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The Mediating Effects of Self-Esteem on Anxiety and Emotion Regulation

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Abstract

Individuals with anxiety disorders maladaptively appraise interpersonal threat cues leading to inaccurate interpretations of the self and others. However, little is known about the factors that mediate this association, therefore, the main aim of this study was to examine the relationship between state and trait anxiety, self-esteem, and emotion regulation strategies: reappraisal and suppression. Young adults aged between 18–26 years participated in the study. They completed a set of self-reports measuring emotion regulation, self-esteem, state-trait anxiety, and positive and negative attributes. Participants also completed an experimental task, using the dot-probe paradigm, which measures threat bias and response inhibition. The findings showed that trait and state anxiety predicted suppression, reappraisal, and internalising problems, and is linked to response inhibition. Importantly, low self-esteem, significantly mediated the relationship between increased anxiety and suppression. Taken together, these results show specific associations between emotion regulation and anxiety, highlighting the significant impact of self-esteem in young adults.

Keywords

Emotion regulation, self-esteem, anxiety, state anxiety, trait anxiety

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Introduction

Individuals with anxiety often use maladaptive emotion regulation (ER) strategies rather than adaptive ER strategies (Garnefski & Kraaij, 2006; Martin & Dahlen, 2005; Schäfer et al., 2017). Gross and John (2003) define ER as the individual's ability to utilise effective cognitive or behavioural strategy to manage the behavioural presentation of an emotion, as is appropriate for the individual and the context. The Process Model of ER offers a framework through which emotions can be regulated in one of five steps (Gross, 2014). The first three steps of this model, 'situation selection', 'situation modification' and 'attentional deployment' relate to ways in which individuals can change the situation or their attention to alter the resulting emotional experience. The fourth step, 'cognitive change', involves the individual changing their understanding or interpretation of the situation whilst the final step, 'response modulation', is a last line of defence and occurs after an emotion has been elicited and aims to manage the observable expression of the emotion (Gross, 2014).

Two of the most studied ER strategies are 'cognitive reappraisal' and 'emotional suppression' (Gross, 2014). Cognitive reappraisal is part of the 'cognitive change' set of ER strategies and involves the individual attempting to change the way they think about a situation to alter their emotional experience. Emotional suppression, on the other hand, is part of the 'response modulation' set of ER strategies and involves the individual behaviourally altering the observable expression of the emotion (Gross, 2014). Individuals who employ suppression strategy are more likely to experience negative emotions and less positive emotions, whereas individuals who utilise reappraisal report experiencing significantly more positive emotions and less negative emotions (Gross & John, 2003). Research has also found that reappraisal is related to better cognitive skills than suppression (Richards & Gross, 2000), yet it is not clear whether this is a consequence of reappraisal or precedes it.

Anxiety inhibits the development of successful and healthy ER strategies because anxious individuals often rely on avoidant strategies (e.g., suppression), whilst exhibiting difficulties in successfully utilising reappraisal in negative situations (Carthy, Horesh, Apter, Edge, et al., 2010; Carthy, Horesh, Apter, & Gross, 2010). When anxious individuals have been explicitly instructed to use suppression, the physical symptoms of anxiety, such as heart rate, and psychological symptoms, such as distress, are significantly increased (Campbell-Sills et al., 2006). Furthermore, fMRI measures have suggested that, when individuals with increased trait anxiety effectively use reappraisal, it takes significantly more cognitive effort than low-anxious individuals (Campbell-Sills et al., 2011). Trait anxiety refers to an individual's baseline level of anxiety, this relates to the individual's personality trait, often this is a response to various situations; whereas state anxiety refers to an individual's current anxiety level, a transient and temporary emotional reaction to adverse events (Marteau & Bekker, 1992).

These findings suggest that trait anxious individuals rely on avoidant ER strategies such as suppression, potentially due to a lack of confidence in using reappraisal or because reappraisal requires more cognitive effort. Moreover, Spielberger et al. (1976) mentions that individuals with trait anxiety are often likely to have low self-esteem which affects their perception of threat and then cognitive reappraisal.

