

## Emotion Regulation Difficulties Associated with the Experience of Uncued Panic Attacks: Evidence of Experiential Avoidance, Emotional Nonacceptance, and Decreased Emotional Clarity

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Emotion regulation difficulties among nonclinical uncued panickers were examined in two studies. In Study 1, participants with a recent history of uncued panic attacks ( $n = 91$ ), compared to a nonpanic sample ( $n = 91$ ), reported significantly greater levels of experiential avoidance, lack of emotional acceptance, and lack of emotional clarity. In Study 2, a subset of uncued panickers and nonpanickers from Study 1 ( $n = 17$  per group) viewed positive and negative emotion-eliciting film clips. Despite comparable levels of self-reported distress and physiological arousal, panickers reported using more emotionally avoidant regulation strategies during both film clips. Panic participants also responded with greater negative emotion to the positive emotion-eliciting clip. Results are discussed in terms of their research and clinical implications.

PANIC ATTACKS ARE DEFINED as discrete episodes of intense arousal experienced through a variety of bodily sensations and accompanied by feelings of fear and/or discomfort (American Psychiatric Association [APA], 1994). Although panic attacks are evident across the anxiety disorders, uncued panic attacks are a core, defining feature of panic disorder (PD; APA, 1994). PD is a common condition, with a lifetime prevalence rate of 4.7% reported in the National Comorbidity Survey Replication (Kessler et al., 2005). Moreover, the experience of uncued panic attacks in the general population is also common, with estimates of 7.4% yearly prevalence in one undergraduate sample (Deacon & Valentiner, 2001) and 12% lifetime prevalence in another (Telch, Lucas, & Nelson, 1989). Uncued panic attacks are clinically relevant in that they are associated with a higher frequency of panic attack occurrence and greater panic symptom severity (Norton, Dorward, & Cox, 1986), as well as greater risk for the development of PD (Barlow, 2002). Given that the presence of uncued panic attacks may be considered evidence of PD vulnerability, research exploring factors associated with the experience of uncued panic attacks (that may also eventually contribute to the development of PD) is needed. Although psychological vulnerability models pertaining to the pathogenesis of panic have been proposed, these models have primarily been cognitive in nature (e.g., anxiety sensitivity, catastrophic misinterpretation; see McNally, 1990). Limited research has examined the extent to which uncued panic attacks may be associated with difficulties in the perception and functional use of emotions and the ability to engage in adaptive behaviors in the face of emotional distress (i.e., difficulties with emotion regulation; see Gratz &

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Roemer, 2004, for a comprehensive review of this definition).

In examining difficulties in emotion regulation, it is important to distinguish between what might be considered adaptive versus maladaptive regulation strategies. Although a number of factors influence in the end whether a strategy is adaptive or maladaptive (such as the ability to flexibly use different strategies in response to the particular goals of a situation; Diamond & Aspinwall, 2003), one important factor concerns the distinction between the modulation and the avoidance or nonacceptance of an emotion. Modulating an emotion involves altering the intensity or duration of an emotion and may be considered adaptive in that it may actually facilitate willingness to come into contact with an emotion (as it may feel less threatening) as well as the pursuit of goal-directed, functional behavior. Attempting to extinguish the emotion altogether or responding to an emotional experience with fear, shame, or some other negative emotion (secondary emotional responding or nonacceptance), however, has generally been associated with worse outcomes. For example, emotional avoidance and the nonacceptance of emotions are associated with anxiety disorder-related psychopathology (see Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Salters-Pedneault, Tull, & Roemer, 2004). It has also been demonstrated that emotion regulation difficulties in the form of low emotional clarity and awareness may contribute to certain anxiety disorders, such as generalized anxiety disorder (Mennin, Heimberg, Turk, & Fresco, 2005). Thus, it has been suggested that emotion regulation-focused research may improve our understanding of panic (Baker, Hollo-way, Thomas, Thomas, & Owens, 2004; Barlow, Allen, & Choate, 2004).

Albeit limited, theoretical literature and a small body of empirical research provide support for the potential presence of emotion regulation difficulties in the form of emotional nonacceptance, experiential avoidance, and decreased emotional clarity among those who experience panic attacks. Individuals who experience panic attacks exhibit a tendency to fear and avoid the experience of panic-related internal sensations (Borden, Clum, Broyles, & Watkins, 1988). Williams, Chambless, and Ahrens (1997) suggest that this tendency to fear bodily sensations may generalize to stimuli that produce physiological reactions similar to anxiety, such as an intense emotional experience. Likewise, Clark (1986) suggests that individuals with panic disorder may catastrophically misinterpret bodily sensations associated with emotions that produce physiological sensations similar to anxiety. If certain emotions are perceived as threatening due to the

internal sensations that accompany them, individuals who experience panic attacks may be less accepting of their emotions (i.e., exhibit secondary emotional reactions, such as fear or anger, to a primary emotion; Gratz & Roemer, 2004) and may be motivated to engage in emotion regulatory strategies that serve an experientially avoidant function (i.e., attempts to alter the form or frequency of unwanted internal experiences, primarily emotions; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Evidence suggests that nonclinical and clinical samples of individuals who experience panic attacks are more likely to rely on avoidant coping strategies in response to emotionally salient events (see Feldner, Zvolensky, & Leen-Feldner, 2004). In addition, Baker et al. (2004) found that PD patients, compared to healthy controls, reported a greater tendency to suppress and constrict the experience and expression of negative emotions.

