



# Pathways to social anxiety: The role of reinforcement sensitivities and emotion regulation



Elodie J. O'Connor<sup>a</sup>, Petra K. Staiger<sup>a,\*</sup>, Nicolas Kambouropoulos<sup>a</sup>,  
Luke D. Smillie<sup>b</sup>

<sup>a</sup> School of Psychology, Faculty of Health, Deakin University, 221 Burwood Highway, Burwood, Melbourne, Victoria 3125, Australia

<sup>b</sup> School of Psychological Sciences, The University of Melbourne, Melbourne, Victoria, Australia

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## ABSTRACT

Past research has demonstrated a strong relationship between threat sensitivity and social anxiety; however, the relationship between reward sensitivity and social anxiety is less clear. Further, the role that emotion regulation (ER) may play in the expression of social anxiety disorder (SAD) is rarely considered. The current study tested whether two emotion regulation strategies (emotional suppression and cognitive reappraisal) mediated associations between threat sensitivity and reward sensitivity and social anxiety in a community sample (402 adults, 78% female;  $M_{age}=32.49$ ,  $S.D._{age}=11.53$ ). Path analyses indicated that low reappraisal mediated the relationship between high threat sensitivity and high social anxiety; and both low reappraisal and high suppression mediated the relationship between low reward sensitivity and high social anxiety. These results highlight the potential role that emotion regulation plays in the relationship between trait motivation and social anxiety.

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## 1. Introduction

It is well known that people with anxiety problems such as social anxiety disorder (SAD) experience more intense emotions than non-clinical samples (Turk et al., 2005; Aldao et al., 2010), and are more likely to utilise maladaptive ways of managing their emotions (Salters-Pedneault et al., 2006). Individuals with social anxiety disorder (SAD) experience a persistent degree of anxiety regarding one or more social situations, such as public speaking, causing a level of distress that significantly interferes with daily functioning (American Psychiatric Association, 2000).

There has been increasing interest in utilising Reinforcement Sensitivity Theory (RST; Gray and McNaughton, 2000; Smillie et al., 2011)—which concerns dispositional tendencies to approach rewards and avoid threats—to understand the underlying mechanisms of social anxiety (e.g., Kimbrel, 2008; Bijttebier et al., 2009). This is possibly because there is potential reward in approaching social stimuli (e.g., joining a group), but also potential threat (e.g., potential social rejection). Approach-avoidance motivation models such as RST suggest that the experience of anxiety can be understood in terms of motivational responses to potential threat (e.g. Gray, 1994; Bijttebier et al., 2009). From a motivational perspective, according to Gray (1994), anxiety occurs as the result of

a behavioural predisposition towards a dominant avoidance motivation system. Anxiety disorders occur when there are problems with regulation of anxiety; for example, if there is an excessively high level of anxiety for the situation, or a type of anxiety is experienced that is inappropriate for the situation (Marks and Nesse, 1997).

It is generally agreed that higher levels of negative emotion are associated with psychopathology (e.g. Cole and Hall, 2008); however, this negative emotion itself does not lead to the development of anxiety disorders such as social anxiety disorder. Rather, it has been proposed that it is the way that these emotions are regulated that is important. For example, those high on the tendency to avoid situations may also be more likely to avoid, or suppress, their emotions. Interestingly, emotion regulation (ER) strategies are rarely examined alongside levels of reward and threat sensitivity when predicting social anxiety symptoms. Emotion regulation is the process of modifying emotional states in order to influence and control experienced emotion (Gross and John, 2003). Given the significant levels of anxiety experienced in individuals with SAD the contribution of how individuals regulate these negative emotions is critical to our understanding and treatment of SAD. It has been reported that individuals with SAD have a dysfunctional understanding and appreciation of their emotions (e.g., Turk et al., 2005), which provides valuable insight into the relationship between emotion regulation and social anxiety. According to RST (for a recent summary see Smillie et al. (2011)) there are three neurological systems that mediate

\* Corresponding author. Tel.: +61 3 9244 6876; fax: +61 3 9244 6858.

E-mail address: [pstaiger@deakin.edu.au](mailto:pstaiger@deakin.edu.au) (P.K. Staiger).

responses to motivationally-salient stimuli: (1) the Behavioural Activation System (BAS) regulates behavioural approach of reward and associated experiences of reward desire (i.e. reward sensitivity; [Pickering and Smillie, 2008](#)); (2) the Fight-Flight-Freeze System (FFFS) regulates behavioural escape from threat and associated feelings of fear and panic; and (3) the Behavioural Inhibition System (BIS) is engaged by the concurrent activation of the FFFS and BAS in response to goal conflict, such as in the case of a threat stimulus which must be approached ([Gray and McNaughton, 2000](#)). The BIS and FFFS are thought to jointly contribute to aversive motivation processes (i.e., threat sensitivity; [Corr, 2008, Figure 1.2](#)). In addition, it has been postulated that the strength of a reaction to threatening stimuli will be strongest for those high on threat sensitivity and low on reward sensitivity ([Corr, 2002](#)).

To date, there is limited research examining the *joint* relationship between threat sensitivity and reward sensitivity in the prediction of social anxiety disorder (SAD). Recently, [Kimbrel et al. \(2010\)](#) proposed that high levels of threat sensitivity increase the anxiety experienced in response to social interactions, while low levels of reward sensitivity decrease the pleasure experienced in social interactions. In combination, therefore, it might be expected that high threat sensitivity and low reward sensitivity increase the risk for developing SAD. Consistent with this, Kimbrel and colleagues demonstrated that high threat sensitivity but also low reward sensitivity significantly predicted social interaction anxiety (SIA). On the other hand, [Bijttebier et al. \(2009\)](#) reviewed this literature and concluded that studies investigating anxiety symptoms have tended to report positive correlations with threat sensitivity but little to no association with reward sensitivity. In sum, anxiety has a robust positive association with threat sensitivity and a somewhat inconsistent association with reward sensitivity (e.g. [Bijttebier et al., 2009](#)), indicating much is still unknown about the relationship between threat sensitivity and reward sensitivity in the prediction of anxiety, particularly social anxiety.