Theoretical models have differed from this interpretation. Cisler et al. (2010) suggests suppression can reinforce an aversive response to fear stimuli and consequently increase the baseline level of fear. When a conditioned fear stimulus is re-encountered, the negative associations are reinforced. This in turn can cause a negative feedback loop, whereby aversive strategies are employed more often, and the fear of a stimulus is not resolved and the physiological and behavioural symptoms of anxiety increase (Cisler et al., 2010). According to this review, as anxious individuals are inflexible in their choice of ER strategy, they will continue to suppress emotional responses which can compound anxiety (Cisler et al., 2010). Moreover, these individuals with internalising symptoms are less likely to use reappraisal as an ER strategy (Aldao & Nolen-Hoeksema, 2012; Martin & Dahlen, 2005). Therefore, anxiety may impair the cognitive effort to use reappraisal.

There is a clear distinction between the ER strategies used by those experiencing internalising problems, such as withdrawing or anxious/depressed symptoms, and those experiencing externalising problems, such as aggressive behaviour and attention problems (Garnefski et al., 2005). Garnefski et al. (2005) suggest that individuals with internalising problems were more likely to use event-related ER strategies, such as a lack of positive reappraisal, whilst those with externalising problems were more likely to use event-avoidant ER strategies. Whilst this suggests unique ER strategies for individuals with internalising symptoms compared to those with externalising symptoms, it is also the case that anxiety can be interrelated with externalising disorders (Marmorstein, 2007). Therefore, the relationship between internalising and externalising symptoms with both anxiety and ER strategy is not yet clear.

Another mechanism to consider is attentional bias. It has long been acknowledged in research that anxious individuals have an attentional bias to threat, with consistent findings for individuals with both clinical and non-clinical levels of anxiety (Cisler & Koster, 2010; Mogg et al., 1997). Individuals who rely on suppression to regulate emotions are at greater risk of succumbing to threat bias and have a higher level of threat-related emotional arousal than individuals employing cognitive reappraisal (Bardeen & Daniel, 2017). This suggests that ER and anxiety maybe involved in a negative feedback loop, where individuals utilising maladaptive and less successful ER strategies lead to anxiety. MacLeod et al. (2019) added support to these findings by suggesting that anxiety is linked to increased selective attention to threatening stimuli. Additionally, the ability to inhibit behavioural reactions has also been implicated with anxiety and ER. For

example, anxious individuals instructed to orient to happy faces rather than threatening faces reported being less stressed than those given no goal, this was regardless of their trait anxiety levels (Johnson, 2009). This suggests that inhibition is likely associated with regulating emotional experiences.

Finally, regardless of gender and age, self-esteem is closely associated with anxiety (Sowislo & Orth, 2013). Enhanced self-esteem is believed to act as a buffer against the development of anxiety (Doron et al., 2013), trait anxiety in particular is consistently related to low self-esteem (Doron et al., 2013; Guil et al., 2019). The effect of self-esteem on consequent anxiety appears to be stronger than the effect of anxiety on self-esteem (Manna et al., 2016), indicating that the two are strongly related. In adolescent populations in particular, research has indicated that higher self-esteem can act as a protective factor against stressful life events, whereas adolescents with low self-esteem are likely not protected against stress and anxiety in the future (Moksnes et al., 2010; Trzesniewski et al., 2006). Gross and John (2003) found that individuals who reported low self-esteem will often use expressive suppression as an emotion regulation strategy. Additionally, Velotti et al. (2017) found gender differences in the relationship between self-esteem and ER, with males reporting higher levels of self-esteem and suppression and females reporting higher levels of shame and cognitive reappraisal. These findings suggest that self-esteem is directly associated with the maintenance of anxiety and ER strategy use separately.

Overall, there is a general consensus that ER is intricately linked to anxiety (Schäfer et al., 2017), with studies reporting that individuals with trait anxiety are more likely to utilise suppression (Aldao et al., 2010). Literature also highlights that anxiety and ER could be influenced by mechanisms, such as self-esteem (Velotti et al., 2017). What remains unclear however is the extent to which inhibition and threat bias is associated with ER. Therefore, the main aim of the study is to assess the relationship between state and trait anxiety, inhibition, threat bias, and ER strategies (cognitive reappraisal and emotional suppression). Maladaptive ER characterise anxiety (Cisler et al., 2010), thus we expect that individuals scoring highly on both state and trait anxiety to rely more on suppression to regulate emotions. As anxiety is shown to predict ER self-esteem (Sowislo & Orth, 2013), we further expect to see self-esteem mediating the relationship between anxiety and ER.

