pressure. These were considered exclusionary criteria to prevent adverse reactions and to control for conditions that could affect one's responses to pain. Detailed sample characteristics can be viewed in Table 1.

Table 1 Sample Characteristics

Characteristic	Total $N = 160$
Age, M (SD)	20.71 (3.98)
Handedness, n (%)	
Right	142 (88.8%)
Left	17 (10.6%)
Ambidextrous	1 (.6%)
Gender, n (%)	
Female	110 (68.8%)
Male	48 (30%)
Transgender	2 (1.3%)
Primary Ethnicity, n (%)	
European American/White	87 (54.4%)
African American/Black	40 (25.0%)
Asian or Asian American	9 (5.6%)
Chicano/a/Latino/a/Hispanic	8 (5.0%)
Middle Eastern or Arab American	5 (3.1%)
Mixed Heritage/Other	12 (6.9%)
Relationship Status, n (%)	
Single, never married	139 (86.9%)
Other[a]	21 (13.1%)
Educational Status, n (%)	
Some college	149 (93.1%)
Bachelor's degree	11 (6.9%)

[a]Other category includes divorced, not remarried, living with partner, married, married with children, relationship status not included in listed categories

Procedure

The study received approval by the Human Subjects Institutional Review Board (HSIRB) at a Midwestern university and all procedures were carried out in accordance with the American Psychological Association (APA) Ethics Code. One research assistant for each session was assigned the role of "experimenter." As such, they were responsible for collecting all data points and fully adhering to the protocol. Each session began by reviewing and signing the informed consent document. Two participants chose not to participate in the study because they did not want to complete a public speaking task. After signing the informed consent document, participants were instructed to attach a heart rate monitor using an elastic strap and chest transmitter. Heart rate data was transmitted to a wristwatch worn on the right hand of participants. Heart rate data were collected as part of a larger study evaluating the potential oscillations of heart rate as a function of completion of each task as there is evidence that heart rate can be impacted by both the cold pressor test and social stress experiments (Ghiasi

et al., 2020). After the experimenter confirmed that the heart rate monitor was working properly, baseline heart rate data was taken for ten minutes while participants remained seated and completed a packet of self-report questionnaires. Average and maximum heart rate data were recorded at the end of the ten-minute baseline period. The total scores for baseline and state-based measures following each task are presented in Table 2.

Self-report measures

Demographics

At the start of each session, participants completed a demographics questionnaire designed by the investigator to collect data on participant age, gender, ethnicity, relationship status, educational status, annual household income, and handedness. Handedness data were used to control for the cold pressor condition. This was done to ensure standardization and to rule out for potential

Table 2 Total Scores for Baseline Measures and Task State-Based Measures

Baseline Measures	M (SD)	Cold Pressor	M (SD)	TSST	M (SD)
SMEA	7.58 (3.45)	SMEA	8.65 (4.06)	SMEA	11.39 (4.17)
Negative Affect Total	19.39 (6.35)	Negative Affect Total	16.50 (6.06)	Negative Affect Total	19.19 (7.41)
Distressed	2.25 (1.01)	Distressed	2.0 (1.05)	Distressed	2.28 (1.21)
Upset	2.03 (.92)	Upset	1.68 (.90)	Upset	1.97 (1.02)
Guilty	1.75 (.96)	Guilty	1.46 (.83)	Guilty	1.62 (.99)
Scared	1.72 (.91)	Scared	1.39 (.73)	Scared	1.56 (.86)
Hostile	1.50 (.75)	Hostile	1.38 (.73)	Hostile	1.43 (.74)
Irritable	2.41 (1.06)	Irritable	1.90 (.93)	Irritable	2.12 (1.04)
Ashamed	1.60 (1.02)	Ashamed	1.41 (.77)	Ashamed	1.86 (1.15)
Nervous	2.46 (1.07)	Nervous	2.08 (1.05)	Nervous	2.55 (1.23)
Jittery	2.0 (1.25)	Jittery	1.78 (1.01)	Jittery	2.20 (1.24)
Afraid	1.61 (.84)	Afraid	1.38 (.70)	Afraid	1.57 (.96)
AAQ-II	20.13 (9.24)				
MEAQ	211.21 (34.40)				

confounds. Participants were also asked to rate their perceived level of pain tolerance on a Likert-type scale.

