

SHORT TITLE: Emotional reactivity, intensity, and perseverance

Emotional reactivity, intensity, and perseverance: Independent dimensions of trait affect and associations with depression, anxiety, and stress symptoms

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Abstract

Background: Individual differences in emotional reactivity and perseveration have recently been demonstrated to account for independent variance in trait positive and negative affect. We extend this research and investigate: 1) if individual differences in the tendency to experience intense emotions (emotional intensity) represent an additional dimension of trait positive and negative affect, and 2) if emotional reactivity, intensity, and perseveration are differentially associated with psychological distress and symptoms of depression, anxiety, and stress. **Method:** Undergraduate students ($n = 472$) completed the Positive and Negative Affect Schedule (PANAS), the Emotional Reactivity Intensity and Perseveration Scale (ERIPS, adapted from the PANAS), the Kessler Psychological Distress Scale (K10), and the Depression Anxiety and Stress scales (DASS). **Results:** Psychometric analyses confirmed the hypothesised structure of the ERIPS, with all subscales demonstrating excellent internal consistency. Correlations with the K10 established criterion validity. Emotional reactivity, intensity and perseveration accounted for unique variance in trait positive and negative affect scores and were differentially associated with depression, anxiety and stress scores. **Conclusion:** Findings provide a preliminary validation of the ERIPS and suggest emotional reactivity, intensity, and perseveration represent independent dimensions of trait affect. Future research investigating these dimensions could enhance understanding of normal emotional responding and emotional vulnerability.

1. Introduction

Watson and Tellegen (1985) organised affective experiences around the dimensions of positive and negative affect. Positive affect (PA) is characterised as pleasurable engagement with one's environment, and feelings such as enthusiasm, whereas negative affect (NA) refers to unpleasant engagement, subjective distress, withdrawal, and adverse feelings, such as irritability (Watson & Clark, 1984). Individual differences in trait positive and negative affect (the stable predisposition to experience positive and negative emotions; Watson & Clarke, 1984; Watson & Tellegen, 1985) have received considerable empirical and theoretical attention due to their links with mood and anxiety disorders (Watson, Gamez, & Simms, 2005). Trait PA is positively associated with physical and subjective wellbeing, and inversely related to mental illness (Beck, et al., 2003; Cohen & Pressman, 2006). In contrast, trait NA is predictive of stress, depression, anxiety, and inversely related to mental health and wellness (Beck, et al., 2003; Crawford & Henry, 2004; Lonigan, Phillips, & Hooe, 2003; Watson, Clarke, & Carey 1988).

Trait affect is typically assessed using self-report instruments. Of these, the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) is the gold standard and most frequently used. The PANAS measures the extent to which individuals *generally* feel positive and negative emotions. Theoretically, individual differences in a number of different types of dispositional emotional responding could underlie variation in trait affect scores. Recent research has supported two types of emotional responding as underlying individual differences in trait PA and NA: Emotional reactivity (a disposition that reflects increased probability of experiencing positive or negative affect in response to situations or stimuli) and emotional perseveration (a disposition to experience prolonged emotional reactions once elicited; Boyes, Carmody, Clarke, and Hasking, 2017).

Reactivity and perseveration have also been dissociated in trait anxiety, a construct closely related to NA (Bados, Gómez-Benito, & Balaguer, 2010). Specifically, anxiety reactivity and anxiety perseveration independently account for variance in trait anxiety scores (Rudaizky, Page, & MacLeod, 2012; Rudaizky & MacLeod, 2013) and predict state anxiety in the context of a stressor (Rudaizky & MacLeod, 2014). More recently, Boyes and colleagues (2017) developed the Emotional Reactivity and

Perseveration Scale (ERPS, adapted from the PANAS) to measure individual differences in emotional reactivity and perseveration. Reactivity and perseveration accounted for unique variance in trait affect scores and were differentially associated with symptoms of depression, anxiety, and stress.

Perseveration of negative affect was associated with symptoms of depression, but not anxiety. In contrast, negative emotional reactivity predicted symptoms of anxiety, but not depression.

Additionally, positive reactivity was associated with lower depression, anxiety, and stress scores, whereas, perseveration of positive affect had no association with any mental health variables.