Method

Participants

Participants were recruited on a voluntary basis through the university's student participation pool and social media. Participant's age ranged from 18 to 26 years (M_{age}= 21.96, $SD = 2.44$). Participants who volunteered were then provided an online link to complete the tasks and the questionnaires, in total 303 participants

completed the questionnaires; difficulty accessing the task programme meant that 126 participants out of the 303 participants completed the attentional probe task ($n = 41$ male, $n = 83$ female and $n = 3$ other). Therefore, any analyses reported using measures of threat bias or inhibition which were measured via the attentional probe task, only the data from 126 participants was included. Additionally, two participants had significantly poor score on the task, therefore their data was excluded from the analyses.

Materials

Emotion regulation measure. The Emotion Regulation Questionnaire (ERQ; Gross & John, 2003) was used to measure emotion regulation. It consists of 10 items, 6 of which measure cognitive reappraisal and 4 measure expressive suppression. Participants were required to show how strongly they agreed with each statement on a seven-point Likert scale, ranging from "strongly disagree" to "strongly agree". Example items include, for cognitive reappraisal; "*I control my emotions by changing the way I think about the situation I'm in*" and for expressive suppression; "*I keep my emotions to myself*". The two subscales can be scored separately, with a higher mean score indicating a higher use of each regulation strategy. The subscales have previously been shown to have acceptable internal reliabilities, with Cronbach's alpha for cognitive reappraisal ranging from .75 to.82, and expressive suppression ranging from .68 to.76 (Gross & John, 2003). In the present study, the Cronbach Alpha was .87 (suppression) and .95 (reappraisal).

State and trait anxiety measure. The State-Trait Anxiety Inventory, Form Y (STAI-Y), which consists of 40 items, was used to measure state and trait anxiety. Twenty items measure state anxiety, and the remaining 20 items measure trait anxiety. Participants were asked to rate the extent to which they are experiencing a given item at the current time, as well as how frequent the experience is in general, on a four-point Likert scale, ranging from "not at all" to "very much so". An example of a state anxiety item is "*I feel calm*" and an example of a trait anxiety item is "*I feel rested*". The two scales are scored separately and a higher score for each indicates a higher experience of the anxiety type. Both scales have previously been found to have strong internal reliabilities, with .92 Cronbach's alpha for the state anxiety scale and .90 for the trait anxiety scale (Kabacoff et al., 1997). Cronbach Alpha for the present study was .94 (trait anxiety) and .95 (state anxiety).

Emotional and behavioural problems measure. The Strengths and Difficulties Questionnaire (SDQ), self-report version for those 18 years and above (accessed via the website: https://www.sdqinfo.org/Adult) was used to measure emotional symptoms, conduct problems, hyperactivity/inattention, peer problems and

prosocial behaviour. This measure has been recently adapted for young adults from the earlier measure by Goodman et al. (1998) which was initially created for children and adolescents (Brann et al., 2018). It contains 25 items which can be rated on a three-point Likert scale, ranging from "not true" to "certainly true". An example of an internalising question is; "*I worry a lot*" and an example of an externalising question is; "*I am restless, I find it hard to sit down for long*." Similar to the research by Goodman et al. (2010), this study will focus on internalising and externalising problems as two subscales. The overall total difficult score has been found to have a high internal validity ($\alpha = .82$; R. Goodman et al., 1998). The Cronbach alpha of the SDQ in the present study was .47 (externalising problems) and .63 (internalising problems).

Self-esteem measure. The Rosenberg Self-Esteem (RSE) scale was used to measure self-esteem (Rosenberg, 1965). Participants reported how strongly they agreed or disagreed with each of the 10 items on a four-point Likert scale, ranging from "strongly agree" to "strongly disagree". An example of the item: "*I take a positive attitude toward myself*". Some questions are reverse scored, and some were combined to give an overall rating of high or low self-esteem. The scale has been found to have high internal validity, ranging from .88 to .90 (Robins et al., 2001). In this study a decent Cronbach's alpha of .93 was found.

