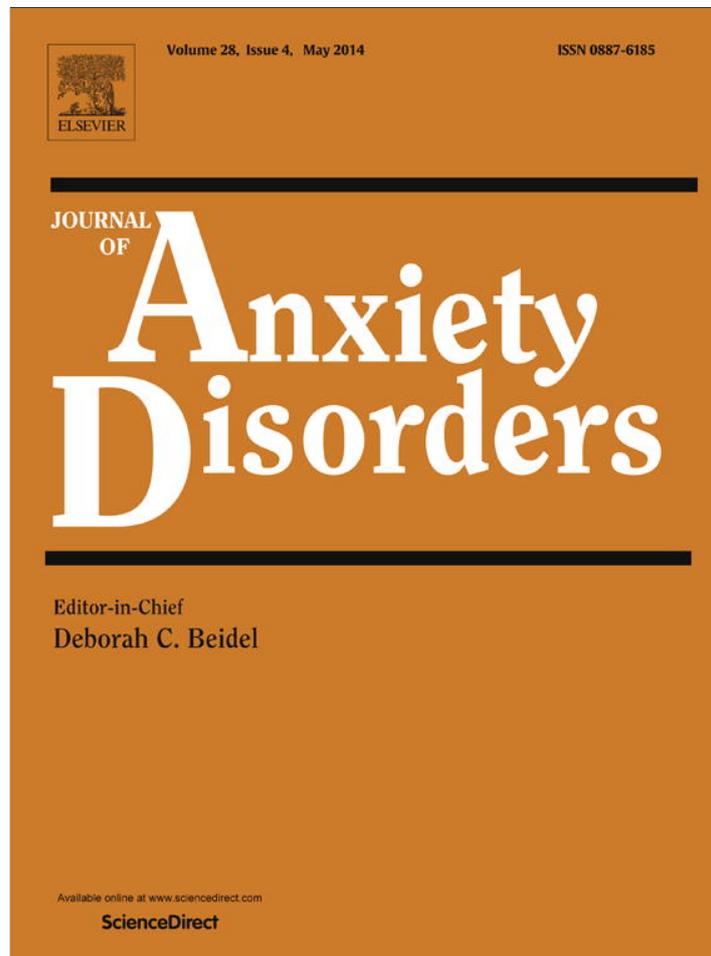


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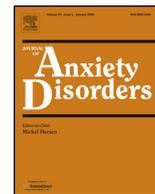
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An examination of the incremental contribution of emotion regulation difficulties to health anxiety beyond specific emotion regulation strategies

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ABSTRACT

Given the potential transdiagnostic importance of emotion dysregulation, as well as a lack of research examining emotion dysregulation in relation to health anxiety, the present study sought to examine associations among specific emotion regulation strategies (cognitive reappraisal and expressive suppression), emotion regulation difficulties, and health anxiety in a physically healthy sample of adults ($N = 482$). As hypothesized, results of a series of hierarchical multiple regression analyses showed that emotion regulation difficulties provided a significant incremental contribution, beyond the specific emotion regulation strategies, in predicting each of the three health anxiety variables. Among the six dimensions of emotion regulation difficulties, the dimension representing perceived access to effective emotion regulation strategies was the only emotion regulation difficulty dimension that predicted all three health anxiety variables beyond the effects of the specific emotion regulation strategies. Results indicate that emotion regulation difficulties, and particularly one's subjective appraisal of his/her ability to effectively regulate emotions, may be of importance to health anxiety. Clinical implications are discussed.

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1. Introduction

The field of emotion regulation continues to flourish, as studies consistently find robust associations between emotion dysregulation and maladaptive psychological outcomes. For example, emotion dysregulation has been implicated in posttraumatic stress symptomatology (Bardeen, Kumpula, & Orcutt, 2013; Ehring & Quack, 2010), anxiety disorders (Cisler, Olatunji, Feldner, & Forsyth, 2010), alcohol dependence (Berking et al., 2011), depression (Tull, Stipleman, Salters-Pedneault, & Gratz, 2009), borderline personality disorder (Gratz, Rosenthal, Tull, Lejuez, & Gunderson, 2006), and a host of other maladaptive outcomes (see Aldao, Nolen-Hoeksema, & Schweizer, 2010 for a review). Although there is a wealth of research showing associations between emotion dysregulation and maladaptive psychological outcomes, to date, there is lack of consensus regarding what exactly is meant by the term “emotion

regulation;” a number of theoretical models and measures purport to capture this polysemous construct.

Among the various accounts of emotion regulation, two conceptual models have garnered the bulk of empirical focus (Gratz & Roemer, 2004; Gross, 1998). Gratz and Roemer (2004) provided one of the most comprehensive conceptualizations of emotion regulation to date, proposing that effective emotion regulation involves identification and understanding of emotions, acceptance of emotions, perceived access to effective emotion regulation strategies, and the ability to continue to pursue goal-directed behavior and inhibit impulsive behaviors when experiencing negative emotions. Based on this model, Gratz and Roemer (2004) developed the Difficulties in Emotion Regulation Scale (DERS), which is made up of the six dimensions of emotion regulation difficulties mentioned above. The DERS was intended to measure Gratz and Roemer's (2004) conceptualization of emotion dysregulation in its entirety; and thus, may be described as a global measure of emotion regulation difficulties. The focus of the DERS on emotion regulation difficulties in all of the domains of emotion regulation proposed by Gratz and Roemer (2004) is important because, as noted by Gratz and Roemer (2004), it is not uncommon for measures of emotion regulation to focus on specific emotion regulation strategies as they relate to maladaptive outcomes. However, this

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practice suggests that specific strategies are either adaptive or maladaptive independent of context, rather than suggesting that almost all strategies can be adaptive depending on their flexible use within a given context (e.g., Bonanno, Papa, Lalande, Westphal, & Coifman, 2004; Cheng, 2001). For this reason, Gratz and Roemer (2004) included items on the DERS that assess for the subjective appraisal of one's ability to effectively regulate emotions (as represented by the Limited Access to Emotion Regulation Strategies subscale); thus accounting for the context-dependent nature of adaptive emotion regulation strategy use.