Emotion regulation (ER) can be either explicit (effortful) or implicit (automatic; [Gyurak et al., 2011](#); [Koole and Rothermund, 2011](#)). Two of the most commonly researched ER strategies are suppression (generally thought to be a maladaptive ER strategy) and reappraisal (generally thought to be an adaptive ER strategy). Cognitive reappraisal involves reinterpreting an emotional event in a way that changes the emotional impact of that event, while emotional suppression involves the inhibition of the expression of emotion ([Gross and John, 2003](#)). A recent meta-analysis has indicated that suppression is consistently found to have a significant positive association with anxiety disorders such as SAD, while reappraisal has a negative association with anxiety disorders such as SAD ([Aldao et al., 2010](#)). On the other hand, much less is known about the relationship between ER and reward and threat sensitivity. Available evidence suggests that threat sensitivity is positively correlated with maladaptive ER ([Leen-Feldner et al., 2004](#); [Tortella-Feliu et al., 2010](#); [Tull et al., 2010](#)). The relationship between reward sensitivity and ER is even less clear. Results of a recent study show that one measure of reward sensitivity was positively associated with self-reported emotion dysregulation, while another was negatively associated with self-reported emotion dysregulation ([Tull et al., 2010](#)).

To date, only two studies have investigated the relationships among reinforcement sensitivities, ER, and anxiety, both of which focused on general anxiety rather than social anxiety. In a small ( $n=67$ ) sample of college students, [Dennis \(2007\)](#) found that both reward sensitivity and threat sensitivity were positively correlated with reappraisal. Threat sensitivity was negatively correlated with suppression and positively with trait anxiety, while reappraisal was negatively correlated with trait anxiety, and only threat

sensitivity significantly predicted anxiety. In a much larger ( $N=1441$ ) sample of adolescents, [Tortella-Feliu et al. \(2010\)](#) reported that a combination of heightened negative effect and threat sensitivity and a composite negative ER scale (including self-blame, rumination, catastrophising, and blaming others subscales) were both associated with an increase in anxiety symptoms (representing six childhood anxiety disorders). Together, these studies indicate that emotion regulation may mediate the association between reinforcement sensitivities and anxiety; however, this has yet to be investigated.

In the present study, we aim to examine the relationships among reward and threat sensitivity, emotion regulation, and social anxiety. Specifically, it is argued that emotion regulation will mediate the relationship between reward sensitivity and social anxiety. In doing so, we attempt to improve on some limitations of existing research (i.e., [Dennis, 2007](#); [Tortella-Feliu et al., 2010](#)). First, these previous studies used college/student samples rather than an adult, community sample, which may restrict the generalisability of obtained findings. In contrast, the present study will utilise a large, adult, community sample. Second, we employ more recent measures of threat sensitivity that putatively differentiate BIS and FFFS processes more clearly than previous measures ([Heym et al., 2008](#)). Third, while both studies focused upon somewhat broad conceptualisations of anxiety, we focus more specifically on social anxiety, which seems particularly likely to reflect the influence of reward and threat sensitivities.

The aim of this research is to examine whether emotion regulation mediates the relationship that reward and threat sensitivity have with severity of social anxiety symptoms. It was hypothesised that a) high threat sensitivity would predict social anxiety symptoms; b) low reward sensitivity would predict social anxiety symptoms; c) reappraisal would have a significant negative relationship with social anxiety symptoms; d) suppression would have a significant positive relationship with social anxiety symptoms; and e) suppression and reappraisal would mediate the relationship between trait motivation and social anxiety symptoms.

## 2. Method

### 2.1. Participants

Four hundred and two adults (78% female) ranging in age from 18 to 73 years ( $M=32.49$ ,  $S.D.=11.53$ ) were drawn from a community sample. Participants responded to advertisements placed (a) around the campus of an Australian University, (b) numerous anxiety-related websites and forums, and (c) circulated via word of mouth. Seventy-one per cent of participants identified as Australian; 10% identified as British/English, 5% identified as American, and the remaining participants identified as various other ethnicities (e.g. European). Of the participants, 55% were university educated (with a further 33% currently studying). Forty-four per cent of participants were currently married or living with a partner, while a further 31% were single. Based on published cut-off scores ([Liebowitz, 1987](#)), the majority (62%) of participants had no social anxiety; 10% had moderate social anxiety; 11% had marked social anxiety; 8% had severe social anxiety; and 9% had very severe social anxiety.

### 2.2. Measures

The Carver–White BIS/BAS scales (CW-BIS/BAS; [Carver and White, 1994](#)) consist of 20 self-report items, which measure reward and threat sensitivity. Items are rated on a four-point Likert scale (from 1=strongly disagree to 4=strongly agree); scores range from 7 to 28 for the BIS scale, while scores range from 13 to 52 for the BAS scale. According to [Heym et al. \(2008\)](#), the 'BIS' scale can actually be divided into separate measures of BIS-anxiety and FFFS-fear subscales ([Heym et al., 2008](#)). Cronbach's alpha in the present study was 0.74 for the BIS-anxiety subscale and 0.70 for the FFFS-fear subscale, while the correlation between the two subscales was 0.58. Consistent with recent theory and research in RST, we operationalised threat sensitivity in terms of the combined influence of both of

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