Inhibition and threat bias measure. The online attentional probe task delivered 80 trials, the first 40 of which were practice trials for participants to become comfortable with the task. Each trial showed a pair of word stimuli for 500 ms. Each word in the pair either appeared above or below three fixation crosses and were followed by an attentional probe (see Figure 1). Each time the following symbols '<', '>' were shown on screen, participants were instructed to press the respective key on their keyboard. These symbols were presented following threat or neutral words. The word pairs contained a threat word and a neutral word, and their position was either above or below the fixation crosses. The order of the presentation of conditions to each participant was randomised. Reaction time to the attentional probe was measured for both the threat and neutral stimuli, as well as the correct and incorrect responses. The use of an online attentional bias task to measure threat bias and inhibition has been validated previously by MacLeod et al. (2007). Correct responses were used as a measure of inhibition. The mean reaction time for neutral stimuli was subtracted from the mean reaction time for threat stimuli, resulting in a threat bias score, whereby a negative value would suggest an attentional bias to threat and a positive value would indicate an attentional bias away from threat and a value of 0 would suggest no attentional bias (Putwain et al., 2011). This study was programmed using c++ and published on the university server, whereby participants could complete the task remotely.
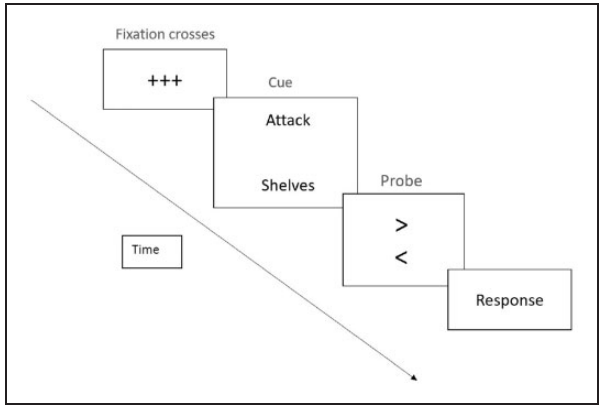
Figure 1. An illustration of the dot-probe task.

Procedure

Participants were provided with an online link for the task and the questionnaire. Firstly, they were required to complete a consent form and basic demographic questions (i.e., age and gender) before completing the full set of questionnaires, all of which was published in the online survey program Qualtrics. Following the completion of the questionnaire, the participants were then automatically directed to the task. During the attentional probe test, the stimuli pairs were presented pair after pair. Participants were required to indicate which attentional probe had been present (' < ' or '>') by pressing the corresponding left or right arrow key on their keyboard.

Ethical approval was obtained from the Ethics Advisory Sub-Committee of the University's Psychology Department, following Internet-mediated research (IMR) BPS ethical guidelines.

Data analysis

Preliminary analyses were conducted to examine any differences in gender. Normality tests conducted using Shapiro-Wilk showed that data was normally distributed for ER strategies reappraisal, suppression, self-esteem, externalising problems, internalising problems and state and trait anxiety for male, female and gender non-conforming participants. Data was not normally distributed for externalising problems and reappraisal for female participants. As the data is largely normally distributed for the rest of variables, Pearson's correlation was carried out to determine the relationship between the main factors. Following this multiple linear regression analyses was conducted to measure the impact of anxiety on suppression and reappraisal. Additionally, to measure the effects of

self-esteem, Process Macro was used . This form of mediation analysis is based on linear models, allowing to measure the indirect effect via multiple mediators.

Results

Mean and standard deviations for emotion regulation strategies, anxiety, self-esteem, internalising, and externalising problems are shown in Table 1. This table also shows group differences which were examined using one-way ANOVA's. These results show that female and gender non-conforming (expression by an individual that they do not adhere to binary gender norms) participants had significantly higher scores for trait anxiety and were more likely to report internalising problems, whilst male and gender non-conforming participants had significantly higher scores for suppression. There were no further significant differences found between genders. Similarly, there were no significant gender differences observed for scores of inhibition and threat bias (see Table 2).

Table 1. Means (standard deviations) and ANOVA's for all self-reports.