A second conceptual model of emotion regulation which has received considerable attention in the extant literature is Gross's (1998) process model of emotion regulation. As defined by Gross, "emotion regulation refers to the process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (p. 275; emphasis in original). Gross's process model asserts that there are five points in the emotion generative process at which emotions can be regulated. These points, or stages, include situation selection, situation modification, attentional deployment, cognitive change, and response modulation (Gross & Thompson, 2007). These stages are further categorized as being either antecedent- (the first four stages) or response-focused (the final stage). Antecedent-focused strategies occur before emotion response tendencies are fully activated and response-focused strategies occur after response tendencies are already underway (i.e., behavior has already been altered by the emotional experience; Gross & Thompson, 2007).

Although several specific emotion regulation strategies have been examined in the extant literature, in the context of Gross's (1998) model, the cognitive change strategy of cognitive reappraisal and the response modulation strategy of expressive suppression have received an overwhelming amount of attention as they relate to maladaptive psychological outcomes (see Aldao et al., 2010). In fact, Gross and John (2003) developed the Emotion Regulation Questionnaire (ERQ) to allow for the assessment of these two specific emotion regulation strategies. Cognitive reappraisal occurs relatively early in the emotion generative processes and refers to efforts to change the interpretation of an emotion-eliciting event in order to alter its emotional impact. In contrast, expressive suppression occurs relatively late in the emotion generative process and refers to inhibiting emotion-expressive behavior (John & Gross, 2004). Although Gross and Thompson (2007) explicitly note that they make no assumptions about whether specific strategies are adaptive or maladaptive, cognitive reappraisal has typically been identified as an adaptive emotion regulation strategy and expressive suppression as a maladaptive emotion regulation strategy (see John & Gross, 2004).

There is conceptual and empirical evidence to suggest that Gratz and Roemer's (2004) DERS and Gross and John's (2003) ERQ assess distinct facets of emotion regulation. For example, Gratz and Roemer (2004) described the "DERS as a measure of difficulties in emotion regulation" (p. 52), with the DERS assessing such difficulties along the six dimensions outlined above. Gross and John (2003) described the ERQ as assessing emotion regulation strategies, noting that "both reappraisal and suppression are strategies that allow individuals to modify their emotions" (p. 352; emphasis added). These differing descriptions of the measures by the scale developers are notable, as Gratz and Roemer (2004) developed the DERS, in large part, to extend the assessment of emotion dysregulation beyond assessing for specific emotion regulation strategies. More precisely, and as noted above, Gratz and Roemer (2004) asserted that subjective appraisal of one's ability to effectively regulate emotions is particularly important when considering the role emotion dysregulation in psychopathology. Although Gratz and Roemer (2004) suggest that the six dimensions of emotion regulation difficulties assessed by the DERS may affect emotional responding and

experience, none of the six dimensions constitute strategies in and of themselves (e.g., DERS Strategies assesses one's perception of their ability to regulate their emotions, DERS-Clarity assesses one's ability to understand and identify their emotions).

Coupled with these conceptual differences across the two measures, the magnitude of intercorrelations among the scales of the DERS and ERQ further support the above noted position that the two measures assess distinct facets of emotion dysregulation. For example, Ehring and Quack (2010) found that the cognitive reappraisal (r s ranging from $-.25$ to $-.50$) and expressive suppression (r s ranging from $.28$ to $.46$) scales of the ERQ shared small to moderate correlations with the scales of the DERS. The conceptual and empirical distinctiveness of the DERS and ERQ strongly support the position that these two measures assess unique aspects of emotion dysregulation. Following from the descriptions used by the respective scale developers, we refer to the DERS as assessing the construct of *emotion regulation difficulties* and the ERQ as assessing the construct of *emotion regulation strategies* for the remainder of this manuscript.

As described, evidence to date suggests the transdiagnostic importance of emotion dysregulation, especially in relation to anxiety pathology (Cisler et al., 2010). Despite its potential transdiagnostic status, we know of only two studies to examine emotion dysregulation, as operationalized using one of the major conceptualizations of emotion dysregulation outlined above, in the context of health anxiety (Fergus & Valentiner, 2010; Gørgen, Hiller, & Witthöft, 2014). Health anxiety has been defined as "the wide range of worry that people can have about their health" (Asmundson & Taylor, 2005, p. 5). It has been suggested that health anxiety results from misinterpretations of body sensations (e.g., rapid heartbeat) and/or symptoms (e.g., sore throat) as a sign of a medical problem (Abramowitz & Braddock, 2008; Taylor & Asmundson, 2004). Taxometric studies support conceptualizing health anxiety as a dimensional construct, such that individuals differ quantitatively rather than qualitatively in their health anxiety (Ferguson, 2009; Longley et al., 2010). Given evidence in support of the dimensionality of health anxiety it is important for researchers to use the full range of available scores when assessing health anxiety. This methodological approach maximizes statistical power and minimizes information loss.