The experience of panic attacks has also been associated with decreased emotional clarity (defined as the ability to accurately differentiate between various emotional states or between bodily sensations and emotional states; Gratz & Roemer, 2004). For example, Baker et al. (2004) found that PD patients, as compared to healthy controls, reported greater difficulties labeling emotions. Also, PD patients have been found to report heightened levels of alexithymia (Parker, Taylor, Bagby, & Acklin, 1993), a multifaceted construct consisting of the following dimensions: (a) difficulty identifying feelings, (b) difficulty describing feelings, and (c) an externally oriented thinking style. The first two dimensions are consistent with the above definition of emotional clarity in that it has been suggested that they stem from difficulties in the ability to differentiate emotional states from bodily sensations (Taylor, 2000). In support of their relevance to panic-related symptomatology, Cox, Swinson, Shulman, and Bourdeau (1995) found that PD patients exhibited heightened difficulties on these dimensions, and PD vulnerability (i.e., high anxiety sensitivity) was positively associated with scores on these dimensions (Devine, Stewart, & Watt, 1999). Interestingly, despite finding worse emotional clarity, Baker et al. (2004) found that PD patients reported greater emotional awareness (the tendency to attend to and acknowledge emotions; Gratz & Roemer, 2004). It may be that the hypervigilance for internal sensations commonly associated with panic disorder (Schmidt, Lerew, & Trakowski, 1990) results in increased attention allotted toward emotional states accompanied by heightened physiological arousal, thus leading to the reporting of greater awareness. At the same time, however, panickers may perceive their

emotional experience as diffuse states not easily distinguishable from bodily sensations (i.e., reduced clarity).

These emotion regulation difficulties (emotional nonacceptance, experiential avoidance, and/or a lack of emotional clarity) may result in emotions being perceived as uncontrollable and unpredictable—two factors which, according to [Bouton, Mineka, and Barlow \(2001\)](#), are associated with heightened fear and anxiety among individuals who experience panic attacks, increasing the extent to which fear conditioning may occur. The nonacceptance of emotions and use of experientially avoidant emotion regulation strategies may also have a paradoxical, negative effect, as attempts to avoid emotions may actually result in increased distress and dysregulation. For example, some (although not all; see [Leen-Feldner, Zvolensky, & Feldner, 2004](#)) studies have demonstrated that the suppression of emotional expression and experience may result in increased physiological arousal ([Campbell-Sills, Barlow, Brown, & Hofmann, 2006](#); [Gross & Levenson, 1993, 1997](#)). Given a learned tendency to associate threat with physiological arousal among individuals who experience panic attacks, increased arousal may heighten anxiety and the likelihood of a panic attack. Experiential avoidance may also maintain and reinforce the learned association between panic-related bodily sensations and fear (i.e., “Since I avoid these sensations, they must be bad”). Finally, a lack of emotional clarity may contribute to the extent with which internal sensations are perceived as ambiguous, and thus, threatening ([Richards, Austin, & Alvarenga, 2001](#)).

The purpose of these studies, then, was to provide a preliminary investigation of emotion regulation difficulties (emotional nonacceptance, experiential avoidance, and lack of emotional awareness and clarity) among PD vulnerable individuals, a non-treatment seeking sample of persons who have experienced uncued panic attacks. These studies differ from past studies examining panic attacks and emotion regulation difficulties (e.g., [Baker et al., 2004](#); [Cox et al., 1995](#); [Parker et al., 1993](#)) in that a multimethod approach was used. Specifically, in addition to self-report methods (Study 1), emotional responses to an emotion induction task were examined (Study 2).

### Study 1

Given the paucity of research concerning the relationship between panic attacks and specific emotion regulation difficulties, the goal of Study 1 was to examine whether individuals who have experienced uncued panic attacks differ from those

without a history of panic in experiential avoidance, emotional nonacceptance, and lack of emotional clarity. The following hypotheses were proposed: (1) Panic, compared to nonpanic, participants would report significantly higher levels of experiential avoidance and emotional non-acceptance; and (2) Panic, compared to nonpanic, participants would report significantly lower levels of emotional clarity. As [Baker et al. \(2004\)](#) found greater emotional awareness among PD patients (a finding which runs counter to expectations), no specific predictions were made regarding potential between-group differences in emotional awareness.

### METHOD

*Participants.* A total of 407 participants from the University of Massachusetts, Boston, completed questionnaire packets. From this larger sample, 91 participants (72 women and 19 men) met criteria for the experience of at least one limited or full symptom uncued panic attack within the last year, no current treatment for panic attacks, and no missing data on any variables of interest (see *Procedure*). Panic participants reported experiencing an average of 4.53 ( $SD=11.75$ ) uncued panic attacks within the past year and having experienced panic attacks for an average of 54.11 months ( $SD=76.8$ ). Age of panic participants ranged from 18 to 50 ( $M=23.62$ ,  $SD=6.88$ ). In regard to racial/ethnic self-identification, 54.9% self-identified as White, 6.6% as Black/African American, 9.9% as Asian/Pacific Islander, 7.7% as Latino, 12.1% as multiracial, and 8.8% identified as being from another, unspecified racial/ethnic background.

A group of 91 participants (71 women and 20 men) not reporting any past history of panic attacks was also identified as a comparison sample. Attempts were made to best match nonpanic participants to panic participants according to age, gender, and ethnicity. Age of nonpanic participants ranged from 18 to 46 with an average age of 22.81 ( $SD=5.65$ ). In terms of racial/ethnic self-identification, 54.9% self-identified as White, 11% as Black/African American, 12.1% as Asian/Pacific Islander, 6.6% as Latino, 5.5% as multiracial, and 9.9% identified as being from another, unspecified racial/ethnic background. No significant differences were found between groups on matching variables, thus indicating that the matching was successful.

*The assessment of panic attack occurrence and panic-related phenomena.* The Panic Attack Questionnaire (PAQ; [Norton et al., 1986](#)) has been used extensively to identify the presence of panic attacks (cued and uncued) in nonclinical samples (e.g., see [Antony, 2001](#)). The PAQ provides participants with

a brief definition of a panic attack followed by items concerning the intensity of *DSM-IV* panic symptoms rated on a Likert-type scale ranging from 1 (*not at all noticed*) to 8 (*strongly felt*). The PAQ is based on well-established sources (e.g., *DSM-IV*), and there is evidence for the adequate reliability and validity of certain sections of the PAQ (e.g., assessment of panic symptoms; see Antony, 2001). Researchers have modified the original PAQ in an attempt to differentiate panic attacks that occur in PD (i.e., uncued) from those that occur in the context of other anxiety disorders. Although this change creates a nonstandardized version of the PAQ, it provides a more conservative estimate of nonclinical panic attack prevalence rates (Zvolensky & Raulin, 1999). This study used the modified version.

