



## Social anhedonia and affiliation: Examining behavior and subjective reactions within a social interaction

Katiah Llerena<sup>a,\*</sup>, Stephanie G. Park<sup>a</sup>, Shannon M. Couture<sup>b</sup>, Jack J. Blanchard<sup>a</sup>

<sup>a</sup> University of Maryland, Department of Psychology, College Park, MD, USA

<sup>b</sup> University of Southern California, Department of Psychology, Los Angeles, CA, USA

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### ABSTRACT

Social anhedonia is a promising indicator for the vulnerability towards developing schizophrenia-spectrum disorders and is an important determinant of the social impairment associated with these disorders. It is unknown if social anhedonia is associated with true deficits in experiential reactions or if lower social functioning in social anhedonia reflects behavioral deficits in social skill or initiation of social contact. Using a novel social interaction task, the current study compared controls ( $n=60$ ) to individuals elevated on social anhedonia ( $n=49$ ) on observer-rated social skill and facial affect and participant self-reports of their experiential reactions to an affiliative interaction. Compared to the control group, the social anhedonia group was rated as behaviorally less affiliative and less socially skilled during the affiliative interaction. In response to the social interaction, the social anhedonia group reported less change in positive affect, less willingness to engage in future social interactions with the interaction partner, and less positive reactions toward the interaction partner compared to controls. There were no group differences in facial displays of emotion. Using a standardized affiliative stimulus, it was demonstrated that individuals high in social anhedonia have alterations in both their social skill and in their self-reported experiential reactions during a social interaction.

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### 1. Introduction

The reduced ability to experience pleasure from social experiences, social anhedonia, is a hallmark feature of schizophrenia (Meehl, 1962), is a key negative symptom (Blanchard and Cohen, 2006; Horan et al., 2006; Blanchard et al., 2011), and contributes to social dysfunction in schizophrenia (Meehl, 1962; Blanchard et al., 1998). Given its association with schizophrenia and related spectrum disorders, social anhedonia has also been studied as a potential indicator of schizotypy and other spectrum disorders (Kwapil, 1998; Kwapil et al., 2008; Gooding et al., 2005; Blanchard et al., 2011). Focusing on social outcomes, in non-clinical individuals, social anhedonia is associated with poorer social adjustment (Mishlove and Chapman, 1985; Kwapil, 1998; Diaz et al., 2002; Blanchard et al., 2011), less social support (Blanchard and Brown, 1999; Blanchard et al., 2011), and problematic family relations (Blanchard et al., 2011).

Despite evidence of impairment on broad indicators of social functioning described above, less is known about the actual social behavior of individuals with elevated social anhedonia. Recent experience-sampling methodology (ESM) studies have attempted

to examine social dysfunction in the daily lives of people with social anhedonia and have found that these individuals interact with others less frequently (Brown et al., 2007; Kwapil et al., 2008), report a preference for solitude and are alone by choice (Brown et al., 2007; Kwapil et al., 2008), and when in social situations, they take part in larger and less intimate groups and do not feel social (Kwapil et al., 2009). Although these findings are highly informative and tell us a great deal about the social worlds of individuals high in social anhedonia, there are a number of questions that remain. The ESM studies are based on self-reports of social activity and subjective responses to the environments that these individuals encounter. Thus, it is unclear if lower positive affect reported by individuals high in social anhedonia (e.g., Brown et al., 2007) reflects a lack of capacity for pleasure or if these altered emotional experiences reflect different social environments encountered by these individuals. Individuals high in social anhedonia may self-select less reinforcing social environments that lead to subjective declines in positive affect. Alternatively, schizoid and schizotypal characteristics may be associated with behaviors that elicit peer rejection as reflected by findings that these traits are associated with peer ratings of less likeability (Oltmanns et al., 2004). Additionally, the ESM findings leave open the question of how social anhedonia is manifested in social behavior and how this may contribute to difficulties in social interactions.

\* Corresponding author. Tel.: +1 301 405 6876; fax: +1 301 314 9566.  
E-mail address: [kllerena@umd.edu](mailto:kllerena@umd.edu) (K. Llerena).

The goal of the present study was to conduct direct assessments of social behavior of individuals high in social anhedonia to examine the potential underpinnings and mechanisms of social anhedonia. Maladaptive social behavior (i.e., poor social skill) may be a part of the process that leads to the manifestation of individual differences in the experience of pleasure that then invokes non-rewarding social environments. For this purpose we developed a novel video task that permitted us to standardize the social partner across participants while eliciting social behavior and collecting self-reports of emotional and affiliative responding.

In the realm of social behavior we examined behavioral ratings of social skill and facial emotional expression. Successful social interactions are based on both verbal and nonverbal social skills (Hersen and Bellack, 1976; Bellack et al., 2004). Most studies assessing social skill in clinical populations focus on using role-plays that are not based on social or interpersonal contexts that accurately examine the social pleasure deficits that underlie social anhedonia (e.g., in role-plays people have to solve conflicts, such as pleading to keep their job) (e.g., Bellack et al., 1990; Pinkham et al., 2007). Interestingly, there has yet to be an examination of whether non-clinical individuals high in social anhedonia manifest behavioral skills deficits in response to a laboratory paradigm. Social skill deficits might suggest factors that contribute to the social difficulties evident in individuals high in social anhedonia.