	Overall	Males	Females	GNC	F	$\eta2$
N	301	79	210	12		
Anxiety						
Trait anxiety	53.47 (12.67)	50.92 (13.04)	54.02 (12.48)	60.58 (10.10)	3.75*	.03
State anxiety	48.13 (13.71)	46.42 (14.39)	48.62 (13.20)	50.67 (17.68)	.96	.01
ERQ						
Reappraisal	26.40 (7.49)	27.30 (7.23)	26.26 (7.55)	23.00 (7.56)	1.86	.01
Suppression	15.85 (5.53)	16.89 (5.32)	15.30 (5.58)	18.67 (4.54)	4.06*	.03
Self esteem	15.91 (2.53)	15.94 (2.47)	15.91 (2.59)	15.75 (2.17)	.03	.00
SDQ						
Externalising problems	7.00 (3.47)	6.89 (3.18)	7.02 (3.55)	7.42 (4.10)	.13	.00
Internalising problems	8.83 (4.15)	7.56 (4.31)	9.19 (4.02)	10.83 (3.54)	6.10**	.04

Note: **$p < .001$, *$p < .05$; GNC = Gender Non-Conforming; ERQ = Emotion Regulation Questionnaire; SDQ = Strengths and Difficulties Questionnaire; α = Cronbach's Alpha.

Table 2. Means (standard deviations) and ANOVA's for the experimental task.

	Overall	Males	Females	GNC	F	$\eta2$
N	124	41	80	3		
Inhibition	75.60 (4.25)	76.39 (3.19)	75.23 (4.70)	75.60 (4.25)	1.05	.02
Threat Bias	73.40 (1112.71)	−94.04 (323.66)	160.63 (1360.25)	35.83 (210.36)	.71	.01

Note: *$p < .05$; GNC = Gender Non-Conforming.

Table 3 shows correlations between all the study variables. As expected, there was a significant positive relationship between anxiety measures, internalising problems, and externalising problems.

There was a significant negative relationship between anxiety scores and ER strategy reappraisal; reappraisal was also negatively related to both internalising and externalising problems; which contrasted with ER strategy suppression. High scores of trait and state anxiety were significantly positively correlated with suppression. Suppression was also positively related to internalising problems, supporting previous research whereby individuals reporting suppression are more likely to report high levels of anxiety. These results show a significant negative correlation between self-esteem, trait anxiety, state anxiety, internalising and externalising problems, however there was also a positive correlation between self-esteem and reappraisal and inhibition. Inhibition scores were also significantly negatively related to anxiety, externalising and internalising problems. No significant relationships were observed for threat bias. Further analyses showed (see Tables 4 and 5) that state anxiety significantly predicted reappraisal (F (1, 300) = 50.65, $p < .001$, $R^2 = .14$) and suppression (F (1, 300) = 12.29, $p < .01$, $R^2 = 19$). Similarly, reappraisal (F (1, 300) = 121.81, $p < .001$, $R^2 = .29$) and suppression (F (1, 300) = 21.00, $p < .001$, $R^2 = .07$) was predicted by trait anxiety.

The next step of our analysis was to examine the mediating effects of self-esteem on the relationship between anxiety and ER strategies suppression and reappraisal. The relationship between state anxiety and suppression was significantly mediated by self-esteem (b = .062, 95% BCa CI [.025, .104]); similarly the relationship between trait anxiety and suppression was significantly mediated by self-esteem (b = .068, 95% BCa CI [.022, .121]), suggesting that those reporting high scores of anxiety and low self-esteem were more likely to use suppression as an ER strategy. The mediation analysis shows a significant effect of internalising

Table 3. Correlations between anxiety, emotion regulation, self-esteem, externalising problems, internalising problems, inhibition, and threat bias ($N = 301$).

	1	2	3	4	5	6	7	8	9
1 Trait anxiety	–								
2 State anxiety	.76**	–							
3 Reappraisal	−.52**	−.38**	–						
4 Suppression	.26**	.20**	−.07	–					
5 Self esteem	−.56**	−.47**	.30**	−.26**	–				
6 Externalising problems	.39**	.38**	−.21**	−0.05	−.26**	–			
7 Internalising problems	.80**	.64**	−.39**	.29**	−.55**	.33**	–		
8 Inhibition	−.23**	−.19*	.14	−.03	.22*	−.28**	−.20*	–	
9 Threat bias	.05	−.09	.05	−.02	−.01	.00	.10	.01	–

Note. **$p < .001$, *$p < . 05$.

and externalising problems as covariates on anxiety and suppression. These were added as covariates considering they were significantly related to anxiety and ER. However, there was no significant mediating effects of self-esteem on the relationship between state (b = −.015, 95% BCa CI [−.058, .042]) and trait (b = .009, 95% BCa CI [−.046, .066]) anxiety and reappraisal (see Tables 4 and 5). Threat bias and inhibition scores had no significant mediation effects in either model.