Relatedly, Larsen and colleagues (Diener, Larsen, Levine, & Emmons, 1985; Larsen, 1984; Larsen & Diener, 1987) also established that the intensity or magnitude of an emotional experience is a salient characteristic of emotional responding, that there are stable individual differences in affect intensity, and that higher levels of affect intensity are associated with psychological distress. Specifically, individuals who experience more intense negative emotions tend to experience greater psychological distress (Bornovalova, Matusiewicz, & Rojas, 2011) and anxiety (Brumariu & Kerns, 2013). Although affect intensity has received significant attention, problems with its measurement remain. For example, the Affect Intensity Measure (AIM; Larsen, 1984) asks respondents how frequently they experience differing levels of emotional intensity, thereby conflating the frequency (i.e. emotional reactivity) and intensity of emotional responses (Bachorowski & Braaten, 1994). Similarly, items on the Emotional Reactivity Scale (ERS; Nock, Wedig, Holmberg, & Hooley, 2008) conflate the frequency, perseveration, and intensity of emotional responses. Finally, existing measures of affect intensity do not always distinguish between positive and negative emotional responses (e.g. “I experience emotions very strongly”).

This study extended the ERPS to additionally measure individual differences in emotional intensity, thereby providing a single measure of three types of emotional responding (reactivity, intensity, and perseveration), which map directly onto trait PA and NA as measured by the PANAS. We aimed to establish the basic psychometric properties (structure, internal consistency, and criterion validity) of the Emotional Reactivity Intensity and Perseveration Scale (ERIPS) and determine whether the proposed reactivity, intensity, and perseveration dimensions are independently associated

with trait PA and NA. Finally, we explored whether the ERIPS subscales were differentially associated with psychological distress and symptoms of depression, anxiety, and stress.

2. Method

2.1. Participants

Undergraduate psychology students ($n = 472$) ranging from 17-64 years old ($M = 22.27$, $SD = 6.44$, 74% Female) participated in the study. Of the sample, 115 (24.4%) reported a prior diagnosis of mental illness, most commonly a depressive ($n = 29$) or anxiety ($n = 16$) disorder, or a combination of depression and anxiety ($n = 38$). This is comparable to the prevalence of mental disorders amongst Australians aged 16 to 24 (Australian Institute of Health and Welfare, 2011).

2.2. Materials

2.2.1. Positive and negative affect. Trait affect was measured using the dispositional version of the PANAS. The PANAS contains two 10-item subscales, assessing PA (e.g. proud, excited) and NA (e.g. upset, nervous). Using a 5-point Likert scale (1: *very slightly or not at all*; 5: *extremely*), respondents rate the extent to which they 'generally' feel each emotion. The PANAS has demonstrated excellent psychometric properties (Crawford & Henry, 2004), including high internal consistency (PA = .88; NA = .87; Watson et al., 1988). Cronbach's alphas in the current sample were $\alpha = .88$ for PA and $\alpha = .89$ for NA.

2.2.2. Emotional reactivity, intensity, and perseveration. The proposed reactivity, intensity, and perseveration dimensions of emotion were measured using the ERIPS (totalling 60 items, Appendix A). The ERIPS uses the original 20 adjectives of the PANAS; however, the instructions and response options have been adapted to reflect reactivity, intensity, and perseveration. To assess reactivity, participants were asked, "When exposed to a situation that would make the 'average' person experience this feeling, how likely is it that *you* will experience this particular feeling?" (1: *not at all likely*; 5: *extremely likely*). To assess intensity, participants were asked, "When you are

experiencing a situation that does make you feel this way, how intense is the feeling compared to how other people feel?" (1: *not at all intense*; 5: *extremely intense*). To assess perseverance, participants were asked, "When you are experiencing a situation that does make you feel this way, how long is this feeling likely to persist?" (1: *not at all persistent*; 5: *extremely persistent*). Relevant items were summated to generate separate indices of positive reactivity, intensity, and perseverance, and negative reactivity, intensity, and perseverance.