*Assessment of emotion regulation difficulties.* The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure developed to assess individuals' difficulties understanding, accepting, and modulating their emotions, as well as choosing goal-directed actions in a state of emotional distress. Participants are asked to indicate how often each item applies to themselves using a 5-point Likert-type scale (1 = *almost never* to 5 = *almost always*). The DERS includes 6 subscales: Lack of Acceptance of Emotional Responses, Inability to Engage in Goal-Directed Behaviors, Poor Impulse Control, Lack of Emotional Awareness, Lack of Accessibility to Effective Emotion Regulation Strategies, and Lack of Emotional Clarity. Of particular interest to the present study were the subscales of Lack of Acceptance of Emotional Responses, Lack of Emotional Awareness, and Lack of Emotional Clarity. The Lack of Emotional Acceptance, Awareness and Clarity subscales have been found to have adequate test-retest reliability ( $r_s = .69, .68,$  and  $.80$  for Lack of Acceptance, Awareness, and Clarity, respectively; Gratz & Roemer, 2004). Evidence for the construct validity of the DERS and its subscales has also been demonstrated through its relationship with other self-report measures of emotion regulation, experiential avoidance, emotional inexpressivity, self-harm behavior, and intimate partner abuse (see Gratz & Roemer, 2004), as well as a behavioral measure of emotion dysregulation (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006). Higher scores are indicative of greater regulation difficulties on each subscale. Internal consistency within the panic sample for the Lack of Emotional Acceptance ( $\alpha = .73$ ), Awareness ( $\alpha = .56$ ), and Clarity ( $\alpha = .84$ ) subscales was adequate, as was internal consistency for the nonpanic sample ( $\alpha = .90, .47,$  and  $.74,$

respectively), with the exception of the awareness subscales.

The Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004) is a self-report measure of experiential avoidance, primarily in regard to emotions and distressing thoughts. This study used the 16-item AAQ due to the greater face validity of its items in regard to avoidance, such as "I try hard to avoid feeling depressed or anxious" and "I rarely worry about getting my anxieties, worries, and feelings under control [*reverse-scored*]." The 16-item AAQ is strongly correlated with the more commonly used 9-item AAQ ( $r = .89$ ; Hayes et al., 2004). Higher AAQ scores correspond to the greater presence of experiential avoidance tendencies. There is evidence for the AAQ's reliability, as well as its construct validity (see Hayes et al., 2004). Specifically, (a) factor analyses have demonstrated that the AAQ items consistently load on one factor (Hayes et al., 2004); (b) AAQ scores exhibit the strongest correlations with other, well-established, self-report measures of avoidance (see Hayes et al., 2004); (c) the AAQ is strongly correlated with an experimental measure of emotional willingness ( $r = -.76$ ; Gratz et al., 2006); and (d) the AAQ demonstrates strong relationships with self-report measures of processes serving an experientially avoidant function, such as worry ( $r = .57$ ; Roemer, Salters, Raffa, & Orsillo, 2005). Internal consistency was adequate in the panic ( $\alpha = .76$ ) and nonpanic ( $\alpha = .70$ ) samples.

*Covariate assessment.* Data were collected on participants' demographic information (e.g., racial/ethnic background, gender, and age) in order to identify potential covariates. In addition, given the high co-occurrence of depression with panic attacks (see Kessler et al., 1998) and previously demonstrated relationships between emotion regulation difficulties and depression (e.g., Rude & McCarthy, 2003), depressive symptom severity was assessed using the Depression Anxiety Stress Scales (DASS; Lovibond & Lovibond, 1995). The DASS is a self-report questionnaire designed to differentiate between core symptoms of depression, anxiety, and stress. The DASS has demonstrated adequate test-retest reliability (Brown, Chorpita, Korotitsch, & Barlow, 1997), and there is evidence for its construct validity (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown et al., 1997; Lovibond & Lovibond, 1995). Only the depression subscale of the DASS was used in this study. Internal consistency for both groups was good ( $\alpha_s = .89$ ).

*Procedure.* Undergraduate students were recruited from psychology courses. After providing informed consent, participants filled out a battery of questionnaires, including those described above.

Course research credit was received in exchange for participation.

Participants were considered to meet criteria for a history of nonclinical uncued panic attacks if they reported the experience of an uncued panic attack in the past 12 months accompanied by at least 1 panic-related symptom rated as at least of moderate intensity, consistent with past studies (Deacon & Valentiner, 2001; Zvolensky & Raulin, 1999). This criterion allows the inclusion of limited (<4 symptoms) and full symptom ( $\geq 4$ ) panic attacks (Barlow, 2002). It was decided to collapse participants with limited ( $N=22$ ) or full symptom ( $N=69$ ) panic attacks into one group given our analyses demonstrating no significant differences between these two groups on demographics, past year frequency of panic attacks, number of months experiencing panic attacks, variables pertaining to emotion regulation difficulties, and depressive symptom severity (all  $ps > .10$ ). Participants were excluded if they were currently receiving psychotherapy or pharmacological therapy for panic attacks. To be eligible for the nonpanic group, participants had to report no lifetime experience of a panic attack.

## RESULTS

Effect sizes ( $\eta_p^2$ ) accompanying findings are reported for Study 1 and 2 (for reference, an effect size of  $\eta_p^2 = .059$  is considered a medium effect and  $\eta_p^2 = .138$ , a large effect; Cohen, 1977). Raw mean variable scores for both groups and correlations between variables for panic participants are presented in Table 1. No significant between-group differences were found on any demographic variable, thus none were included as covariates in analyses. However, panic participants ( $M=11.99$ ,  $SD=10.20$ ) reported significantly more severe depressive symptoms than nonpanic participants ( $M=8.01$ ,  $SD=9.01$ ),  $F(1, 180)=7.77$ ,  $p < .01$ ,

$\eta_p^2 = .04$ . Therefore, after initial examination of between-group differences in emotion regulation difficulties, analyses were conducted with this variable included as a covariate.

