



Unique associations of reinforcement sensitivity theory dimensions with social interaction anxiety and social observation anxiety



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ABSTRACT

The study examined the unique relationships of Behavioral Inhibition System (BIS), Fight-Flight-Freeze System (FFFS) and Behavioral Approach System (BAS), and Sensitivity to Punishment (SP) and Sensitivity to Reward (SR) with social interaction anxiety and social observation anxiety. A total of 200 adults completed the Behavioral Inhibition System/Behavioral Activation System scales, the Sensitivity to Punishment and Sensitivity to Reward Questionnaire, and questionnaires measuring social interaction anxiety and social observation anxiety. Multiple regression analyses revealed that both forms of social anxiety were associated with SP, BIS-Anxiety and BIS-Fear, and negatively with BAS-FS. The theoretical implications of the findings for reinforcement sensitivity theory are discussed.

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1. Introduction

Social anxiety refers to the experience of self-conscious apprehension that one will say or do something embarrassing and/or will be negatively evaluated by others. According to current and previous versions of the Diagnostic and Statistical Manual (DSM), the core feature of clinical levels of social anxiety, known as social anxiety disorder, is avoidance of or excessive anxiety and fear when faced with certain social situations (American Psychiatric Association, APA, DSM-5, 2013). In the way of temperament and personality, high behavioral inhibition, a tendency to inhibited responses when confronted with novel situations or unfamiliar people, has been most strongly associated with high social anxiety. Behavioral inhibition is a major personality dimension in Gray's personality theory, currently referred to as reinforcement sensitivity theory (RST) of personality. To date, several studies have examined the links between social anxiety, viewed as a dimensional construct, and the RST personality dimensions. The current study extends this area of research.

It is now generally accepted that social anxiety reflects two closely related classes of feared situations: social interaction anxiety and social observation anxiety (Mattick & Clarke, 1998). Social interaction anxiety refers to excessive distress in relation to social situations that involve direct social interactions with others, such as when speaking to someone new at a party, or expressing one's

view at a meeting. It is associated with fears related to concerns such as being inarticulate, boring, not knowing what and how to engage in conversation, and being ignored. Social observation anxiety refers to excessive distress in relation to social situations that involve being directly observed by others or performing in front of others (e.g., public speaking, eating in public). It is associated with fears related to concerns of showing signs of being anxious such as trembling and blushing (Mattick & Clarke, 1998).

Mattick and Clarke (1998) have developed the Social Interaction Anxiety Scale (SIAS) and the Social Phobia Scale (SPS) that have been used widely as self-report dimensional measures of social observation anxiety and social interaction anxiety, respectively. Examples of items in the SIAS and SPS are "I worry about expressing myself in case I appear awkward" and "I feel self-conscious if I have to enter a room where others are already seated", respectively. In the initial development and validation study of these measures, there was support for a single factor for each scale. There was also support for their convergent and discriminant validity in that they correlated as expected with other measures of social anxiety, and showed low or non-significant correlations with general measures of depression, anxiety, locus of control, and social desirability. Heimberg, Mueller, Holt, Hope, and Liebowitz (1992) found support for the external validity of the SIAS and SPS in that the SIAS correlated more highly with a measure of interaction anxiety than with a measure of social observation anxiety, while the SPS correlated only with a measure of social observation anxiety.

To date, several studies have examined the links between RST personality dimensions and social anxiety. In the original RST (o-RST), proposed by Gray's (1982), personality was viewed in terms of individual differences in two major neurobiological

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systems: the Behavioral Inhibition System (BIS) and the Behavioral Approach System (BAS). The BIS has been postulated to be sensitive to punishment, frustrative nonreward and novelty, and its activation has been associated with anxiety and avoidance behaviors. The BAS has been postulated to be sensitive to reward and nonpunishment, and its activation has been associated with positive emotions and approach behaviors.

The o-RST has been substantially updated by Gray and McNaughton (2000) and McNaughton and Corr (2004). In the revised model or r-RST, BAS is conceptualized as it is in o-RST. The BIS is still linked to anxiety, although it is not related to mediating reactions to punishment (as in the original model) but to resolving goal conflicts, especially approach-avoidance conflicts. The BIS is also linked to cognitive processes, such as attention and memory, involved in resolving such conflicts. Too high or too low BIS activity is assumed to be dysfunctional. Reactions to all types of punishment are now postulated to be mediated by a Fight-Flight-Freeze System (FFFS), which in many respects is comparable to the original o-BIS. The FFFS mediates the emotion of fear.

O-RST of personality has spawned a large literature (Corr, 2008), the majority of which is based on two psychometric measures: the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ; [Torrubia, Avila, Molto, & Caseras, 2001](#)) and, most notably, the Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) scales ([Carver & White, 1994](#)). In the SPSRQ, the sensitivity to punishment (SP) and Sensitivity to Reward (SR) scales measure the traits of the BIS and BAS, respectively. In the BIS/BAS scales, the BIS scale and BAS scale measure their namesakes. However, [Heym, Ferguson, and Lawrence \(2008\)](#) have shown that the seven items in the BIS scale can be separated into subscales for Anxiety (BIS-Anxiety) and Fear (BIS-Fear). According to these authors, these measure the BIS and FFFS, respectively, as conceptualized in r-RST. The BAS scale has subscales for Reward Responsiveness (BAS-RR), Drive (BAS-DR) and Fun Seeking (BAS-FS). BAS-RR measures approach motivation in anticipation of a future reward; BAS-DR measures goal-directed behavior; and BAS-FS measures the tendency to impulsively pursue pleasure. [Smillie, Jackson, and Dalgleish \(2006\)](#) have shown that these scales are better conceptualized as comprising two factors: a super-factor for the BAS-RR and BAS-DR factors that reflects reward reactivity, and another factor for BAS-FS that reflects impulsivity. They have argued that BAS-FS may not be related to the BAS, as conceptualized in the RST. Consistent with this, in a factor analysis involving the BIS/BAS scales with other personality measures, [Gomez and Corr \(2010\)](#) found that the BIS-RR and BIS-DR loaded with other measures of positive emotionality and reward sensitivity, whereas the BIS-FS loaded with other measures of impulsivity and low control.