2.2.3. Psychological distress. General psychological distress was measured using the 10-item Kessler Psychological Distress Scale (K10; Kessler et al., 2002). Using a 5-point scale (1: *none of the time*; 5: *all of the time*), participants indicated how frequently they experienced symptoms of psychological distress over the past four weeks. The K10 has evidenced high internal consistency ($\alpha = .92$; Kessler et al., 2002) and good construct reliability and validity as a screening tool for mental illnesses (Kessler et al., 2003). Internal consistency was excellent in the current sample ($\alpha = .91$). Symptoms of depression, anxiety, and stress were assessed using the 21-item Depression Anxiety and Stress Scales (DASS; Lovibond & Lovibond, 1995). Using a 4-point scale (0: *never*; 3: *almost always*) participants rated the presence of symptoms over the past week. The DASS subscales have shown good internal consistency and construct validity (Henry & Crawford, 2005). Cronbach's alphas in the current study were .90, .84, and .86 for depression, anxiety, and stress respectively.

2.3. Procedure

Following ethical approval, the study was advertised on an online booking system for undergraduate psychology students wanting to participate in research for course credit. After providing informed consent, participants were invited to complete the online survey in their own time. Participants first completed the PANAS, followed by the ERIPS, K10 and DASS. Details of relevant counselling resources were provided at the beginning and end of the survey for reference if its completion highlighted any emotional issues for participants.

2.4. Statistical Analysis

Statistical assumptions for each analysis were considered prior to analyses; all assumptions were met. Data were analysed in five stages. First, correlations between possible confounders (age, gender, and a history of mental illness) and the variables of interest were tested. Second, we assessed the factor structure and internal consistencies of the ERIPS subscales. Confirmatory factor analyses were conducted to test the hypothesised six-factor structure of the ERIPS, as well as an alternative higher order model in which the positive/negative reactivity, intensity, and perseveration factors loaded onto general PA and NA factors. Internal consistencies were assessed with Cronbach's alpha. Third, the criterion validity of the ERIPS was assessed by examining correlations between ERIPS subscales and general psychological distress. Fourth, two multiple linear regressions were conducted to determine whether ERIPS subscales accounted for unique variance in trait PA and NA scores. Finally, four multiple linear regressions were conducted to examine relationships between ERIPS subscales and general psychological distress, depression, anxiety, and stress scores.

3. Results

Fifty-one (0.1%) individual data points were missing across the dataset. Given the extremely low rates of missing data, expectation maximisation was used to impute missing values on all scales (Schafer, 1999). Relationships between all variables of interest and potential confounding variables of age, gender and a history of prior mental illness diagnoses were assessed. Age was negatively correlated with all measures of negative affect, general psychological distress, as well as depression, anxiety, and stress scores (Table 1). Females reported significantly higher NA [$t(467) = 3.163, p = .002$], negative reactivity [$t(467) = 3.512, p < .001$], negative perseveration [$t(467) = 3.277, p = .001$], and stress [$t(467) = 2.704, p = .007$] scores than males. Participants who reported a history of mental illness reported significantly higher NA [$t(472) = 4.06, p = < .003$], negative intensity [$t(472) = 4.26, p = .037$], depression [$t(472) = 3.70, p = .008$], anxiety [$t(472) = 5.28, p = .001$], and stress [$t(472) = 6.22, p = .011$] scores than participants who reported no history of mental illness. Age, gender, and a history of mental illness were statistically controlled in all regression analyses.

Table 1. Descriptive statistics for the variables of interest (correlations, means, and standard deviations).

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	-												
2. Positive Reactivity	.07	-											
3. Positive Intensity	-.05	.60***	-										
4. Positive Perseveration	.05	.72***	.66***	-									
5. Negative Reactivity	-.13**	.11*	.01	-.02	-								
6. Negative Intensity	-.23***	-.03	.33***	.04	.66***	-							
7. Negative Perseveration	-.22***	-.00	.10*	.09	.75***	.75***	-						
8. PA	.08	.65***	.51***	.65***	-.22***	-.21***	-.20***	-					
9. NA	-.22***	-.16***	-.03	-.14**	.59***	.60***	.64***	-.19***	-				
10. Psychological Distress	-.17***	-.18***	-.09	-.19***	.49***	.51***	.53***	-.36***	.69***	-			
11. Depression	-.15**	-.25***	-.12**	-.25***	.39***	.44***	.44**	-.39***	.61***	.81***	-		
12. Anxiety	-.16***	-.07	-.03	-.05	.41***	.40***	.46***	-.18***	.62***	.70***	.63***	-	
13. Stress	-.11*	-.10*	-.06	-.12**	.47***	.44***	.50***	-.23***	.62***	.72***	.68***	.75***	-
<i>M</i>	22.27	32.65	30.23	29.90	28.96	27.49	28.49	32.31	23.89	23.43	12.79	11.95	14.43
<i>SD</i>	6.44	6.65	7.53	6.74	8.53	8.65	8.36	6.32	7.45	7.94	4.48	4.06	4.44

Note: * $p < .05$ ** $p < .01$ *** $p < .001$.