Both Fergus and Valentiner (2010) and Gørgen et al. (2014) asserted that emotion dysregulation is important to health anxiety. For example, Fergus and Valentiner (2010) noted that emotion dysregulation might lead individuals to incorrectly ascribe body sensations and/or symptoms as a medical condition when under stressful conditions as a result of an inability to identify and understand their emotional experience. Gørgen et al. (2014) similarly noted that emotion dysregulation may result in an inability to adequately terminate negative emotional states, thereby leading to elevated emotional arousal and ultimately health anxiety due to the misinterpretation of the meaning of their emotional arousal. In the context of Gross's (1998) conceptualization of emotion dysregulation, both groups of researchers found that expressive suppression was generally more relevant to health anxiety than was cognitive reappraisal.

Although these are promising findings linking emotion dysregulation to health anxiety, the studies completed by Fergus and Valentiner (2010) and Gørgen et al. (2014) both had a key limitation in that they only assessed for the use of specific emotion regulation strategies in the form of cognitive reappraisal and expressive suppression. As explained by Gratz and Roemer (2004), context and flexibility of use may be particularly important in determining the degree to which the use of specific emotion regulation strategies results in maladaptive psychological outcomes. For example, the suppression of emotion may be extremely adaptive when playing poker, but rigidly applied across contexts, may result in a number

of psychological problems, including health anxiety (Fergus & Valentiner, 2010; Gørgen et al., 2014). Although the use of specific emotion regulation strategies is important, it seems clear that the construct of emotion dysregulation, in its entirety, must account not only for specific strategies, but also for other processes which impact emotional responding (e.g., identification and understanding of emotions). Thus, the use of a more global measure of emotion regulation difficulties, such as the DERS, may offer advantages over more limited examinations of specific emotion regulation strategies (i.e., cognitive reappraisal, expressive suppression; ERQ) and shed further light on the emotion dysregulation–health anxiety association.

Following this rationale, and based on the general lack of research in this area, the present study had four primary aims. First, we sought to examine associations among specific emotion regulation strategies, a global measure of emotion regulation difficulties, as well as each of the dimensions of emotion regulation difficulties, and health anxiety. At the bivariate level, we expected expressive suppression, as well as a global measure of emotion regulation difficulties and each dimension of emotion regulation difficulties, to significantly positively correlate with health anxiety. We further expected that cognitive reappraisal would significantly negatively correlate with health anxiety. Second, we sought to examine the incremental contribution of a global measure of emotion regulation difficulties, beyond the two specific emotion regulation strategies, in predicting health anxiety. We predicted that a global measure of emotion regulation difficulties would provide significant unique variance in predicting health anxiety after accounting for cognitive reappraisal and expressive suppression. Third, exploratory analyses were used to examine the specific dimensions of emotion regulation difficulties that are particularly relevant to health anxiety. Finally, these predictions were based on conceptualizing health anxiety as a unidimensional construct; however, health anxiety appears best conceptualized as a multidimensional construct (e.g., Asmundson et al., 2008). As such, we completed additional exploratory analyses to examine relations among specific emotion regulation strategies, a global measure of emotion regulation difficulties and each dimension of emotion regulation difficulties, and two health anxiety dimensions identified by Asmundson et al. (2008; i.e., health worry and somatic symptoms/bodily preoccupation). Additionally, because evidence suggests that failing to account for the shared variance of negative affect in associations between health-related and psychological constructs may obscure relations between these variables of interest (Watson & Pennebaker, 1989), negative affect was controlled for in all multivariate analyses.

2. Method

2.1. Participants

The sample consisted of 482 physically healthy community adults recruited via the Internet. The sample was 57.7% female and had an average age of 33.4 years ($SD=11.2$). In regard to racial/ethnic identification, 79.7% of the sample self-identified as White, 7.1% as Black/African-American, 6.0% as Asian, 3.1% as Hispanic/Latino, 3.5% as multi-racial, and 0.6% as Native American.

2.2. Measures

2.2.1. Whitley Index (WI)

The WI (Pilowsky, 1967) is a 14-item measure that assesses health anxiety and Asmundson et al.'s (2008) revised 6-item version of the WI was used in the present study. Asmundson et al.'s

(2008) revised version addresses factorial instability of the original version of the WI (see Welch, Carleton, & Asmundson, 2009). Following the recommendations of Welch et al. (2009), items were rated using a 5-point scale (1 = *not at all* to 5 = *a great deal*) rather than using the traditional true/false rating system. Fergus (2013) found that Asmundson et al.'s (2008) 6-item WI evidenced adequate internal consistency ($\alpha=.90$) and strong convergent correlations with other measures of health anxiety (r s of .63 of .80). The 6-item WI consists of two, 3-item scales that assess health worry (e.g., “Do you worry a lot about your health?” – termed WI Health Worry in the present study) and somatic symptoms/bodily preoccupation (e.g., “Do you find that you are bothered by many different symptoms” – termed WI Somatic Preoccupation in the present study). In the present study, internal consistencies of the WI total scale ($\alpha=.91$), WI Health Worry ($\alpha=.84$), and WI Somatic Preoccupation ($\alpha=.90$) were adequate.