Discussion

The main aim of this study was to examine the relationship between trait and state anxiety, ER strategies (reappraisal and suppression), threat bias, inhibition, and self-esteem. Another aim was to identify factors which mediate this relationship; a potential mediator included self-esteem. Gross and John (2003) first reported that individuals who reappraise were more likely to have higher

Table 4. Suppression regression analyses summary of predictive variables self-esteem, and covariates internalising problems, externalising problems, and inhibition (N = 127).

	Trait			State		
Variable	*b*	*SE*	*t*	*b*	*SE*	*t*
Self-esteem	−.71	.24	−2.92**	−.83	.24	−3.38**
Internalising problems	.36	.19	1.93*	.43	.15	2.79*
Externalising problems	−.42	.14	−2.88**	−.39	.14	−2.72*
Inhibition	.00	.11	.01	.00	.11	.01
R^2		.19			.21	
F		4.72***			5.14***	

Note. ***p < .001, **p < .01, *p < . 05.

Table 5. Reappraisal regression analyses summary of predictive variables self-esteem, and covariates internalising problems, externalising problems, and inhibition. (N = 127).

	Trait			State		
Variable	*b*	*SE*	*t*	*b*	*SE*	*t*
Self-esteem	−.10	.31	−.31	.20	.34	.58
Internalising problems	.25	.23	1.06	−.35	.21	−1.63
Externalising problems	.10	.18	.57	.04	.20	.18
Inhibition	.07	.15	.47	.10	.16	.66
R^2		.29			.42	
F		9.51***			16.74***	

Note. ***p < .001, **p < .01, *p < . 05.

self-esteem, whereas those who used suppression strategies were often likely to report low self-esteem. Since then however, studies that examined the relationship between emotion regulation and self-esteem have been limited. To our knowledge, the present study was the first to have examined the relationship between anxiety and emotion regulation and the potential effects of self-esteem on this relationship.

In line with Gross and John's (2003) earlier findings, our results show that those who reported higher levels of trait and state anxiety also reported increased use of suppression but were less likely to reappraise. Importantly however, self-esteem was found to significantly influence ER strategy use, whereby having high anxiety and low self-esteem significantly predicted the use of suppression. Anxiety is strongly associated with low self-esteem (Sowislo & Orth, 2013). Moreover, individuals with low self-esteem often report feeling less deserving of positive emotions and therefore are less likely to employ ER strategies, such as reappraisal, to improve their emotional experience (Wood et al., 2009). The findings from the present study adds support to the claim that increased state and trait anxiety is predictive of low self-esteem (Manna et al., 2016), which is further associated with the use of maladaptive ER (Aldao et al., 2010). Low self-esteem has been found to act as a risk factor for anxiety and ER problems (Guil et al., 2019; Manna et al., 2016). Guil et al. (2019) highlighted the close relationship between individual self-esteem, anxiety and emotional intelligence, with self-esteem predicting trait anxiety and individuals' ability to attend to their own and others emotional states (Guil et al., 2019; Werner et al., 2011).

Supporting previous studies (Campbell-Sills et al., 2006; Cisler et al., 2010; Gross & John, 2003; Klemanski et al., 2017), our findings showed a strong relationship between anxiety (state and trait) and ER strategy suppression, with state and trait anxiety predicting the use of both reappraisal and suppression. These findings support previous studies which showed overuse of suppression strategy among individuals with anxiety disorders (Werner et al., 2011). As reported by several researchers, individuals with high anxiety scores require more cognitive effort to use reappraisal, potentially due to their experiences of intense negative emotions (Campbell-Sills et al., 2011; Carthy, Horesh, Apter, Edge, Gross, 2010). Thus, it is not surprising that high trait and state anxiety was associated with increased suppression and decreased reappraisal.