3.1. Confirmation of the structure and internal consistencies of the ERIPS

The proposed six-factor structure of the ERIPS was tested through confirmatory factor analyses, using the WLSMV estimator in Mplus. Items measuring positive reactivity, intensity, and perseverance were constrained to load onto latent Positive Reactivity, Positive Intensity, and Positive Perseveration factors respectively. Items measuring negative reactivity, intensity, and perseverance items were constrained to load onto latent Negative Reactivity, Negative Intensity, and Negative Perseveration factors respectively. The six factors were hypothesised to be correlated. Correlated error terms were only permitted for the same emotion across the reactivity, intensity, and perseverance factors.

As, chi-square (χ^2) is sensitive to sample size, relative chi-squared is reported (χ^2/DF). Additionally, the comparative fit index (CFI), Tucker Lewis index (TLI) and the root mean squared error of approximation (RMSEA) are reported. A relative chi-square of less than 3 indicates good model fit. RMSEA values of 0.05 or less indicate a good model fit. Values of 0.95 or larger for CFI and TLI indicate good fit (Marsh, Hau, & Wen, 2004).

A test of the full model revealed non-significant correlations between negative reactivity and positive intensity, negative reactivity and positive perseverance, negative intensity and positive reactivity, negative intensity and positive perseverance, negative perseverance and positive reactivity, and negative perseverance and positive intensity. After removing these non-significant correlations, the six factor model demonstrated good fit: $\chi^2(1640) = 2642.40$, $p < .001$, $\chi^2/DF = 1.61$; CFI = .967; TLI = .965; RMSEA = .036. An alternative hierarchical model was also analysed. In this model, Positive Reactivity, Positive Intensity, and Positive Perseveration were subsumed under a broader PA factor, and Negative Reactivity, Negative Intensity, and Negative Perseveration were subsumed under a broader NA factor. Whilst this higher order model demonstrated adequate fit [$\chi^2(1643) = 3990.15$, $p < .001$, $\chi^2/DF = 2.43$; CFI = .922; TLI = .916; RMSEA = .055], the hypothesised six-factor model was a significantly better fit to the data than the higher order model [$\chi^2(3) = 153.61$, $p < .001$].

Correlations between ERIPS subscales ranged between $r = .11$ (positive reactivity and negative reactivity) and $r = .75$ (negative reactivity and negative perseverance). All ERIPS subscales demonstrated excellent internal consistency ($\alpha = .89$ to $\alpha = .92$). Factor loadings and internal

consistencies are summarised in Table 2. In terms of criterion validity, negative reactivity, negative intensity, and perseveration of negative affect demonstrated significant positive correlations with K10 scores. Positive reactivity and perseveration of positive affect demonstrated significant negative correlations with K10 scores. There was no relationship between the K10 and positive intensity (Table 1).

Table 2. Standardized factor loadings and internal consistencies of ERIPS subscales.

Positive Item	Loadings			Negative Item	Loadings		
	Positive Reactivity	Positive Intensity	Positive Perseveration		Negative Reactivity	Negative Intensity	Negative Perseveration
<i>Reactivity</i>				<i>Reactivity</i>			
Interested	.67			Distressed	.82		
Excited	.74			Upset	.77		
Strong	.68			Guilty	.80		
Enthusiastic	.82			Scared	.84		
Proud	.65			Hostile	.57		
Alert	.66			Irritable	.67		
Inspired	.76			Ashamed	.80		
Determined	.84			Nervous	.82		
Attentive	.75			Jittery	.75		
Active	.68			Afraid	.87		
<i>Intensity</i>				<i>Intensity</i>			
Interested		.68		Distressed		.76	
Excited		.78		Upset		.80	
Strong		.69		Guilty		.79	
Enthusiastic		.78		Scared		.87	
Proud		.72		Hostile		.52	
Alert		.75		Irritable		.63	
Inspired		.76		Ashamed		.80	
Determined		.82		Nervous		.82	
Attentive		.86		Jittery		.74	
Active		.71		Afraid		.89	
<i>Perseveration</i>				<i>Perseveration</i>			
Interested			.71	Distressed			.77
Excited			.74	Upset			.80