To explore group differences in experiential avoidance and emotional nonacceptance (Hypothesis 1), a multivariate analysis of variance (MANOVA) was conducted with panic/nonpanic group assignment as the independent variable and experiential avoidance and lack of emotional acceptance as dependent variables. The overall model was significant, Wilkes  $\lambda=0.94$ ,  $F(2, 179)=5.68$ ,  $p < .01$ ,  $\eta_p^2 = .06$ . *Post hoc* univariate analyses of variance (ANOVAs) demonstrated that panic, compared to nonpanic, participants reported significantly greater experiential avoidance and lack of emotional acceptance, consistent with predictions (see Table 1). To explore group differences in emotional awareness/clarity variables (Hypothesis 2), the same procedure used to test Hypothesis 1 was followed except lack of emotional clarity and lack of emotional awareness were entered as the dependent variables. The overall model was significant, Wilkes  $\lambda=0.95$ ,  $F(3, 178)=4.75$ ,  $p < .01$ ,  $\eta_p^2 = .05$ . *Post hoc* ANOVAs demonstrated that groups differed significantly on lack of emotional clarity. No differences were found on lack of emotional awareness (see Table 1).

Analyses were then conducted to determine whether group differences remained when controlling for depressive symptom severity. Differences on experiential avoidance,  $F(1, 179)=4.41$ ,  $p < .05$ ,  $\eta_p^2 = .02$ , and lack of emotional clarity remained,  $F(1, 179)=4.84$ ,  $p < .05$ ,  $\eta_p^2 = .03$ ; however, the previously found between-group difference for the Lack of Emotional Acceptance subscale was no longer significant,  $F(1, 179)=1.45$ ,  $p > .10$ ,  $\eta_p^2 = .01$ .

## SUMMARY AND LIMITATIONS

Results from Study 1 replicate previous findings of emotion regulation difficulties associated with

Table 1  
Correlations between and raw mean scores for Study 1 variables of interest for panic and nonpanic participants

Variable	1	2	3	4	Panic		Nonpanic		F	$\eta_p^2$
					Mean	SD	Mean	SD		
1. Experiential Avoidance	—				63.25	12.32	57.50	10.95	11.06**	.06
2. DERS Lack of Emotional Acceptance	.44**	—			13.22	5.70	11.56	5.31	4.13*	.04
3. DERS Lack of Emotional Awareness	.33**	.20	—		14.64	4.97	14.09	4.48	.62	.00
4. DERS Lack of Emotional Clarity	.48**	.45**	.61**	—	11.13	3.93	9.62	2.96	8.64**	.05

Note. Experiential Avoidance=16-item Acceptance and Action Questionnaire total score (scores range from 16 to 112); DERS Lack of Emotional Acceptance=Difficulties in Emotion Regulation Scale Lack of Emotional Acceptance subscale score (scores range from 6 to 30); DERS Lack of Emotional Awareness=Difficulties in Emotion Regulation Scale Lack of Emotional Awareness subscale score (scores range from 6 to 30); DERS Lack of Emotional Clarity=Difficulties in Emotion Regulation Scale Lack of Emotional Clarity subscale score (scores range from 5 to 25).

\*  $p < .05$ .

\*\*  $p < .01$ .

panic (see Baker et al., 2004). In this study, uncued panickers reported significantly greater levels of experiential avoidance, lack of emotional acceptance, and lack of emotional clarity, as compared to participants with no history of panic. Differences on experiential avoidance and lack of emotional clarity remained when controlling for depressive symptom severity, providing preliminary support for the specificity of certain emotion regulation difficulties in uncued panic. No significant differences were found for lack of emotional awareness. Although this may be due to the subscale's low internal consistency, the finding may also speak to a conceptual difference between emotional awareness and clarity. That is, individuals with uncued panic attacks may not experience poor awareness of emotional arousal. Instead, their fear of this arousal may prevent the full processing of emotional experience, inhibiting their ability to fully differentiate between distinct emotional states.

Study 1 is not without limitations. First and foremost, the study was correlational and cross-sectional in nature. Study 1 also only examined emotion regulation difficulties in the context of negative emotions or emotions in general. No studies to date have examined emotion regulation difficulties among individuals who experience panic attacks in response to negative and positive emotional stimuli. Study 2 was conducted to expand upon Study 1 and in an attempt to address these limitations.

## Study 2

Study 2 provides a preliminary experimental examination of differences in emotional avoidance and lack of emotional awareness and clarity in response to negative and positive emotion-eliciting stimuli among individuals reporting a recent history of nonclinical uncued panic attacks and individuals without a history of uncued panic attacks. The following hypotheses were proposed for Study 2: Panic, as compared to nonpanic, participants would (1) report greater distress and negative emotional reactivity (as determined by the frequency and number of different negative emotion words used to describe reactions to each film clip) in response to both film clips; (2) demonstrate heightened physiological arousal (i.e., heart rate and skin conductance response) in response to the film clips; and (3) report the greater use of avoidant emotion regulation strategies in response to both film clips. Emotional awareness in response to each film clip was also assessed by having participants write about their reaction to

each film clip and then scoring these writings for level of emotional awareness (see below). Study 2 analyses involving emotional awareness variables were again considered exploratory.

## METHOD

*Participants.* Participants were 32 women and 4 men who agreed to be contacted for and participate in Study 2 following their participation in Study 1. No significant differences were found on any measured variable (i.e., demographic characteristics, past year panic attack frequency, number of months experiencing panic attacks, emotion regulation difficulties, and depressive symptom severity) between panic participants who agreed or refused to participate in Study 2 (all  $ps > .10$ ). Participants were assigned to a panic or nonpanic group based on the criteria used in Study 1. Seventeen participants were assigned to the panic group and 19 were assigned to the nonpanic group. Two control participants (both women) were excluded because they reported experiencing an uncued panic attack following their completion of Study 1. The final sample included 17 panic (15 women and 2 men) and 17 nonpanic (15 women and 2 men) participants, matched on gender. Average age was 23 ( $SD = 6.16$ ) for panic participants and 22 ( $SD = 3.13$ ) for nonpanic participants.