2.2.2. Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) is a 36-item self-report measure which assesses six dimensions of emotion regulation for which one could experience difficulties, including Nonacceptance of Emotional Responses (Nonacceptance), Difficulty Engaging in Goal-Directed Behavior (Goals), Impulse Control Difficulties (Impulse), Lack of Awareness of Emotions (Awareness), Limited Access to Strategies for Regulation (Strategies), and Lack of Emotional Clarity (Clarity). Items are rated on a 5-point scale based on how often participants believe each item pertains to them (1 = *almost never* to 5 = *almost always*). Each of the DERS dimensions has evidenced good internal consistency, as well as adequate predictive and construct validity (Gratz & Roemer, 2004). As per Gratz and Roemer (2004), the 36 DERS items were summed to create a total scale score (DERS-T) with higher scores indicating more emotion regulation difficulties.¹ In the present study, the DERS-T ($\alpha=.95$) and all of the DERS subscales evidenced adequate internal consistency (α values ranging from .83 to .92).

2.2.3. Emotion Regulation Questionnaire (ERQ)

The ERQ (Gross & John, 2003) is a 10-item self-report measure that assesses the tendency to use two specific emotion regulation strategies. Six items assess the tendency to use cognitive reappraisal (e.g., “When I want to feel more positive emotion, I change the way I’m thinking about the situation”) and four items assess the tendency to use expressive suppression (e.g., “I control my emotions by not expressing them”). Items are rated on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). The ERQ has shown adequate psychometric properties in prior research, including adequate average internal consistencies (reappraisal $\alpha=.79$ and suppression $\alpha=.73$), retest reliability over a 3-month time period (.69 for both scales), and evidence of convergent and discriminant validity for each scale (Gross & John, 2003). In the present study, internal consistency for both scales was adequate (reappraisal $\alpha=.90$, suppression $\alpha=.82$).

¹ A recent examination of the psychometric properties of the DERS found that the DERS-Awareness dimension (a) consistently shares only modest intercorrelations with the other DERS subscales, (b) demonstrates differential relations with criteria of interest, and (c) provides a markedly lower contribution to the general DERS factor relative to the other DERS dimensions (Bardeen, Fergus, & Orcutt, 2012). Thus, we also conducted regression analyses using the scoring method recommended by Bardeen et al. (2012) for calculating the DERS total scale score (i.e., removing items from the Awareness subscale from the total score). Results were unchanged; that is, statistically significant associations remained significant and nonsignificant findings were unchanged.

2.2.4. Positive and Negative Affect Schedule (PANAS)

The PANAS (Watson, Clark, & Tellegen, 1988) is a 20-item measure that assesses the dimensions of positive and negative affect. Participants are asked to indicate how they have felt in the previous seven day period by rating each item (e.g., interested, upset) on a 5-point scale (1 = not at all to 5 = extremely). PANAS-NA has demonstrated high internal consistencies ($\alpha = .84-.87$; Watson et al., 1988), convergent validity with measures of general distress and anxiety and depression (Watson et al., 1988; Henry & Crawford, 2005), and measurement invariance across demographic subgroups (i.e., age, gender; Crawford & Henry, 2004). In the present study, the 10-item negative affect scale of the PANAS (PANAS-NA) was used to examine the degree to which general distress accounts for the shared variance in associations between emotion dysregulation and health anxiety. Internal consistency for the PANAS-NA in the present sample was adequate ($\alpha = .93$).

2.3. Procedure

Participant recruitment took place using Amazon Mechanical Turk (MTurk), an online labor market where researchers can recruit general population adults to complete questionnaires in exchange for payment. A number of studies support the quality of data collected via MTurk (e.g., Behrend, Sharek, Meade, & Wiebe, 2011; Buhrmester, Kwang, & Gosling, 2011; Paolacci, Chandler, & Ipeirotis, 2010; Shapiro, Chandler, & Mueller, 2013). In addition, participation was restricted to MTurk workers with approval ratings above 95%, a method which has been shown to increase the likelihood that data is of high quality (Peer, Vosgerau, & Acquisti, 2014). Moreover, MTurk samples tend to be more demographically diverse than American undergraduate samples (Buhrmester et al., 2011). This study was approved by the local institutional review board. Recruitment was limited to MTurk users located within the United States and over the age of 18. All participants reported that they had not been diagnosed with a medical condition (physical, but not necessarily psychological disorders) by a doctor. This strategy was used to ensure physical health minimally contributed to observed levels of health anxiety. Informed consent and questionnaires were completed using a secure online survey program.

Participants could complete the study from any computer with internet access. Participants were paid \$1 upon study completion, an amount which is consistent with precedence for paying MTurk workers in similar questionnaire studies (Buhrmester et al., 2011).