Acceptance and action questionnaire-II (AAQ-II)

The AAQ-II (Bond et al., 2011) is a 7-item Likert-type self-report measure designed to measure experiential avoidance/psychological inflexibility. Items are responded to on a 7-point Likert type scale as follows: 1 = *never true*; 2 = *very seldom true*; 3 = *seldom true*; 4 = *sometimes true*; 5 = *frequently true*; 6 = *almost always true*; 7 = *always true.* The AAQ-II was given at baseline as a measure of trait experiential avoidance. Internal consistency of the AAQ-II was excellent (α = 0.89). Example items: "My painful memories prevent me from having a fulfilling life" "Emotions cause problems in my life."

Multidimensional experiential avoidance questionnaire (MEAQ)

The MEAQ (Gámez et al., 2011) is a 62-item self-report measure of experiential avoidance containing six dimensions (i.e., behavioral avoidance, distraction and suppression, repression and denial, procrastination, distress aversion, and distress endurance). It was designed to address problems related to the AAQ-II's internal consistency and discriminant validity by explicitly measuring experiential avoidance according to its operational definition. The MEAQ has evidenced good internal consistency and excellent convergent validity with other measures of avoidance. Items on the MEAQ are responded to on a 6-point Likert scale where 1 = *strongly disagree*; 2 = *moderately agree*; 3 = *slightly disagree*; 4 = *slightly agree*; 5 = *moderately agree*. The MEAQ was given at baseline as a measure of trait experiential avoidance. Internal consistency of the MEAQ

was excellent (α = 0.91). Example items: "I avoid activities if this is even a small possibility of getting hurt" "I try to put off unpleasant tasks for as long as possible".

State measure of experiential avoidance (SMEA)

The SMEA (Kashdan et al., 2014) is a 4-item Likert-type self-report measure of state-based experiential avoidance that we adapted from the Kashdan article with the authors' permission. The SMEA is completed using a Likert scale with 1 = *very slightly or not at all*; 2 = *a little*; 3 = *moderately*; 4 = *quite a bit*; 5 = *extremely*. Participants completed the SMEA at baseline, post cold pressor and post TSST. This was done to evaluate potential changes in state levels of experiential avoidance across the cold pressor and TSST. Internal consistency of the SMEA was acceptable at baseline (α = 0.79), and good post cold pressor (α = 0.86) and TSST (α = 0.82). Example items: "How much effort did you put into making anxiety-related feelings or thoughts go away?" "How much did you struggle to try and control your anxiety-related feelings or thoughts?".

Positive and negative affect schedule (PANAS)

The PANAS (Watson et al., 1988) is a 10-item Likert-type self-report measure of positive and negative affect. The PANAS was administered at baseline and following each condition. Internal consistency of negative affect intensity was considered good at baseline (α = 0.87), post cold pressor (α = 0.87) and post TSST (α = 0.88).

Behavioral Measures of Experiential Avoidance

To control for the potential of one condition impacting the other, tasks were counterbalanced across all sessions,

alternating between completing the physical discomfort condition and the social discomfort condition first. All participants were offered the option for a ten-minute break following whichever task was administered first.

Cold pressor test

The cold pressor apparatus was designed to prevent the process of convection (i.e., movement in liquid increasing the transfer of heat) through a motorized pump that regulated water flow through tubing connecting two insulated buckets of ice water. Consistent with the research by Zettle et al. (2012), participants were instructed to immerse their left hand in a separate bucket of water regulated at 68-degrees Fahrenheit for two minutes. During this time, the experimenter collected heart rate data. Next, participants were asked to immerse their left hand in the cold pressor apparatus regulated at 40-degrees Fahrenheit for as long as possible and up to five minutes maximum. As soon as participants removed their hand from the water, the wristwatch was stopped, and average and maximum heart rate data were recorded.

Trier social stress test (TSST)

The first task of the TSST (Kirschbaum et al., 1993) involved mentally preparing for and delivering a speech regarding why the participant believed they were a good candidate for their ideal job. Participants were given 10 minutes to prepare their speech. If participants requested writing utensils to prepare, they were instructed to prepare mentally to the best of their ability. Heart rate average and maximum data were collected during speech preparation and delivery. Participants were asked to deliver their speech for as long as possible, with a maximum of five minutes. If a participant was silent for 20 seconds or longer, a confederate judge prompted them to continue.