Frequency of uncued panic attacks for panic participants within the past year ranged from 1 to 10, with an average of 2.82 ( $SD = 2.3$ ). Panic participants also reported that their panic attacks were accompanied by an average of 11.29 ( $SD = 4.07$ ) panic symptoms. In regard to panic participants' racial/ethnic self-identification, 76.5% were White, 11.8% were Latino, 5.9% reported a multiracial/ethnic background, and 5.9% identified being from another, unspecified racial/ethnic background. For nonpanic participants, 70.6% identified as White, 5.9% as Black/African American, 5.9% reported a multiracial/ethnic background, and 17.6% identified as being from another, unspecified racial/ethnic background. No significant between-group differences were found on age, gender, or racial/ethnic background.

*During-experiment self-report questionnaires.* Throughout the course of the experiment, participants completed the Subjective Units of Distress Scale (SUDS; Wolpe, 1990). Participants rated their current level of distress on a scale from 0 to 100, with higher scores indicating greater distress. Participants completed the SUDS following each baseline period and film clip presentation (see Procedure).

Participants also completed a questionnaire after presentation of each film clip based upon the Levels

of Emotional Awareness Scale (LEAS; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990), a written performance measure of the awareness and expression of emotional experience. The following instructions were provided to participants after each film clip:

Please describe your reactions to the film clip you just watched. In writing about your reaction, the only requirement is that you use the word “feel” in your answers. You may make your answers as brief or as long as necessary to express how you feel in response to the film clip.

Consistent with the LEAS, participants' responses were coded for level of emotional awareness and given a score ranging from 0 to 4, with higher scores indicating greater emotional differentiation and awareness (see below for a detailed description of the scoring procedure).

Transcripts of participants' written reactions to each film clip were also analyzed using the Linguistic Inquiry and Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) in order to obtain a non-self-report assessment of participants' emotional response to the film clips. The LIWC is a text analysis computer program designed to assess various components of verbal and written language (e.g., emotional, cognitive, structural components). Output is in the form of the frequency of words used that fit within a particular predetermined category, such as affective/emotional processes, cognitive processes, and sensory/perceptual processes. The frequency of word use for any particular category is presented as a proportion of the total number of words used in a speech sample. The LIWC program contains its own dictionary; therefore, the words that belong to each category have been predetermined (see Pennebaker et al., 2001, for a discussion of the LIWC program's development). However, the original LIWC dictionary for the positive and negative emotion categories contains words that are descriptions of pure emotional states (e.g., sad, anger, fear, happiness), as well as words that are emotionally valenced (e.g., kill, enemy, abusive). In order to capture participants' pure emotional responses, a modified emotion word dictionary was used (for the development of this dictionary, see Tull, Medaglia, & Roemer, 2005) that assesses *only* the use of pure positive and negative emotion words. Transcripts were coded using the modified dictionary, and the frequency of negative and positive emotion word use, as well as the number of different negative and positive emotion words used, was counted. This output provided indices of positive and negative emotional response to the film clips.

*Postexperiment questionnaire.* At the end of the experiment, participants responded to 18 questions (9 per film clip) that assessed the extent to which they used a number of different emotion regulation strategies that function to avoid or escape emotion during each film clip. Participants rated the extent to which they engaged in each strategy using a 5-point Likert-type scale (1 = *not at all* to 5 = *very much*). Higher scores on this measure represent the greater use of emotionally avoidant regulation strategies. Items were theoretically derived and combined based upon their face validity in assessing emotional avoidance (see Appendix). The items were created specifically for this study; therefore, there are no existing data on the measure's psychometric properties. However, internal consistency was generally adequate, especially in regard to panic participants. For panic participants, internal consistency for items pertaining to the positive and negative emotion-eliciting film clip were  $\alpha = .88$  and  $\alpha = .86$ , respectively. Internal consistency for the avoidance questions was lower for the nonpanic participants, particularly for the positive emotion-eliciting film clip ( $\alpha = .38$ , versus  $\alpha = .60$  for the negative emotion-eliciting film clip).

*Physiological assessments.* Physiological arousal was measured via heart rate (HR) and skin conductance (SC) using standard electrodes. HR electrodes were placed under the left and right rib cage and a grounding electrode was placed just above the ankle. Standard Ag-AgCl, unpolarized, SC finger electrodes were placed on the index and middle finger of participants' nondominant hand. SC finger electrodes were filled with .05 molar NaCl concentration conducting gel. Information was relayed through a Biopac encoder unit. Data were recorded on-line through Acknowledge 3.5 software using a sampling rate of 1,000 samples per second. Physiological data were recorded during each baseline period and each film clip. All HR and SC data were visually examined for outliers (identified as peaks in the data due to body movement) and these artifacts were removed using the Acknowledge software and replaced with a data point representing mean HR calculated from participants' HR just prior to and following the outlier. Mean HR for each period was calculated. For SC, total number of responses (SCR; those exceeding .05  $\mu$ S; see Hugdahl, 1995) was calculated.

*Emotional induction stimuli: Positive and negative emotion-eliciting film clips.* Emotional awareness and clarity include the ability to identify and differentiate between various emotional states (Gratz & Roemer, 2004; Lane & Schwartz, 1987);

therefore, the film clips used as stimuli in Study 2 were specifically chosen for their demonstrated ability to elicit a number of negative or positive emotions, as opposed to one in isolation. The positive emotion-eliciting film clip was from the movie *Patch Adams* (Kemp & Shadyac, 1998). The scene is approximately 2 minutes long and depicts a depressed elderly woman in a hospital becoming excited and overjoyed after a childhood wish is made reality by the hospital workers. This film clip has been found to elicit the positive emotions of joy and happiness in both men and women (Luterek, 2006). Ratings of joy were higher than those previously reported with other validated positive emotion-eliciting film clips (see Gross & Levenson, 1995), and happiness ratings were equal to those reported with other validated positive emotion-eliciting film clips (Luterek, 2006).