Beyond broad skills, an important feature of behavior that is relevant to social communication is the facial display of emotion (see review by Kring and Moran, 2008). Diminished emotional expression may have a negative impact on social relations (Butler et al., 2003). Thus, reduced facial emotional expression may have important implications for social functioning. Importantly, research suggests that social anhedonia may be associated with diminished emotional expression. Within non-clinical samples, social anhedonia has been correlated with self-reports of diminished emotional expression (Kring et al., 1994a). In the context of a clinical interview, behavioral codings of expressivity have shown that compared to controls, individuals high in social anhedonia exhibit diminished displays of affect (Collins et al., 2005). Extending this finding, Leung et al. (2010) demonstrated that individuals high in social anhedonia were less facially expressive than controls both on a self-report measure of expressivity and in behavioral ratings of facial expressivity in response to film clips. Emotional expression in an affiliative interaction has not yet been examined to determine if the above results may generalize to more naturalistic social behavior.

Although the social behaviors described above may contribute to the social dysfunction experienced by people elevated on social anhedonia, understanding the subjective emotional experience of these individuals in response to social events may clarify whether social dysfunction is also driven by an inherent diminished experience of pleasure from social events. The diminished ability to experience pleasure from social relationships is considered as the defining characteristic of social anhedonia (Meehl, 1962). Several studies have now shown that social anhedonia in non-clinical individuals is characterized by decreased positive affect (Gooding et al., 2002; Kerns et al., 2008; Leung et al., 2010; Blanchard et al., 2011). However, previous studies have not examined subjective responding in laboratory settings in which participants are socially engaged with an affiliative stimulus. Therefore, understanding the emotional responsivity of these individuals during a social encounter could shed light on whether social dysfunction is driven by subjective responding and/or behavior deficits.

In summary, our knowledge of the social behaviors and emotional responding of people elevated on social anhedonia is limited. The purpose of the current study was to examine

whether individuals elevated on social anhedonia behave differently in social interactions compared to controls and to better understand the role of emotional experience within social situations. First, it was hypothesized that individuals with social anhedonia would report fewer social supports and poorer social functioning as compared to controls. Second, it was hypothesized that participants with social anhedonia would display less observer-rated social skill during a social affiliation interaction task compared to controls. Third, we predicted that participants with social anhedonia would be characterized by reduced emotional expression, as determined by behavioral ratings of facial expressivity, in response to the social interaction compared to controls. Finally, it was also expected that participants with social anhedonia would report experiencing less positive affect and lower affiliative reactions in response to the social interaction compared to controls.

## 2. Methods and materials

### 2.1. Participants

Participants were between the ages of 18 and 30 years who attended a large public university in Maryland. Individuals completed a screening questionnaire, the Revised Social Anhedonia Scale (RSAS; Eckblad et al., 1982) online. Individuals were excluded if they endorsed three or more items in the unexpected direction on the RSAS Infrequency Scale (Chapman and Chapman, 1976). Individuals scoring within the top 10% of RSAS scores within each gender were identified as elevated on social anhedonia. This cut-off score has been used to effectively identify people high on social anhedonia (Germine et al., 2011). Individuals with scores within 0.5 standard deviations of the mean were identified as potential control participants. The final sample included 49 people in the social anhedonia group and 60 people in the control group. As seen in Table 1, participants did not significantly differ on age ( $t(107)=1.35, p=0.181$ ), race ( $\chi^2(4)=1.59, p=0.810$ ), or gender ( $\chi^2(1)=0.843, p=0.359$ ). All participants were compensated for their participation with monetary payment or course research credit.

### 2.2. Measures

#### 2.2.1. Symptom ratings and social functioning

The Schizotypal Personality Questionnaire (SPQ; Raine, 1991) and the Beck Depression Inventory-II (BDI-II) assessed for schizotypal personality symptoms and depressive symptoms in adults, respectively. The SPQ was administered to assess a broader range of schizotypal characteristics in our sample (e.g., do individuals in the social anhedonia group truly endorse more schizotypal traits?). The Social Adjustment Scale: Short (SAS-SR; Weissman and Bothwell, 1976) assessed social functioning. The Social Support Questionnaire (SSQ; Sarason et al., 1983, 1987) assessed the perceived number of and satisfaction with social supports.

#### 2.2.2. Social affiliation interaction task

Adapting procedures from prior laboratory studies examining mate selection and behavior (Simpson et al., 1993; Simpson et al., 1999; Gangestad et al., 2004), a video was developed to elicit affiliative social behaviors and positive emotion from participants. This video was developed to address the limitations of role-play stimuli previously used to measure social skill in clinical populations. In this simulated social affiliative interaction we created, participants were led to believe that the confederate in the video was an actual participant in another room that was interacting with them live via a closed-circuit video camera. The clip, which lasted 2 min 43 s, featured a friendly, attractive, and outgoing female who discussed her social relationships and activities enjoyed with others, such as going to parties and school sporting events. As the video clip ended, the video confederate asked participants what they like to do with friends and family, at which point the video concluded and the participants were instructed to respond. Participants were told that this was a study of how people get to know one another and they were told that the video confederate would also be watching them from the other room. Participants were recorded while they watched the confederate's introduction and while they responded to the confederate.

#### 2.2.3. Positive and negative affect schedule (PANAS)

The PANAS (Watson et al., 1988) is a 20-item self-report measure of positive and negative affect. Four additional items measuring affiliative emotions were included in this measure: *friendly*, *rejected*, *lonely*, and *sociable*. In the current study, the PANAS was used with short-term instructions, such as *right now*, to

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