Following the speech portion of the task, participants completed a challenging mental arithmetic task intended to induce distress. The arithmetic task involved mentally subtracting the number 13 from 1,022 and reporting their answers aloud. Each time a mistake was made, a confederate judge instructed the participant to start over from 1,022. Participants were asked to continue the mental arithmetic task for as long as possible, with a maximum of five minutes. Average and maximum heart rate data were collected during this time.

Both the speech and arithmetic portion of the TSST were evaluated by two confederate judges (research assistants) who wore white lab coats. Judges were instructed to keep a flat, neutral affect and wrote contrived feedback on a clipboard throughout the duration of the speech and arithmetic tasks. To further induce distress, a video camera was pointed at the participants during both portions of the TSST. Participants were not aware that the camera was not filming.

Participants were debriefed following the final task (i.e., when TSST administered last, debriefing occurred immediately after and vice versa for the cold pressor test). During the debriefing procedure, participants were notified that video recording had not occurred and that no actual performance evaluations were conducted. They were also provided with referral slips for psychological services and asked to keep the study procedures confidential.

Approach to data analysis

All data analyses were conducted using Statistical Packaging for the Social Sciences (SPSS) version 20. The expectation maximization algorithm was used to replace missing data values and all data were considered missing completely at random (MCAR) after conducting Little's MCAR test. To investigate the bivariate relationships between dimensions of negative affect, state, and trait experiential avoidance, a series of Pearson's product moment correlation coefficients were computed. The Process approach to non-parametric bootstrapping (Hayes, 2018) was used to investigate the indirect effects of state experiential avoidance on the relationship between trait experiential avoidance and negative affect intensity following each task. Bootstrapping was selected over the Baron and Kenny method as it does not require the assumption of normality to be met and is superior to the Sobel method in detecting mediation (Hayes, 2009).

Results

We were interested in further understanding the relationship between state and trait experiential avoidance and each dimension of negative affect measured by the PANAS following each task. Regarding the cold pressor test, it was noted that trait experiential avoidance, as measured by the AAQ-II, had moderate to strong positive correlations with each affective dimension and was most strongly associated with feeling scared following the cold pressor test ($r = 0.50$, $p = 0.00$), while the MEAQ was most strongly associated with feeling ashamed ($r = 0.21$, $p = 0.008$). State experiential avoidance was also mildly to moderately correlated with some dimensions of negative affect and had the strongest association with feeling distressed ($r = 0.26$, $p = 0.001$). The correlation matrix is displayed in Table 3. Trait experiential avoidance was also moderately to strongly positively associated with dimensions of negative affect following the TSST, especially feeling distressed with the AAQ-II ($r = 0.46$, $p = 0.00$) and feeling irritable with the MEAQ ($r = 0.29$, $p = 0.00$). State experiential avoidance following the TSST was linked with every dimension of negative affect post-TSST apart from feeling

Table 3 Bivariate Correlations Between State and Trait Experiential Avoidance and Negative Affect Dimensions Post Cold Pressor

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. State Experiential Avoidance	–												
2. AAQ-II	.16*	–											
3. MEAQ	.12	.40**	–										
4. Distressed	.26**	.42**	.16*	–									
5. Upset	.13	.04	.04	.54**	–								
6. Guilty	.19*	.49*	.15	.39**	.52**	–							
7. Scared	.13	.50**	.12	.42**	.39**	.41**	–						
8. Hostile	.08	.26**	.16*	.25**	.38**	.28**	.28**	–					
9. Irritable	.04	.31**	.18*	.41**	.52*	.41**	.25**	.50**	–				
10. Ashamed	.21**	.45**	.21**	.35**	.49**	.70**	.51**	.33**	.36**	–			
11. Nervous	.18*	.45**	.19*	.50**	.49**	.49**	.49**	.26**	.39**	.49**	–		
12. Jittery	.16*	.40**	.07	.47**	.36**	.43**	.58**	.10	.29**	.34**	.51**	–	
13. Afraid	.15	.40**	.06	.41**	.44**	.44**	.67**	.05	.16*	.54**	.52**	.43**	–

$N = 160$, * $p < .05$, ** $p < .01$, *** $p < .001$

hostile and the strongest relationship was noted between state experiential avoidance and feeling nervous ($r = 0.48$, $p = 0.00$). These correlations are provided in Table 4. Correlation analyses were in the expected directions and consistent with prior literature (Luoma et al., 2020; Shahar & Herr, 2011).