The negative emotion-eliciting film clip was from the movie *Fatal Attraction* (Lansing, Jaffe, & Lyne, 1987). This film clip is also approximately 2 minutes long and depicts a scene where a husband confesses to his wife that he has had an extramarital affair and that the other woman is pregnant as a result. The wife becomes very upset and an argument occurs that is witnessed by their child who begins to cry. This film has been found to reliably elicit a number of negative emotions in men and women, including sadness, anxiety, and anger (Richards & Gross, 2000).

*Procedure.* Participants who agreed to be contacted for opportunities to participate in future studies from Study 1 were contacted by phone and told about the study. Participants were initially told that the purpose of the study was to examine differences in how people process visual information, and to this end, participants would watch two film clips, one of which may elicit negative emotions. Monetary reimbursement was received in exchange for participation.

Upon arrival for the experiment, participants provided written informed consent. The experimenter then instructed participants in how to attach the HR and SC sensors to their body and then left the room in order to minimize the influence of social desirability during the experiment. During the experiment, all communication occurred through the use of an intercom. Participants initially rested for 5 minutes to establish baseline HR and SCR and then reported on their current level of distress. Participants were then instructed to direct their attention to the monitor in front of them and were told that they would now be watching a film clip. The first of the two film clips then started. The films were presented in a fixed order (the positive emotion-eliciting film

clip followed by the negative emotion-eliciting film clip) given findings that cardiovascular activation persists for a longer period of time after negative emotions as compared to positive emotions (Brosschot & Thayer, 2003). During the film clip, HR and SCR were assessed. After viewing the film clip, participants were instructed to write about their reactions and report on their level of distress. After presentation of the first film clip, participants were again instructed to sit quietly for 5 minutes in order to allow a return to baseline. Afterwards, participants again reported on their level of distress in order to obtain new subjective baseline data. Once completed, participants were told they would now watch another film clip. The experimenter then began the negative emotion-eliciting film clip. HR and SCR were assessed during the film clip, and afterwards, participants wrote about their reaction and reported on their level of distress. HR and SC sensors were then removed and participants were given the post-experiment emotion regulation questionnaire. Participants were then debriefed.

*Coding transcripts for level of emotional awareness.* Procedures for coding participants' reactions to the film clips were based upon LEAS scoring procedures recommended by Lane (1991). Highly structured scoring criteria are used to evaluate the complexity and differentiation of the words used by participants to describe their emotional response to each film clip. Ratings are based entirely on structure, and no attempt is made to rate the appropriateness of the response. For each film clip, participants receive a score of 0 to 4, based upon Lane and Schwartz's (1987) cognitive-developmental theory of emotional awareness. The lowest score (0) indicates the use of nonemotional words or when thoughts are described instead of emotions (e.g., "I felt confused"). A Level 1 score reflects the awareness of physiological cues or sensations associated with feeling states (e.g., "I felt my heart racing"). A Level 2 score is achieved if undifferentiated words are primarily used (e.g., "I felt bad"). A Level 3 score would be obtained through the participant's use of one, typical, differentiated emotion word (e.g., happy, sad, angry). A Level 4 score indicates the use of multiple or blended emotion words (e.g., "I felt excited and anxious"). All transcripts were scored by two undergraduate research assistants trained according to Lane's (1991) structured guidelines for LEAS scoring. Raters were trained to reliability. For scores with a discrepancy of 1 or greater, raters met to discuss the criteria used to evaluate the scenario to come to an agreement on the score. Raters independently scored LEAS responses,

afterwards meeting to resolve any inconsistencies in scoring. Across all ratings, interrater reliability was high,  $r = .93$ ,  $p < .001$ .

## RESULTS

No significant between-group baseline differences in subjective distress, HR, and SCR were found (see Table 2). To test the first and second hypotheses, a series of ANOVAs were conducted to examine group differences in subjective distress following each film clip and HR and SCR during each film clip. No significant between-group differences were found for either film clip (and all findings were associated with small effect sizes; see Table 2). These findings remained when controlling for baseline distress, depressive symptom severity, baseline HR, or baseline SCR. To further test emotional reactivity to the film clips, differences in the frequency and number of different positive and negative emotion words used in participants' descriptions of their reaction to each film clip (obtained from the modified-LIWC) were assessed. In regard to the LIWC output, there were no significant between-group differences on the frequency and number of different positive and

negative emotion words to describe reactions to the negative emotion-eliciting film clip (see Table 2); however, panic participants, as compared to non-panic participants, used a significantly higher frequency of negative emotion words to describe their reaction, as well as a greater number of different negative emotion words, in response to the positive emotion-eliciting film clip. No significant differences were found between groups for the number of different positive emotion words used in response to the positive emotion-eliciting film clip. All results remained even when controlling for baseline subjective distress or depressive symptom severity. To determine whether between-group differences on the LIWC for each film clip were the result of one group producing less verbal output (thus producing higher frequencies), analyses were conducted comparing the total number of words used to describe reactions to each film clip within each group. No significant differences were found for the positive,  $F(1, 32) = 1.04$ ,  $p = .32$ ,  $\eta_p^2 = .03$ , or negative-emotion eliciting film clips,  $F(1, 32) = 0.01$ ,  $p = .92$ ,  $\eta_p^2 = .00$ .

To test Hypothesis 3, ANOVAs were conducted on the composite of emotional avoidance items on