Strong			.69	Guilty			.80
Enthusiastic			.81	Scared			.86
Proud			.69	Hostile			.54
Alert			.72	Irritable			.65
Inspired			.76	Ashamed			.81
Determined			.77	Nervous			.79
Attentive			.82	Jittery			.72
Active			.68	Afraid			.86
Internal							
Consistency	.89	.91	.90		.92	.91	.91

3.2. Associations between emotional reactivity, intensity, and perseverance and trait affect

Two multiple linear regressions (controlling for age, gender, and history of mental health problems) were conducted to determine if emotional reactivity, intensity, and perseverance were independently associated with PA and NA (Table 3). Positive reactivity (4%), positive intensity (0.5%), and positive perseverance (3.5%), as well as negative reactivity (0.8%) and negative intensity (0.5%) explained a small, but unique proportion of variance in trait PA scores (Table 3). Negative perseverance was not independently associated with PA scores. The full model accounted for 57% of the variance in PA scores [$R^2 = .57$, $F(9, 456) = 63.39$, $p < .001$]. Negative reactivity (1.4%), negative intensity (1.4%), and negative perseverance (2.1%), as well as positive reactivity (0.6%) explained a small, but unique proportion of variance in trait NA scores. Positive intensity and perseverance were not associated with NA scores. The full model accounted for 51% of the variance in NA scores [$R^2 = .51$, $F(9, 456) = 52.22$, $p < .001$].

Table 3. Associations between ERIPS subscales and trait positive and negative affect

Predictor	Positive Affect		Negative Affect	
	<i>B</i>	β	<i>B</i>	β
Age	-0.03	-.03	-0.08	-.07
Gender	0.64	.04	1.15	.07*
Prior Mental Illness	-0.95	-.06*	-0.18	-.01
Positive Reactivity	0.34	.35***	-0.15	-.13*
Positive Intensity	0.12	.14*	-0.15	-.15
Positive Perseveration	0.30	.32***	-0.06	-.05
Negative Reactivity	-0.12	-.16**	0.19	.22***
Negative Intensity	-0.10	-.14*	0.20	.24***
Negative Perseveration	-0.03	-.04	0.25	.28***

Note: * $p < .05$ ** $p < .01$ *** $p < .001$.

3.3. Associations between emotional reactivity, intensity and perseverance, and symptoms of depression, anxiety, stress, and general psychological distress.

Multiple linear regression analyses were conducted to assess associations between emotional reactivity, intensity, and perseverance and general psychological distress, as well as depression, anxiety, and stress. The overall models accounted for 38% of the variance in general psychological distress [$R^2 = .38$, $F(9, 456) = 30.96$, $p < .001$], 31% of the variance in depression [$R^2 = .31$, $F(9, 456) = 23.21$, $p < .001$], 26% of the variance in anxiety [$R^2 = .26$, $F(9, 456) = 17.42$, $p < .001$], and 32% of the variance in stress [$R^2 = .32$, $F(9, 456) = 23.75$, $p < .001$] scores (Table 4). Perseveration of positive affect was negatively associated with general psychological distress scores and depression. Positive emotional reactivity and intensity were not associated with any mental health scores. Perseveration of negative affect was associated with higher psychological distress, depression, anxiety, and stress scores. Negative emotional intensity was associated with higher psychological distress and depression scores, and negative emotional reactivity was associated with higher stress scores.

Table 4. Associations between ERIPS subscales and depression, anxiety, stress and general psychological distress scores

Predictor	Distress		Depression		Anxiety		Stress	
	<i>B</i>	β	<i>B</i>	β	<i>B</i>	β	<i>B</i>	β
Constant	18.98		12.31		10.37		12.11	
Age	-0.05	-.04	-0.02	-.03	-0.05	-.08	-0.02	-.03
Gender	0.31	.02	-0.43	-.04	0.05	.01	0.37	.04
Prior Mental Illness	-1.28	-.07	-0.38	-.04	-1.24	-.13**	-1.43	-.14**
Positive Reactivity	-0.04	-.04	-0.05	-.07	-0.02	-.04	-0.01	-.01
Positive Intensity	-0.08	-.07	-0.04	-.07	-0.04	-.07	-0.04	-.06
Positive Perseveration	-0.16	-.14*	-0.11	-.17*	0.01	.02	-0.06	-.09
Negative Reactivity	0.11	.12	0.03	.05	0.06	.12	0.08	.16*
Negative Intensity	0.25	.27***	0.14	.27**	0.06	.13	0.07	.13
Negative Perseveration	0.21	.22**	0.12	.22**	0.11	.23**	0.13	.25**

Note: * $p < .05$ ** $p < .01$ *** $p < .001$.