Experimental manipulation

We also conducted several paired samples t-tests to confirm that in addition to an increase in negative affect, the conditions also resulted in reductions in positive affect. As predicted, positive affect significantly reduced following each task (Baseline $M = 35.58$; $SD = 7.82$; post-TSST $M = 31.92$; $SD = 9.56$; t (159) = 7.60, $p = 0.00$, ($d = 0.5$); post-cold pressor $M = 33.67$, $SD = 9.33$; t (159) = 4.56, $p = 0.00$, ($d = 0.2$). As the means in negative affect reported remained consistent from baseline to post-TSST [Baseline $M = 19.39$; $SD = 6.36$; post-TSST $M = 19.19$; $SD = 7.42$; t (159) = 1.09, $p = 0.664$, ($d = 0.1$)], the hypothesis that state experiential avoidance may work to alleviate negative affect momentarily was supported.

Lastly, we tested the hypothesis that state experiential avoidance would significantly increase following exposure to each task. We found that state experiential avoidance increased following both tasks [Baseline $M = 7.58$; $SD = 3.45$; post-TSST $M = 11.39$; $SD = 4.17$;

Table 4 Bivariate Correlations Between State and Trait Experiential Avoidance and Negative Affect Dimensions Post TSST

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. State Experiential Avoidance	–												
2. AAQ-II	.26**	–											
3. MEAQ	.33**	.40**	–										
4. Distressed	.41**	.46**	.20**	–									
5. Upset	.34**	.40**	17*	.69**	–								
6. Guilty	.25**	.46**	.18*	.47**	.56**	–							
7. Scared	.33**	.37**	.22**	.39**	.42**	.31**	–						
8. Hostile	.14	.17*	.10	.26**	.32**	.38**	.14	–					
9. Irritable	.18*	.35**	.29**	.38**	.32**	.31**	.12	.49**	–				
10. Ashamed	.35**	.38**	.21**	.56**	.64**	.60**	.41**	.22**	.39**	–			
11. Nervous	.48**	.36**	.22**	.57**	.55**	.50**	.44**	.19*	.33**	.59**	–		
12. Jittery	.46**	.24**	.09	.48**	.49**	.46**	.47**	.26**	.20*	.57**	.56**	–	
13. Afraid	.32**	.37**	.14	.47**	.50**	.36**	.79**	.09	.14	.53**	.53**	.56**	–

$N = 160$, * $p < .05$, ** $p < .01$, *** $p < .001$

$t(159) = -10.787$, $p = 0.002$, $(d = 0.8)$; post cold pressor $M = 8.65$; $SD = 4.06$; $t(159) = 3.078$, $p < 0.001$, $(d = 0.2)$]. However, the mean changes were lesser following the cold pressor, suggesting the TSST evoked a stronger change in experiential avoidance in the moment.

Non-parametric bootstrapping analyses

To conduct the mediation analyses, we first conceptualized trait experiential avoidance, measured by the AAQ-II, as more of a distal risk factor embedded in learning history. Thus, the tendency to endorse trait experiential avoidance was considered a predictor variable and was treated this way statistically in each mediation model. The purpose of the study was to investigate the impact of both state and trait experiential avoidance on changes in negative affect. Because negative affect was measured as a state-based variable after participation in each task, it was considered the criterion variable. Negative affect was measured by the negative affect subscale of the PANAS and was assessed at baseline as well as following the cold pressor and TSST. State experiential avoidance was hypothesized to be the most critical factor in determining momentary changes in negative affect following each task. Therefore, state experiential avoidance was estimated as a mediating factor of the relationship between trait experiential avoidance and negative affect intensity following each task.

Cold pressor Test

SPSS Process was used to estimate a single mediation model to test the effects of state experiential avoidance directly, after being exposed to the cold pressor test, on the relationship between trait experiential avoidance and negative affect intensity. Five thousand bootstrap samples were generated, with BCa confidence intervals used to test the indirect effects. According to Hayes (2018), the confidence intervals must not contain zero if a mediation effect is to be concluded. In the a-path, trait experiential avoidance had a significant direct effect on the hypothesized mediator, state experiential avoidance. However, in the b-path, state experiential avoidance did not significantly predict an increase or decrease in negative affect intensity following the cold pressor test. The indirect effect of state experiential avoidance on the association between trait experiential avoidance and positive affect intensity was also non-significant as the confidence intervals contained zero. Thus, a mediation effect was not concluded for the context of physical discomfort evoked by the cold pressor test. As a follow up analysis, the moderating effect of trait experiential avoidance x state experiential avoidance (both AAQ-II and MEAQ were estimated as separate X variables) on negative affect was evaluated and also found to be non-significant.