Table 2  
Study 2 descriptive statistics for panic and non-panic participants

Variable	Panic		Nonpanic		F	$\eta_p^2$
	Mean	SD	Mean	SD		
Baseline 1 HR	82.11	14.64	77.28	10.19	1.24	.04
Baseline 1 SCR	10.76	10.73	10.00	9.34	.05	.00
Baseline 1 SUDS	14.97	18.45	10.88	12.36	.58	.02
Film 1 HR	78.70	15.11	75.21	9.98	.63	.02
Film 1 SCR	8.41	5.42	7.94	5.61	.06	.00
Film 1 SUDS	10.88	13.86	8.85	14.89	.17	.01
Film 1 Avoidance (Post-Experiment)	11.88	2.60	13.94	5.65	1.86	.06
Film 1 Maximum Emotional Awareness	2.77	.75	2.82	.53	.07	.00
Film 1 Frequency of Positive Emotion Words	5.02	3.91	3.44	2.40	2.01	.06
Film 1 Frequency of Negative Emotion Words	1.33	1.99	.13	.52	5.80*	.15
Film 1 Number of Different Positive Emotion Words	2.35	.93	2.29	.85	.04	.01
Film 1 Number of Different Negative Emotion Words	1.53	.72	1.06	.24	6.56*	.17
Baseline 2 HR	79.08	14.14	75.20	8.09	.96	.03
Baseline 2 SCR	11.35	12.64	9.53	8.51	.24	.01
Baseline 2 SUDS	9.56	8.36	12.18	21.07	.23	.01
Film 2 HR	76.41	14.43	72.54	8.39	.92	.03
Film 2 SCR	9.76	6.97	7.18	5.29	1.49	.05
Film 2 SUDS	31.47	6.33	29.38	4.53	.07	.00
Film 2 Avoidance (Post-Experiment)	10.06	2.05	13.71	5.19	7.26*	.19
Film 2 Maximum Emotional Awareness	2.82	.39	2.88	.49	.70	.01
Film 2 Frequency of Positive Emotion Words	1.11	2.28	.72	1.65	.34	.01
Film 2 Frequency of Negative Emotion Words	4.80	2.82	5.31	6.05	.10	.00
Film 2 Number of Different Positive Emotion Words	1.29	.59	1.29	.59	.32	.00
Film 2 Number of Different Negative Emotion Words	2.88	1.22	2.65	1.22	.00	.01

Note. HR=Mean heart rate (beats per minute); SCR=Skin conductance response (number of responses); SUDS=Subjective Units of Distress Scale; Film 1=Positive Emotion-Eliciting Film Clip, Film 2=Negative Emotion-Eliciting Film Clip; Film 1 Avoidance (Post-Experiment)=Retrospectively reported use of emotionally avoidant regulation strategies in response to Film 1 on the post-experiment questionnaire; Film 2 Avoidance (Post-Experiment)=Retrospectively reported use of emotionally avoidant regulation strategies in response to Film 2 on the post-experiment questionnaire.

\*  $p < .05$ .

the postexperiment questionnaire for both film clips. No significant between-group difference was found in self-reported use of emotionally avoidant regulation strategies in response to the positive emotion-eliciting film clip. Given the low internal consistency of this scale for nonpanic participants (which may have prevented the finding of significant differences on the total score), exploratory analyses were conducted on the separate avoidance items to identify any between-group differences. It was found that panic, as compared to nonpanic, participants reported significantly greater desires to leave the situation so as to end what they were feeling,  $F(1, 32)=4.92$ ,  $p<.05$ ,  $\eta_p^2=.13$ , and attempts to try and think differently in order to change what they were feeling,  $F(1, 32)=4.61$ ,  $p<.05$ ,  $\eta_p^2=.13$ . Panic, compared to nonpanic, participants reported significantly greater usage of emotionally avoidant regulation strategies during the negative emotion-eliciting film clip, using the composite score (see Table 2). Finally, no significant between-group differences were found for highest level of emotional awareness reached in writing about reactions to both film clips (see Table 2).

#### SUMMARY AND LIMITATIONS

Overall, few differences were found between panic and nonpanic individuals. However, a significant difference was found between-groups on retrospectively reported emotional avoidance during the negative emotion-eliciting film clip, confirming findings of heightened experiential avoidance obtained in Study 1 and previous studies (Baker et al., 2004). Further, there was some suggestive evidence that panic participants exhibited a tendency to use more emotionally avoidant regulation strategies in response to the positive emotion-eliciting film clip. While these findings clearly require replication, they provide preliminary evidence that the experience of uncued panic attacks may be associated with a learned aversion to negative and positive emotions, consistent with the suggestion of Williams et al. (1997), as well as a tendency to avoid those emotions. Combined with findings of no significant between-group differences for physiological response and subjective distress (with small effect sizes accompanying these findings), results also suggest that the observed emotion regulation difficulties may stem from the *evaluation* of internal experience, rather than actual greater levels of arousal and distress.

There were no significant between-group differences on level of emotional awareness in response to each film clip. It may be the case that panic participants were aware of what emotions should have been elicited by the film clips. That is, panic

participants may not have decreased emotional knowledge. On the contrary, individuals who experience panic may have a complete understanding of the full range of their emotions. This is evident in findings regarding the frequency and number of different negative emotion words used in response to the positive emotion-eliciting film clip. Panic participants reacted to this film clip with greater and more complex negative emotional responding (a finding not simply due to differences in general distress or depressive symptom severity). This finding suggests that individuals who experience uncued panic attacks may negatively misinterpret positive emotional arousal or experience negative arousal during a positive emotional experience.

It is also possible that the film clips were insufficiently evocative, resulting in a lack of differential findings for emotional awareness. However, panic participants did report greater negative emotion in response to the positive film clip and a greater tendency to engage in emotionally avoidant regulation strategies in response to both film clips. Additional limitations include the small number of participants from Study 1 who agreed to participate in Study 2, the multiple comparisons made, the retrospective nature of the emotional avoidance measure, and the small number of reverse-coded items on the avoidance measure which may have biased responding. Despite a lack of demonstrated differences between participants who agreed or declined to participate in Study 2, it is possible that willing participants may have differed from those who did not participate on some unmeasured variable that could affect findings. Further, the multiple comparisons made in Study 2 may have increased the likelihood of making a Type I error, and the reduced sample size may have increased the possibility of a Type II error (although nonsignificant findings were generally associated with small effect sizes). Replication of findings is needed with a larger sample. Further, films were not matched on their ability to induce arousal and were not counterbalanced, both of which may have influenced findings.