4. Discussion

This research extends previous work by Boyes et al. (2017) and establishes the basic psychometric properties of a measure of emotional reactivity, intensity, and perseverance that is adapted from the gold standard measure of trait affectivity. The predicted six factor structure of the scale was confirmed and all subscales demonstrated excellent internal consistency. Hypothesised correlations with a measure of general psychological distress established criterion validity. Additionally, individual differences in emotional reactivity, intensity, and perseverance accounted for unique variance in trait PA and NA scores, suggesting that these aspects of emotional experience may represent independent dimensions of trait affect. Finally, emotional reactivity, intensity, and perseverance were differentially associated with general psychological distress, as well as depression, anxiety and stress scores. This suggests that measuring these dimensions of emotional experience may further enhance our ability to detect important individual differences associated with different symptoms of psychological distress. Taken together, the findings indicate that emotional reactivity, intensity, and perseverance may contribute to a more complete conceptualisation of trait affect and its associations with psychological distress.

Although the ERIPS subscales only explained only a small proportion of unique variance in trait NA/PA, the reactivity, intensity, and perseverance dimensions did hold utility in predicting general psychological distress, as well as symptoms of depression, anxiety, and stress. However, given the non-clinical nature of this sample, potential associations between the three dimensions and clinical psychopathology remain unclear and should be investigated in future research. Individual differences in emotional reactivity, intensity, and perseverance in clinical samples may contribute to our understanding of the development and maintenance of affective disorders. Many forms of psychopathology reflect disturbances in emotional processing and responding and exploring the consequences of differences in emotional reactivity, intensity and perseverance could have substantial clinical implications. For example, Rudaizky et al. (2012) and Rudaizky and MacLeod (2013) argue that the separate consideration of anxiety reactivity and anxiety perseverance may relate to the likelihood of developing specific anxiety disorders. Specifically, they speculate that reactivity may be

more strongly associated with anxiety disorders which are characterised by an acute onset of symptoms, (e.g. panic disorder; Fava & Morton, 2009), whereas perseverance may be more strongly associated with anxiety disorders which feature prolonged symptomology (e.g. generalised anxiety disorder; Andrews et al., 2010). Related to this, it would be interesting to also examine whether different profiles of emotional reactivity, intensity, and perseverance across NA and PA could be associated with, and conceivably predict, different patterns of depressive disorders. For example, it is well recognised that a significant proportion of individuals who experience an episode of major depression subsequently develop bipolar disorder (Hirschfeld, 2001). Among the factors known to distinguish individuals at risk of future bipolar disorder is the presence of general emotional ‘lability’ (Akiskal, et al., 1995). It would be interesting therefore for future research to examine if, for example, individuals who later develop bipolar show greater NA and PA reactivity and intensity, as compared to those more specifically at risk of unipolar depression, which may instead be characterised by greater perseverance of NA in particular.

Individual differences in emotional reactivity, intensity and perseverance could also usefully inform existing models of emotion and emotion regulatory processes. One potential construct of interest is rumination, the tendency to experience repetitive intrusive thoughts about one’s negative emotional experience (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). The Emotional Cascade Model proposes that rumination fundamentally contributes to emotional dysregulation, which is conceptualised as heightened sensitivity to emotional stimuli, intense emotion, and extended duration of emotions (Selby, Anestis, & Joiner, 2008). For instance, those who tend to engage in rumination whilst upset experience magnified (i.e. more intense) and more persistent emotional responses (Thomsen, 2006). Relatedly, understanding of antecedent- and response-focused emotion regulation strategies, as proposed by Gross (1998), may also be informed by considering associations with emotional reactivity, intensity, and perseverance. Specifically, antecedent-focused emotion regulation strategies that influence the onset of an emotional experience may be associated with individual differences in emotional reactivity (Gross & John, 2003). Conversely, response-focused emotion regulation strategies, that influence the strength and length of emotional responses, may relate to individual differences in both emotional intensity and perseverance (Gross & John, 2003).