According to [Gray and McNaughton \(2000\)](#), heightened BIS and FFFS sensitivities are associated with social anxiety. [Kimbrel, Mitchell, and Nelson-Gray \(2010\)](#) has suggested that an underactive BAS can also be expected to be involved in some aspects of social anxiety, especially when it is generalized across many social situations. This view is based on [Corr's \(2002\)](#) joint-subsystems hypothesis that proposes that under certain situations the BIS and BAS exert interdependent facilitatory and antagonistic effects on behavior. As generalized social anxiety is more closely associated with social interaction anxiety than social observation anxiety ([Heimberg et al., 1992](#)), [Kimbrel et al.](#) has argued that the BAS would be associated with social interaction anxiety rather than social observation anxiety.

To date a number of studies involving adults have examined how the BIS and BAS dimensions in the BIS/BAS scales ([Booth & Hasking, 2009](#); [Kashdan & Roberts, 2006](#); [Levinson, Rodebaugh, & Frye, 2011](#)) and the SPSRQ ([Kimbrel, Cobb, Mitchell,](#)

[Hundt, & Nelson-Gray, 2008](#); [Kimbrel, Nelson-Gray, & Mitchell, 2012](#)) are related to social anxiety. A consistent finding in these studies is that the BIS dimensions (BIS in the BIS/BAS scales, and SP in the SPSRQ) were correlated positively with social anxiety. The BAS dimension of SR (in the SPSRQ) have shown no association with social observation anxiety ([Kimbrel et al., 2008](#)), but association with social interaction anxiety ([Kimbrel et al., 2012](#)). While the total BAS score (of the BIS/BAS scales) showed no correlation with social anxiety ([Kashdan & Roberts, 2006](#)), the subscale scores for BAS-DR and BAS-FS have shown negative correlations with social anxiety in general ([Booth & Hasking, 2009](#)), and also social interaction anxiety ([Levinson et al., 2011](#)). No correlation has been found for BAS-RR. In another study, [Kimbrel et al. \(2010\)](#) examined how composite measures of the BIS (comprising the BIS scale of the BIS/BAS and SP scale of SPSRQ) and BAS (comprising the BAS scale of the BIS/BAS and SR scale of SPSRQ) dimensions were related to social observation anxiety and social interaction anxiety. For three different samples, they found that their BIS dimension was correlated positively with both types of social anxiety. Also while the BAS dimension was correlated negatively with social interaction anxiety, it was not correlated with social observation anxiety.

The studies by [Kimbrel et al. \(2008\)](#) and [Kimbrel et al. \(2010\)](#) have examined the associations of the BIS and BAS dimensions with social anxiety using multiple regression analysis. Unlike correlational analysis, multiple regression analysis provides a test of the associations between variables removing the shared variance in the predictors – that is, it shows if the unique variance in a predictor is associated with an outcome. Like the correlation findings, the multiple regression analysis by [Kimbrel et al. \(2008\)](#) found that SP was positively associated with social anxiety, while SR had no association. Also, like the correlation findings, [Kimbrel et al. \(2010\)](#) found that their BIS dimension was correlated positively with both social observation anxiety and social interaction anxiety, and the BAS dimension was associated negatively with only social interaction anxiety. The findings from these regression analyses suggest that these associations were unique to the RST dimensions.

Overall, there is now data showing positive associations between the BIS and social anxiety, including social observation anxiety and social interaction anxiety. There is also some evidence of negative links for the BAS-DR and BAS-FS of the BIS/BAS with social anxiety, and the SR of the SPSRQ with social interaction anxiety. However we wish to argue that there are limitations and omissions in existing data. Firstly, all past studies involving adults that have used the BIS/BAS scales have examined the BIS as conceptualized in o-RST. To date no study has differentiated the original BIS scale to reflect the r-RST dimensions of BIS-Anxiety and BIS-Fear. Understanding the differential role of these BIS dimensions would contribute to a greater understanding of the personality correlates (especially from a RST perspective) of social anxiety. Secondly, there is no data on how the BAS subscales of the BIS/BAS scales relate differently to social observation anxiety and social interaction anxiety. Given that there is evidence that BAS-FS is a measure of impulsivity and not necessarily a component of the BAS as conceptualized in RST ([Gomez & Corr, 2010](#); [Smillie et al., 2006](#)) this evaluation is important. For instance, if the BAS-FS, but not BAS-RR or BAS-DR, is linked to social anxiety then it could mean that the BAS may not have relevance for social anxiety.

The aim of this study was to use multiple regression analyses to examine how the BIS and BAS dimensions in the BIS/BAS scales, and the SPSRQ were uniquely related to social observation anxiety and social interaction anxiety. For the BIS/BAS scales, the original BIS scale was differentiated into BIS-Anxiety and BIS-Fear dimensions to reflect the r-RST, and all three BAS subscales were used in the regression analysis. Given past findings, it was hypothesized that both social observation anxiety and social interaction anxiety would be predicted positively by all the BIS dimensions

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