2.4. Data analytic strategy

SPSS version 19 (SPSS IBM, New York) was used to perform statistical analyses. Bivariate correlations were calculated to examine the associations among emotion regulation and health anxiety variables. Next, three hierarchical regressions were conducted to test the hypotheses that global emotion regulation difficulties would provide significant incremental contribution, beyond specific emotion regulation strategies, in predicting each of the three health anxiety variables. Cognitive reappraisal, expressive suppression, and negative affect served as predictor variables in the first step of the models and global emotion regulation difficulties was entered into the second step of the model as a predictor variable. Each of the three health anxiety scales from the WI (i.e., total scale score, health worry, somatic preoccupation) served as an outcome variable in one of the models. For each model in which global emotion regulation difficulties provided significant unique variance in predicting the outcome variable, an exploratory follow-up regression was conducted to examine the dimension(s) of emotion regulation difficulties that are most relevant to each specific health anxiety variable. These regression models were identical to those described above, except that the global emotion regulation difficulties total score was replaced in the second step of the model with the six dimensions of emotion regulation difficulties.

3. Results

Descriptive statistics and bivariate correlations among the study variables are presented in Table 1. As shown, skew and kurtosis statistics were within a conventional range (–1 to 1; George & Mallery, 2003; Morgan, Griego, & Gloeckner, 2001) for all of the study variables. To examine the variability in observed health anxiety scores, we compared the observed group mean on the WI total to the mean score obtained by a reference sample (i.e., Fergus, 2013)

Table 1
Zero-order correlations, means, and standard deviations for study variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. WI Total	–												
2. WI Health Worry	.93***	–											
3. WI Somatic Preoccupation	.93***	.74***	–										
4. ERQ-Cognitive Reappraisal	–.21***	–.17***	–.22***	–									
5. ERQ-Emotion Suppression	.19***	.17***	.17***	.02	–								
6. DERS-Total	.46***	.44***	.43***	–.41***	.32***	–							
7. DERS-Nonacceptance	.37***	.33***	.35***	–.23***	.33***	.81***	–						
8. DERS-Goals	.39***	.40***	.33***	–.24***	.13***	.76***	.52***	–					
9. DERS-Impulse	.42***	.39***	.39***	–.35***	.09	.78***	.51***	.62***	–				
10. DERS-Strategies	.49***	.46***	.45***	–.37***	.23***	.88***	.68***	.71***	.69***	–			
11. DERS-Clarity	.27***	.25***	.25***	–.32***	.30***	.71***	.50***	.35***	.45***	.48***	–		
12. DERS-Awareness	.06	.04	.08	–.33***	.39***	.48***	.27***	.10	.20***	.18***	.59***	–	
13. PANAS-NA	.51***	.46***	.48***	–.26***	.18***	.61***	.49***	.48***	.51***	.61***	.43***	.13**	–
M	14.0	7.8	6.2	29.9	15.7	83.8	13.9	14.2	11.8	18.8	10.1	15.0	20.0
SD	5.8	3.1	3.2	6.9	5.5	25.6	6.4	5.3	5.2	8.1	3.9	5.1	8.8
Minimum	6	3	3	6	4	36	6	5	6	8	5	6	10
Maximum	30	15	15	42	28	158	30	25	30	40	25	30	48
Skew	.64	.37	.84	–.75	–.12	.32	.66	.22	1.00	.66	.81	.28	.89
Kurtosis	–.26	–.45	–.23	.58	–.64	–.41	–.51	–.86	.59	–.34	.27	–.34	.22

Note. N = 482. WI = Whitley Index; ERQ = Emotion Regulation Questionnaire; DERS = Difficulties in Emotion Regulation; PANAS-NA = Positive and Negative Affect Schedule – Negative Affect Scale.

* p < .05.
** p < .01.
*** p < .001.

Table 2
Primary regression analyses.

Predictor	Whitley-Index Total				Whitley-Index Health Worry				Whitley-Index Somatic Symptoms/Body Preoccupation			
	F(3,478)	ΔR ²	Step 1 β	Step 2 β	F(3,478)	ΔR ²	Step 1 β	Step 2 β	F(3,478)	ΔR ²	Step 1 β	Step 2 β
Step 1	60.10***	.27***			46.40***	.23***			53.60***	.25***		
ERQ-CR			-.09*	-.03			-.06	.00			-.11**	-.06
ERQ-ES			.10**	.05			.10*	.04			.10*	.06
PANAS-NA			.46***	.46***			.43***	.31***			.44***	.35***
Predictor	Whitley-Index Total				Whitley-Index Health Worry				Whitley-Index Somatic Symptoms/Body Preoccupation			
	F(1,478)	ΔR ²	Step 1 β	Step 2 β	F(1,478)	ΔR ²	Step 1 β	Step 2 β	F(1,478)	ΔR ²	Step 1 β	Step 2 β
Step 2	50.54***	.02**			40.41***	.03**			43.35***	.02**		
DERS-T				.22***				.23***				.17**

Note. N = 482. ERQ = Emotion Regulation Questionnaire (CR = Cognitive Reappraisal; ES = Emotion Suppression); DERS = Difficulties in Emotion Regulation (T = total scale score); PANAS-NA = Positive and Negative Affect Schedule – Negative Affect Scale.

* p < .05.
** p < .01.
*** p < .001.

Table 3
Exploratory regression analyses.