The current study found that internalising problems was a significant covariate between anxiety and suppression, which is in line with the results reported by Aldao and Nolen-Hoeksema (2012). Furthermore, state and trait anxiety were significantly associated with increased externalising problem behaviours, however decreased externalising behaviours were a significant mediator between anxiety and suppression (Aldao & Nolen-Hoeksema, 2012). As internalising and externalising behaviours have been previously found to be associated with separate emotion regulation strategies (Garnefski et al., 2005) individuals with

increased externalising behaviours may have used ER strategies beyond the two discussed in this research.

Another objective of the study was to explore the relationship between anxiety scores and threat bias, in relation to ER. Threat bias scores failed to correlate with any of the variables and did not mediate the relationship between anxiety and emotion regulation. There are two possibilities for the current findings: either that there is no relationship between state and trait anxiety, ER, and threat bias, or that there are limitations with the dot probe paradigm. In relation to the first possibility, research has suggested that there is a differentiation between threat '*engagement* bias', whereby attention is increased towards a threatening stimulus before a neutral stimulus; and threat '*disengagement* bias', whereby individuals are unable to disengage from a threatening stimulus (Sheppes et al., 2013). The current study has therefore investigated engagement bias, in comparing reaction times for threatening words against neutral words. Sheppes et al. (2013) suggested that there is no difference in engagement bias between high and low-anxiety individuals, but that high-anxiety individuals display a significantly larger threat disengagement bias than low-anxiety individuals. Thus, the current study may have potentially overlooked findings of disengagement bias. More recently, MacLeod et al. (2019) advised caution in using the dot-probe paradigm to measure attentional bias to threat among individuals with anxiety as the pattern between groups may not be stable.

Our findings on gender differences are worth noting. Firstly, unlike early research (Aldao et al., 2010; Nolen-Hoeksema & Aldao, 2011), females reported significantly less use of suppression strategy compared to males and females also had high scores on internalising problems. Nolen-Hoeksema and Aldao (2011) argued however, that adaptive strategies also increase with age for females, suggesting the presence of complex mechanisms maybe in place as individuals age and acquire coping skills. The current research thus supports previous findings that males report higher levels of suppression as an ER strategy than females (Velotti et al., 2017).

Secondly, there were significant differences in responses in participants who identified as gender non-conforming, these participants selected the 'other' gender category when gender information was requested. Individuals in the gender non-conforming group report significantly high levels of trait anxiety, internalising problems and the use of suppression compared to male or female participants. John and Gross (2004) emphasised socialisation within the family as an important factor in gender differences in ER strategies. We interpret these results with caution considering there were significantly fewer GNC participants in the current study. Therefore, further investigation of emotional problems and ER strategy use is warranted for this group.

This study has limitations that must be considered when interpreting the findings. Firstly, although the use of an online attentional bias task has been validated (MacLeod et al., 2007), it does mean that extraneous variables might

have interfered in the completion of the task which were beyond the researcher's control. Secondly, the externalising problem subscale had a low Cronbach's alpha and thus low internal consistency, indicating that some of these items may not be representative for this sample. Thirdly, only 126 of the 301 participants completed the attentional bias task. Participants were directed towards the task but right to withdraw meant that it was not compulsory. Furthermore, the complexities of online testing should be considered, particularly when assessing reaction times, Plant and Turner (2009) suggest the requirements of experimental tasks are robust computer systems, be it both the hardware and software which often these online cognitive tests rely on, which could explain variation in delays. Future studies should also assess the differences between positive and negative reappraisal in relation to anxiety and self-esteem. Longitudinal studies using children and adolescents to assess these models would also be beneficial for a developmental understanding of the relationship between anxiety, ER, and self-esteem.

Conclusions

The aim of the current study was to assess the relationship between state and trait anxiety with two ER strategies, reappraisal, and suppression, whilst exploring the effect of the potential effect of self-esteem on this relationship. Supporting previous studies, the findings from this study has reinforced the strong relationship between anxiety and ER strategies, specifically that individuals with high anxiety, use suppression more often and reappraisal less. The current findings also highlight the importance of self-esteem in understanding this relationship, particularly as a mediator between trait and state anxiety and increased suppression. The complex relationship between anxiety and self-esteem has been examined further in this study, indicating that low self-esteem is associated with trait anxiety, but importantly it also mediates the relationship between trait anxiety and elevated use of emotion regulation strategy suppression.

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