#### General Discussion

The purpose of these studies was to conduct an examination of different emotion regulation difficulties associated with uncued panic attacks. Results from Study 1 suggest that individuals with nonclinical uncued panic attacks, as opposed to those without a history of panic attacks, report greater experiential avoidance, lack of emotional acceptance, and lack of emotional clarity. Differences in experiential avoidance and lack of

emotional clarity remained after controlling for variance associated with depressive symptom severity. However, differences in lack of emotional acceptance, which were accounted for by shared variance with depressive symptom severity, may still be important to our understanding of panic. As Miller and Chapman (2001) note, covarying out a variable (in this case, depression) with a high degree of overlap with panic due to shared underlying processes (e.g., negative affectivity; Brown, Chorpita, & Barlow, 1998) may result in the remaining variance having poor construct validity for panic in that variance associated with a central component of the construct has been removed.

Results from Study 2 complement these findings by providing some early evidence that nonclinical uncued panickers report a tendency to use emotionally avoidant regulation strategies in response to both positive and negative emotionally evocative stimuli. This may be the result of a learned tendency to negatively evaluate arousal associated with the experience of certain positive and negative emotions, as proposed by Williams et al. (1997). By fearing arousal in general, panic participants may be motivated to engage in maladaptive emotion regulation strategies, such as avoidance, when intense emotions are experienced. This suggestion may be further supported by the finding that panic participants described their reaction to the positive emotion film clip with more negative emotion words, potentially indicating a heightened tendency to negatively respond to or evaluate positive emotional experience. Furthermore, the lack of other significant differences (e.g., HR, SCR, subjective distress) between panic and nonpanic participants in response to the emotionally evocative film clips (along with small effect sizes) suggests that individuals who experience uncued panic attacks may have a lower threshold with which internal states are perceived as threatening or aversive (i.e., lower distress tolerance), consistent with past suggestions regarding the pathogenesis of panic (see Beck & Clark, 1997; Bouton et al., 2001) and findings of heightened intolerance for physical discomfort among individuals with PD (Schmidt, Richey, & Fitzpatrick, 2006). It also warrants mention that biological challenge studies have generally found no differences in physiological arousal among PD and non-PD participants, similar to Study 2 findings (Zvolensky & Eifert, 2001).

Of course, as mentioned previously, the lack of differences in subjective and physiological response to the film clips may also have been due to the fact that the films were not emotionally evocative enough. Findings should be replicated using emotion-induc-

tion procedures that have been found to elicit stronger emotional responses among analogue anxiety disorder samples (e.g., see Mennin et al., 2005) as compared to healthy controls. In addition, a further, more stringent test of the hypothesis that panic is associated with lower levels of distress tolerance is needed, such as through the use of behavioral measures (e.g., the Paced Auditory Serial Addition Task [PASAT]; Lejuez, Kahler, & Brown, 2003).

Both studies also speak to difficulties in capturing the construct of emotional awareness. Future studies may benefit from utilizing novel situations or personally relevant situations in order to assess emotional awareness separate from contextual emotional knowledge. Studies would also benefit from examining individuals with an actual diagnosis of PD. It is possible that findings regarding differences between panic and nonpanic participants on emotional avoidance and clarity would be more pronounced within a clinical sample. In addition, it is possible that the nonclinical status of our sample prohibited a finding of differences on certain measures, such as subjective and physiological responding to the film clips. Likewise, it would also be important to more thoroughly assess whether participants are currently symptomatic or have other comorbid diagnoses that could affect emotional responding, such as major depression. Likewise, although participants in current treatment for panic attacks were excluded from the study, we did not examine whether participants had received treatment in the past. Past treatment may be associated with the greater use of healthy emotion regulation strategies, adversely affecting our results.

Longitudinal studies are also needed to examine whether difficulties in emotion regulation precede or follow the experience of panic (or both). Relatedly, prospective studies examining the longer-term consequences of emotion regulation strategies are needed, especially in regard to whether certain emotion regulation strategies have a rebound effect (i.e., greater distress and dysregulation), placing an individual at greater risk for a panic attack. It will also be important to examine whether specific symptoms associated with the experience of panic (e.g., fear of bodily sensations) increase risk for emotion regulation difficulties. Finally, the role of gender and ethnicity in these relationships should be explored, particularly given the role that cultural factors play in emotion and emotion regulation (e.g., Campos, Mumme, Kermoian, & Campos, 1994). In regard to gender, participants were predominantly female. This has the potential to influence findings, especially given well-established gender differences in emotionality (see Brody & Hall, 1993; Feldman-Barrett, Lane,

Sechrest, & Schwartz, 2000). However, this body of research would actually suggest that men may be more likely to demonstrate difficulties in emotion regulation. For example, Feldman-Barrett et al. (2000) found that men exhibit lower levels of awareness than women, and men also evidence greater inhibition of emotion (e.g., Buck, Miller, & Caul, 1974; Gross & John, 1998).

The findings from this study contribute to the growing body of literature demonstrating emotion regulation difficulties among anxiety disorder-vulnerable and anxiety disordered samples (see Salters-Pedneault et al., 2004, for a review). In addition, the findings suggest that what may be problematic among individuals with panic is their evaluation of and response to internal experiences, not the internal experience itself. Results also suggest that both positively and negatively valenced emotions may be viewed as threatening (although this finding needs replication). Consequently, treatments aimed at the acceptance or mindful observation of internal sensations may have utility in panic treatments (see Levitt & Karekla, 2005), as might those focused on the development of adaptive emotion regulation skills.

## Appendix A

### STUDY 2 POST-EXPERIMENT ASSESSMENT OF EMOTIONAL AVOIDANCE IN RESPONSE TO THE POSITIVE OR NEGATIVE EMOTION-ELICITING FILM CLIPS

Instructions: Please indicate the extent to which each statement corresponds to your response to the first/second film clip. Use the following scale:

1	2	3	4	5
Not at all	A little	Somewhat	A lot	Very much

1. I let myself feel whatever I was feeling. (Reverse scored)
2. I tried to not feel distressed.
3. I tried to avoid the feelings I was having.
4. I wanted to try and stop what I was feeling.
5. I felt the need to get out of the situation so as to end what I was feeling.
6. I tried to reduce the intensity of my feelings.
7. I tried to feel differently about the film.
8. I tried to think differently in order to change what I was feeling about the film.
9. I tried to not show my feelings on my face.

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