Predictor	Whitley-Index Total				Whitley-Index Health Worry				Whitley-Index Somatic Symptoms/Body Preoccupation			
	F(3,478)	ΔR ²	Step 1 β	Step 2 β	F(3,478)	ΔR ²	Step 1 β	Step 2 β	F(3,478)	ΔR ²	Step 1 β	Step 2 β
Step 1	60.10***	.27***			46.40***	.23***			53.60***	.25***		
ERQ-CR			-.09*	-.06			-.06	-.03			-.11**	-.08
ERQ-EA			.10**	.12**			.10*	.12*			.10*	.10*
PANAS-NA			.46***	.31***			.43***	.26***			.44***	.31***
Predictor	Whitley-Index Total				Whitley-Index Health Worry				Whitley-Index Somatic Symptoms/Body Preoccupation			
	F(9,478)	ΔR ²	Step 1 β	Step 2 β	F(9,478)	ΔR ²	Step 1 β	Step 2 β	F(9,478)	ΔR ²	Step 1 β	Step 2 β
Step 2	25.19***	.05***			21.07***	.06***			21.10***	.04***		
DERS-N				.01				-.03				.04
DERS-G				.04				.12*				-.03
DERS-I				.11*				.09				.12*
DERS-S				.16*				.15*				.15*
DERS-C				-.01				.02				-.04
DERS-A				-.09				-.11*				-.06

Note. N = 482. ERQ = Emotion Regulation Questionnaire (CR = Cognitive Reappraisal; ES = Emotion Suppression); DERS = Difficulties in Emotion Regulation (N = Nonacceptance, G = Goals, I = Impulse, S = Strategies, C = Clarity, A = Awareness); PANAS-NA = Positive and Negative Affect Schedule – Negative Affect Scale.

* p < .05.
** p < .01.
*** p < .001.

who completed the same measure.² Scores greater than 1.5 SD above the mean of the reference sample were used to illustrate the variability in observed health anxiety scores (following Carter & Wu, 2010). On the WI Total, a substantial percent of participants in the present sample (i.e., 14.73%) displayed scores greater than 1.5 SD above the mean of the reference sample (i.e., z-score > 1.5). As such, a sizable number of participants endorsed experiencing a relatively severe amount of health anxiety in the present study.

An examination of bivariate correlations showed that the three dimensions of health anxiety (WI Total, WI Health Worry, WI Somatic Preoccupation) were significantly positively associated with expressive suppression, global emotion regulation difficulties (DERS-T), and all but one of the six dimensions of emotion

² Descriptive data are available from larger samples that have completed the WI (e.g., Rief, Hessel, & Braehler, 2001). However, such samples completed the original dichotomous response option version of the measure. Fergus's (2013) sample is among the largest to complete Asmundson et al.'s (2008) revised version of the WI using Welch et al.'s (2009) recommended 5-point response option. As such, Fergus's (2013) sample was considered an appropriate reference group.

regulation difficulties (ps < .001; see Table 1). The Awareness dimension of the DERS was not significantly associated with any of the dimensions of health anxiety. As hypothesized, cognitive reappraisal was significantly negatively correlated with WI Total, WI Health Worry, and WI Somatic Preoccupation (ps < .001).

As seen in Table 2, and as hypothesized, global emotion regulation difficulties (DERS-T) provided a significant incremental contribution, beyond the specific emotion regulation strategies, in predicting WI Total, WI Health Worry, and WI Somatic Preoccupation (ps < .001, ΔR²s < .001). As such, three exploratory follow-up regressions were conducted to examine the incremental contribution of each of the six dimensions of emotion regulation difficulties assessed by the DERS. As seen in Table 3, addition of the six dimensions of emotion regulation difficulties in the second step of each model provided a significant incremental contribution, beyond the specific emotion regulation strategies, in predicting WI Total, WI Health Worry, and WI Somatic Preoccupation (ΔR²s < .001). DERS-Strategies was the only DERS dimension that was significantly positively associated with all three dimensions of health anxiety (ps < .05). However, DERS-Impulse was significantly

positively associated with both WI Total and WI Somatic Preoccupation ($ps < .01$), DERS-Goals was significantly positively associated with WI Health Worry ($p < .05$), and DERS-Awareness was significantly negatively associated with WI Health Worry ($p < .05$). None of the other dimensions of emotion regulation difficulties were significantly associated with WI Total, WI Health Worry, or WI Somatic Preoccupation.

Interestingly, a third variable (a suppressor) appeared to increase the strength of association between DERS-Awareness and WI Health Worry, as evidenced by a change from the non-significant positive bivariate association between these variables to a significant negative association in regression analysis. To identify the suppressor variable, a series of partial correlations was conducted in which each of the predictor variables from the second set of regression analyses was controlled for, one at a time, while examining the correlation between DERS-Awareness and WI Health Worry. DERS-Clarity was identified as the suppressor variable, as it was the only control variable which changed the correlation between DERS-Awareness and WI Health Worry from nonsignificant and positive to significant and negative ($r = -.14$, $p < .01$).

4. Discussion

In the present study, we sought to examine (a) associations among cognitive reappraisal, expressive suppression, emotion regulation difficulties, and health anxiety, (b) the incremental contribution of global emotion regulation difficulties, beyond the two specific emotion regulation strategies, in predicting health anxiety, and (c) the specific dimensions of emotion regulation difficulties that are particularly relevant to health anxiety. At the bivariate level, all but one of our hypotheses was confirmed. Expressive suppression, global emotion regulation difficulties, as well as five of six dimensions of emotion regulation difficulties, all positively correlated with health anxiety. Additionally, as hypothesized, cognitive reappraisal was negatively associated with health anxiety. The DERS-Awareness subscale was the only DERS subscale that was not significantly associated with health anxiety at the bivariate level. This finding may suggest that a lack of emotional awareness is not a prerequisite for the development of health anxiety. It may be that those with heightened health anxiety are just aware of, and attentive to, their emotions as are other individuals. However, this finding may also be the result of psychometric limitations of the DERS-Awareness subscale that have been consistently identified in the literature (see Bardeen et al., 2012). Thus, caution is warranted in interpreting the finding that lack of emotional awareness is not related to health anxiety.