Trier social stress test

To test the hypothesized mediation effects following the TSST, another single mediation model was computed using SPSS Process. The a-path relationship between trait experiential avoidance and state experiential avoidance was significant, as was the b-path relationship between state experiential avoidance and negative affect intensity following the TSST. State experiential avoidance also had a significant indirect effect on the relationship between trait experiential avoidance and negative affect intensity, 95% BCa CI [0.0294—0.1333] providing evidence for a mediating effect. The total effect was also significant, BCa CI [0.3017—0.5186]. Findings are displayed in Fig. 1. For readability, only the statistically significant models are presented as figures. As a follow up post-hoc analysis, the potential moderating effect of trait experiential x state experiential on negative affect was tested and found to be non-significant for both the MEAQ and AAQ-II. As such, these results are not included in the figures displaying the indirect effects.
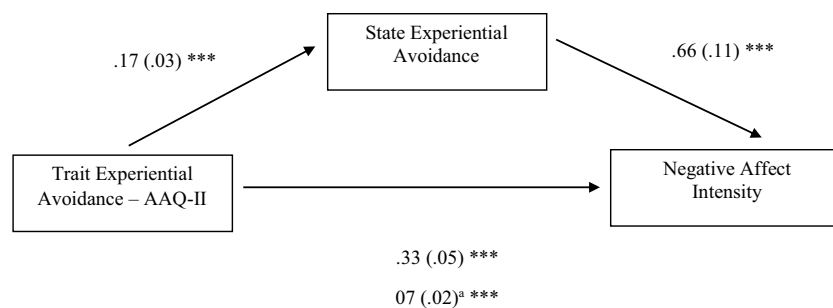

Fig. 1 Indirect effects of state experiential avoidance post TSST on the relationship between trait experiential avoidance (AAQ-II) and negative affect intensity. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Path values were drawn using unstandardized regression coefficients. Parentheses indicate the standard error, [a] Indirect effect displayed.

Given these relationships, we were interested in determining if the relationships still held when the MEAQ was conceptualized as a form of trait experiential avoidance in the mediation models, particularly given the criticisms of the AAQ-II in the literature. Thus, we replicated both the cold pressor and TSST single mediation models using the MEAQ as the predictor variable. In the cold pressor test mediation model, it was noted that while the a-path and b-path were significant, the indirect effect was not. Therefore, even when using the MEAQ as a measure of trait experiential avoidance, the relationship between trait experiential avoidance and negative affect intensity following the cold pressor test was not significant. However, when the analyses were conducted for these variables following the TSST, a significant indirect effect was found for state experiential avoidance, 95% BCa [0.0044—0.0336] (Fig. 2).

Discussion

The aims of the present study were to investigate individual differences in state and trait experiential avoidance as they relate to negative affect outcomes following exposure to two challenging tasks. Given prior literature investigating state experiential avoidance (Machell et al., 2015), it was expected that contextual factors would be important in determining the likelihood of engaging in experiential avoidance in the moment to manage physical and social discomfort. Experiential avoidance likely functions idiographically in context (Kashdan et al., 2014), yet few scholars have paid attention to the unique contextual variables that drive experiential avoidance and instead assume it is a broad functional class of behaviors (Kingston et al., 2010; Zettle et al., 2012). While we conceptualize experiential avoidance to be problematic across contexts, we believed that paying closer attention to how it operates in context would be important. Because few studies have evaluated differences in state and trait experiential

avoidance (Kashdan et al., 2014; Machell et al., 2015), we also believed it would be helpful to make this distinction as experiential avoidance may function differently in the moment. Therefore, it was presumed that a history of engaging in higher levels of trait experiential avoidance would be important for understanding how state experiential avoidance predicts negative affect intensity in context, particularly given the already established relationship between trait experiential avoidance and negative affect (Luoma et al., 2020; Shahar & Herr, 2011).