Another avenue for future research could be to investigate emotional reactivity, intensity, and perseverance as they relate to specific aspects of information processing biases, which have been recognised as underlying emotional vulnerability. For instance, research shows that biased patterns of attentional selectivity can favour the processing of either negative or positive information, and are associated with trait affect (Grafton, Ang, & Macleod, 2012; Macleod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). It is possible that this attentional bias may contribute to variance in emotional reactivity, by influencing the selective attentional processing of environmental stimuli which precedes an emotional reaction. It is also recognised that over-arching patterns of biased attention may be characterised by either or both biased attentional engagement with and/or disengagement from emotionally-valenced stimuli (Clarke, MacLeod, & Guastella, 2013; Koster, Crombez, Verschuere, & Houwer, 2006). It is possible that the three dimensions of emotionality described in the current study may covary with component processes operating in biased cognition. For example, it is plausible that biases in attentional engagement may contribute to increased levels of emotional reactivity, and that biases in attentional disengagement may contribute to increased levels of both emotional intensity and perseverance. Future research could evaluate such hypotheses.

Given the significant associations which were found between gender, age, and several ERIPS scales, it would be of interest to evaluate the measurement invariance of ERIPS across age and gender. Additionally, the ERIPS should be cross-validated against other measures of emotional reactivity and intensity. However, due to the limitations of existing measures noted previously, consideration needs to be given to which measures are used and how correlations (or a lack of these) should be interpreted. Finally, as the ERIPS is a self-report measure, it is limited by a respondent's subjective awareness of their emotional experiences. For example, it might be difficult for an individual who unconsciously represses or avoids emotions to accurately compare their emotional experiences to someone else's (Davis & Schwartz, 1987). To address this, future research could examine individual differences in reactivity, intensity, and perseverance of responses to emotional stimuli in controlled laboratory settings. Specifically, can dispositional ERIPS scores predict the strength of an initial emotional response (self-reported and psychophysiological) to an emotional

stimulus and the persistence of the response following the removal of the stimulus? Such research would further validate these dimensions of emotional experience.

In conclusion, this research extends previous work by incorporating a measure of emotional intensity into an existing measure of emotional reactivity and perseverance. It establishes the basic psychometric properties of the new scale, and demonstrates that reactivity, intensity, and perseverance account for independent variance in trait affect and are differentially associated with general psychological distress and symptoms of depression, anxiety, and stress. ERIPS conceptually distinguishes between, and independently assesses, dimensions of emotional reactivity, intensity, and perseverance in the context of both positive and negative emotion. Additionally, by adapting the PANAS, the ERIPS maps directly onto the gold standard measure of affect. Given this, the ERIPS may be a potentially useful tool for future research examining individual differences in emotional responding, emotion regulation, and dysregulation.

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Appendix: The emotional reactivity, intensity and perseverance scale (ERIPS)

You have just completed a questionnaire in which you indicated how often you tend to have certain feelings or emotional experiences. However, individuals differ in the likelihood of experiencing specific feelings and the degree to which these feelings persist across time. In the following questionnaire you will be shown a list of feelings similar to those in the previous questionnaire but you are asked to make the following two different judgements concerning your tendency to experience such feelings [*This paragraph is included if the ERIPS is being used in conjunction with the PANAS*].

Emotional Reactivity

When exposed to a situation that would make the “average” person experience this feeling, how likely is it that *you* will experience this particular feeling? Please rate this using the five options provided.

Not at all likely	Slightly likely	Moderately likely	Very likely	Extremely likely
1	2	3	4	5

[Followed by the 20 PANAS feelings/emotions]

Emotional Intensity

When you are experiencing a situation that does make you feel this way, how intense is the feeling compared to how other people feel?

Not at all intense	Slightly intense	Moderately intense	Very intense	Extremely intense
1	2	3	4	5

[Followed by the 20 PANAS feelings/emotions]

Emotional Perseveration

When you are experiencing a situation that does make you feel this way, how long is this feeling likely to persist? The longer a feeling lasts the more persistent it is. Please rate this using the five options provided.

Not at all persistent	Slightly persistent	Moderately persistent	Very persistent	Extremely persistent
1	2	3	4	5

[Followed by the 20 PANAS feelings/emotions]