Although Gratz and Roemer (2004) suggest that the six dimensions of emotion regulation difficulties assessed by the DERS may affect emotional responding and experience, none of the six dimensions constitute strategies in and of themselves. In contrast, the constructs assessed by ERQ are best viewed as specific emotion regulation strategies. Coupled with these conceptual differences across measures, the present results highlight a distinct pattern of associations among the DERS, ERQ, and health anxiety. As hypothesized, emotion regulation difficulties, as assessed by the DERS, shared unique variance with health anxiety after accounting for the two specific emotion regulation strategies of the ERQ and negative affect. After controlling for the DERS total scale score, the emotion regulation strategies of the ERQ were no longer significantly associated with health anxiety. These findings support the distinctiveness of the constructs assessed by the DERS and ERQ, while highlighting the particular usefulness of the DERS when interested in assessing for emotion dysregulation in relation to health anxiety.

The present pattern of associations may be best understood in the context of the theory underlying Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999), which suggests that specific strategies, in and of themselves, are neither adaptive nor maladaptive. Instead, the ability to flexibly use a variety of strategies based on the demands of the context is what is important in determining outcomes. For example, as described by Cisler et al. (2010), the use of suppression in the context of a distressing stimulus may be adaptive when used sparingly; however, the chronic and inflexible use of suppression in response to a distressing stimulus, would paradoxically increase focus on the avoided stimulus, thus increasing the likelihood of avoidance behaviors and the long-term outcome of fear maintenance. Flexibility of strategy use is particularly important to the findings of the present study because the ERQ (Gross & John, 2003) asks respondents to endorse their use of cognitive reappraisal and expressive suppression. Although cognitive reappraisal is often times described as adaptive and expressive suppression as maladaptive, as noted by Gross and John (2003), "reappraisal and suppression are two independent regulatory strategies that different individuals use to varying degrees" (p. 1312). Thus, one could report using both of these strategies to a high degree, or report using neither. Therefore, an individual who uses both of these strategies to a high degree, may use them in a contextually appropriate and adaptive manner, and may thus experience a sense of psychological well-being. This consideration may help explain the relatively small magnitude of the relations between cognitive reappraisal and expression suppression with health anxiety that were found in the present study, as well as in previous research (Fergus & Valentiner, 2010; G6rger et al., 2014).

In contrast, the magnitude of the relation between emotion regulation difficulties and health anxiety was medium to large in size and this relation was unaccounted for by cognitive reappraisal, expressive suppression, and negative affect. Thus, because the DERS was intended to measure Gratz and Roemer's (2004) conceptualization of emotion dysregulation in its entirety, across each of the identified domains of emotion regulation, the global emotion regulation difficulties total score appears to be indicative of emotion dysregulation more globally. As noted by Cisler et al. (2010), it is these more stable maladaptive patterns of emotion dysregulation that appear to be associated with maladaptive outcomes (in this case, health anxiety). This rationale is further supported by our exploratory follow-up analyses, which showed that DERS-Strategies was the only dimension of global emotion regulation difficulties uniquely associated with all three facets of health anxiety. Gratz and Roemer (2004) developed this scale of the DERS to account for one's subjective appraisal of his/her ability to effectively regulate emotions; thus accounting for the context-dependent nature of adaptive emotion regulation strategy use. Further, this result is consistent with theories of negative mood regulation expectancies which suggest that perceived ability to effectively regulate emotional distress may be more important in actually alleviating one's distress than the specific strategies that are used (Catanzaro & Greenwood, 1994). Thus, health anxious individuals may perceive themselves as lacking the ability to effectively regulate negative emotions, and as a result, may be less likely to tolerate such emotions in the service of goal pursuit.

In addition, DERS-Impulse was associated with health anxiety even after accounting for cognitive reappraisal, expressive suppression, and negative affect. Thus, individuals with higher levels of health anxiety appear to have greater difficulty remaining in control of their behavior when experiencing negative emotion. The tendency to act impulsively in response to negative emotions, described by some as "negative urgency" (Cyders et al., 2007), has been shown to be associated with a host of maladaptive behaviors

(see Cyders & Smith, 2008). These behaviors have been conceptualized as an attempt to reduce, or avoid, negative emotional experiences. Interestingly, among the dimensions of health anxiety examined in the present study, WI Somatic Preoccupation, but not WI Health Worry, shared significant unique variance with DERS-Impulse. Thus, among health anxious individuals, the emotional distress associated with focusing on bodily sensations as indicators of health problems appears to be indicative of behavioral dyscontrol. This dyscontrol may be manifested as excessive reassurance seeking, as empirical research has shown that both negative urgency (Anestis, Selby, & Joiner, 2007) and health anxiety-related body preoccupation (Longley, Watson, & Noyes, 2005) are related to excessive reassurance seeking. In future research, prospective study designs will be important in determining temporal relations among these constructs, particularly whether the tendency to act impulsively in response to negative emotions mediates the association between health anxiety-related body preoccupation and excessive reassurance seeking.