In support of these hypotheses, state experiential avoidance was an important mechanism for the experience of negative affect. However, these effects appear to be driven by the social context condition as the mediational results did not replicate across conditions. While prior research has evidenced a relationship between negative affect and experiential avoidance (e.g., Jacob et al., 2013; Salters-Pedneault & Diller, 2013), these studies were focused on trait-based measures of experiential avoidance and often relied on self-report assessment. Our findings suggest that increased state experiential avoidance may be related to more intense negative affect when socially uncomfortable. Furthermore, these results indicate it might be insufficient to exclusively conceptualize experiential avoidance as a trait with no attention paid to contextual information.

Interpersonal discomfort was more strongly evocative of momentary changes in negative affect than physical discomfort which makes sense contextually. State experiential avoidance may function to alleviate distress in the moment but may also take away positive affect as evidenced by the reductions in positive affect from pre to post task. While the experience of physical discomfort and affective states were related in the expected direction (e.g., Luoma et al., 2020), the results of this study support the notion that interpersonal context is most strongly associated with reduced positive affect. Further, the relationship between trait experiential avoidance and momentary increases in negative affect was mediated by state experiential
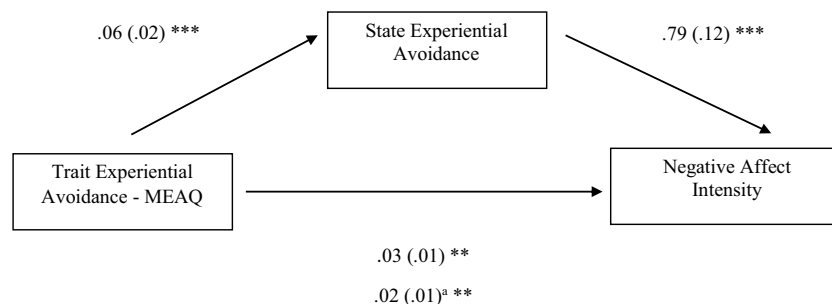

Fig. 2 Indirect effects of state experiential avoidance post TSST on the relationship between trait experiential avoidance (MEAQ) and negative affect intensity. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Path values were drawn using unstandardized regression coefficients. Parentheses indicate the total effect. [a]Indirect effect displayed.

avoidance, a finding that, to our knowledge, has not yet been well established in the literature.

These findings could have potential implications for disorders and behaviors that are driven by impulse. For example, cravings and urges for substances may be affected by both trait and state experiential avoidance differently. A history of suppressing one's private behavior over time may predict an increased likelihood of engaging in experiential avoidance in the moment when presented with emotionally distressing life events. In the example of the individual who engages in problematic substance use, state experiential avoidance may lead to heightened negative affect and subsequently result in more overt forms of experiential avoidance (i.e., alcohol/drug consumption). Maintained through negative reinforcement, these patterns may strengthen and result in a repertoire that can be conceptualized as dispositional experiential avoidance. While the moderation effect of trait x state experiential avoidance on negative affect was tested for both conditions and trait-based measures, these interaction effects were non-significant. This could possibly be because trait-based measures contain less contextual information and thus a more specific trait-based measure with items specific to context (i.e., specific to physical and social distress) might be more appropriate for a moderation analysis.

Given the statistical differences noted across the cold pressor and TSST, it appears more likely that state experiential avoidance is most saliently used in socially uncomfortable contexts, thus supporting the notion that context matters when it comes to experiential avoidance (Kashdan et al., 2014; Machell et al., 2015). While the experience of physical discomfort does seem related to negative affect both in this study and in the literature (Helsen et al., 2011), social reinforcers might arguably be more potent in the social-verbal community (Greer, 2020) the learning history around avoidance of social discomfort (Kirk et al., 2019) might differ from the learning history of avoiding physical discomfort (Zvolensky et al., 2010).That is, humans may generally value social interactions and thus state experiential avoidance in contexts of social discomfort may have survival value (i.e., avoiding social stigma). Roche et al. (2007) found that social pressure was the strongest predictor of latency to withstand the cold pressor test. The authors opine that demand characteristics may be an important potential confound in similar studies. While there was not an explicit social pressure component to our cold pressor portion of the study, the TSST is theoretically a form of social pressure. It is possible that the instructions for either condition or presence of the experimenter in the room could have functioned as a form of social pressure. Participants in a convenience sample are also perhaps more practiced at avoiding social discomfort and may have had fewer trials of reinforcement for avoiding physical discomfort.

Wang et al. (2019) assigned participants to conditions of acceptance of pain or attention to pain during a cold pressor test that was completed before and after a brief mindfulness intervention. They found that participants in the acceptance group endured and tolerated pain significantly longer than the attention group following the mindfulness training. It is possible that participants in the present study, who were not instructed to accept their pain nor given any mindfulness training, were engaging in higher levels of state experiential avoidance which is conceptually the antithesis of acceptance. This could potentially explain the mediation effect of state experiential avoidance on the association between trait experiential avoidance and negative affect. Additionally, while the physical discomfort was aversive, the items on the measures of state and trait experiential avoidance are also much more relevant to the avoidance of emotional discomfort. For example, "I'm afraid of my feelings" is an item endorsed on the AAQ-II while "How upset and distressed over anxiety were you?" is an item on the SMEA. Thus, modifying items on the measures to account for avoidance of physical discomfort could be helpful to aid future researchers.

Wolgast (2014) found the AAQ-II to be a stronger measure of distress than acceptance/nonacceptance. Similarly, in their factor analytic research, Rochefort et al. (2018) found evidence that the AAQ-II loads with measures of neuroticism and negative affect but not with contextual behavior therapy factors, while the MEAQ loads with mindfulness and its own factor. They conclude that the AAQ-II may not be fundamentally distinct form the construct of neuroticism or negative affect. Given these prior studies, it is unsurprising that the AAQ-II was associated with negative affect intensity in the current study. Thus, it is possible that the state measure of experiential avoidance, whose items seem to align with the AAQ/AAQ-II could also function similarly. As such, it would be interesting to develop a shorter, state-based measured of experiential avoidance generated from the MEAQ items which conceptually align better with the behavioral strategies used to engage in experiential avoidance.

Limitations and future directions

Results of this study represent a step toward evaluating the role of state experiential avoidance in producing more intense negative affect in contexts of interpersonal discomfort. However, as these data were collected from a convenience sample of undergraduate students, the generalizability to a clinical sample may be somewhat limited. Additionally, as these data are not longitudinal, temporal precedence cannot be determined and as such, it is impossible to determine whether any of the variables are causally related. At best, the mediation analyses are based heavily on theory and thus should be interpreted with caution. It is also worth noting

that the sample size, while large ($N = 160$) and adequate from a power perspective, may lack precision as there is evidence that correlation analyses stabilize at sample sizes of around 250 (Shönbrodt & Perugini, 2013).

Reductions in positive affect from pre- to post could support the notion that experiential avoidance reduces positive affect. Yet, another possible consideration might be that introducing stressors in and of itself reduces positive affect intensity which is a more difficult phenomenon to control for. Another limitation to the present study was the decision to only assess trait experiential avoidance at one time point (baseline). Although it may be interesting and useful to compare levels following each task, we conceptualized trait experiential avoidance as a generalized risk factor and the item wording is more based on overall proclivities to engage in avoidance. Because the SMEA included items specifically related to the present moment, we decided to only test state experiential avoidance twice (baseline, post cold pressor and TSST). Future psychometric researchers could work more closely to develop a state-based measure of experiential avoidance derived from the MEAQ's factor structure. While state experiential avoidance functioned differently based on context in our study, state experiential avoidance may be more idiographic and nuanced than can be understood in an aggregate format. Thus, conducting single-subject research may be an important next step to further examine the ways in which state experiential avoidance is linked to context. Finally, while our results point to the importance of context in predicting affective states, intervention research could further elucidate how to increase psychological flexibility in the moment.

Conclusion

Results from the present study, while cross-sectional, represent an important step toward differentiating experiential avoidance as a state from experiential avoidance as a trait, a conceptual point that is often missing from the contextual behavioral science literature. State-based experiential avoidance was associated with trait experiential avoidance and negative affect intensity and may function as a mechanism for the impact of trait experiential avoidance on increasing negative affect. Future researchers interested in studying state experiential avoidance could pursue a longitudinal analysis that may translate into meaningful implications for treating avoidance behavior as it presents in a therapeutic context. For example, as a dissociative state or distraction/suppression strategy.

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