Whereas cognitive-behavioral models primarily focus on the role of behavioral avoidance (e.g., reassurance seeking behavior) as it relates to health anxiety, the present results highlight the potential importance of cognitive avoidance among health anxious individuals. More precisely, the health worry dimension of health anxiety was the only healthy anxiety variable uniquely associated with greater difficulty engaging in goal-directed behavior when experiencing negative emotion. According to Borkovec's model of generalized anxiety disorder (Borkovec, Alcaine, & Behar, 2004), worry serves as a form of cognitive avoidance of perceived future threats. By generating a variety of ways to prevent potentially catastrophic outcomes, the individual reduces contact with the feared stimuli, thus reducing anxiety in the short-term, but maintaining it in the long-term. This form of cognitive avoidance likely reduces the cognitive, and sometimes the physical, capacity to engage in goal-directed behavior.

Interestingly, the health worry dimension of health anxiety was also uniquely associated with a tendency to attend to and acknowledge emotions. However, as noted above, this association appears to be the result of a suppression effect; that is, addition of DERS-Clarity to the model changed the correlation between DERS-Awareness and WI Health Worry from nonsignificant and positive to significant and negative. This finding may suggest that the combination of higher emotional awareness with lower emotional clarity may be associated with higher levels of health worry. Thus, individuals with relatively higher health worry may be more attentive to their emotions, and also more likely to misinterpret their emotional experience. This possibility is consistent with evidence which suggests that inordinate attention to and analysis of emotions may actually reduce emotional understanding and potentiate emotion dysregulation (Bardeen, Stevens, Murdock, & Lovejoy, 2013). However, this interpretation would seem to be more plausible if it were in the context of WI Somatic Preoccupation rather than WI Health Worry because evidence indicates that individuals with higher health anxiety attend to and misinterpret bodily sensations to a greater degree than those with lower health anxiety (Olatunji, Deacon, Abramowitz, & Valentiner, 2007). Thus, it seems more plausible that the observed effects are the result of the psychometric limitations observed in the extant literature regarding the DERS-Awareness subscale (see Bardeen et al., 2012). As such, the observed suppression effect involving DERS-Awareness and WI Health Worry should be viewed cautiously until replicated.

Although the present results represent an important step in elucidating associations between emotion dysregulation and health anxiety, study limitations must be acknowledged. Although research suggests that health anxiety is a dimensional construct, thus supporting the use of unselected samples (Ferguson, 2009; Longley et al., 2010; but see also Asmundson, Taylor, Carleton,

Weeks, & Hadjistavropoulos, 2012), it is important in future research to ensure the present results generalize to carefully diagnosed patients with health anxiety (e.g., patients with illness anxiety disorder). However, it bears repeating that a sizable number of participants endorsed experiencing relatively severe health anxiety in the present study. In addition, given the acceptable skew/kurtosis values of health anxiety scores, the dimensional nature of health anxiety, and the likewise dimensional analyses of health anxiety, we believe that the present results meaningfully contribute to the health anxiety literature. Additionally, our cross-sectional study design precludes conclusions regarding temporal relations between emotion dysregulation and health anxiety. Thus, it will be important to extend the present results using a longitudinal study design. This research will be important for determining whether emotion regulation difficulties are a risk factor for, or consequence of, health anxiety. An additional limitation of the present research was our sole use of self-report measures, which might have inflated observed associations. However, one advantage of the present methodology was that it allowed us to simultaneously address relations between health anxiety and several emotion dysregulation variables, which we deem to be an important examination given the current state of the literature. Whereas we assessed health anxiety with a self-report measure commonly used in the extant literature, other self-report measures of health anxiety exist. Some of these measures allow for an assessment of other dimensions of health anxiety not assessed for by the WI (e.g., Longley et al., 2005). Extending our understanding of emotion dysregulation to other dimensions of health anxiety may be important. Finally, we acknowledge that the quality of data obtained via remote collection efforts remains an issue yet to be fully vetted in the psychopathology literature. Nonetheless, we did employ known methods shown to increase the quality of remotely collected data (e.g., using only high reputation MTurk workers; Peer et al., 2014).

To our knowledge, the present study is the first to examine emotion regulation difficulties in the context of health anxiety. Results indicate that global emotion regulation difficulties, and particularly one's subjective appraisal of his/her ability to effectively regulate emotions, may be of importance to health anxiety. These findings are consistent with a wealth of research suggesting that emotion dysregulation is a construct with transdiagnostic importance. Currently, emotion dysregulation is not a primary target of intervention within standard cognitive-behavioral treatments of health anxiety (Abramowitz & Braddock, 2008; Taylor & Asmundson, 2004). Importantly, perceived access to effective emotion regulation abilities can be targeted through clinical intervention (Berking et al., 2008), and thus, based on the present results, may be useful for treating health anxiety. Moreover, treatments which broadly target emotion dysregulation have already received a great deal of empirical support in the treatment of anxiety pathology (e.g., ACT; Hayes et al., 1999) and preliminary data support the use of such treatments in reducing health anxiety (Eilenberg, Kronstrand, Fink, & Frostholm, 2013). Empirical research which continues to evidence robust associations between specific dimensions of emotion regulation difficulties and health anxiety will be important in speaking to the relative merits of targeting specific dimensions of emotion dysregulation within health anxiety interventions. In addition, findings suggest that the DERS may have clinical utility in the assessment of health anxiety.

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