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Normative emotion-modulated startle response in individuals at risk for schizophrenia–spectrum disorders[☆]

Diane C. Gooding^{*}, Richard J. Davidson, Katherine M. Putnam, Kathleen A. Tallent

University of Wisconsin–Madison, Department of Psychology and Psychiatry, 1202 W. Johnson Street, Madison, WI 53706-1696, USA

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Abstract

The nature of the affective deficit that characterizes social anhedonia is not well understood. Emotionally evocative visual stimuli were presented to undergraduates identified as anhedonic or normal, based on their scores on the revised Social Anhedonia Scale. The affective stimuli were chosen to elicit positive and negative emotion; a subset of slides were specifically chosen to include social–interpersonal content. In the acoustic startle paradigm, participants were administered startle probes (50-ms 95 dB white noise bursts) while viewing images from the International Affective Picture System. Socially anhedonic individuals did not differ from normally hedonic individuals in terms of their physiological response to the stimuli, regardless of the nature of the content of the stimuli. However, on the self-report measures of trait affectivity, the socially anhedonic individuals reported significantly lower levels of positive affect and higher levels of negative affect. These findings suggest that the affective deficits reported by socially anhedonic individuals are not global in nature. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

Anhedonia, the reduced ability to experience pleasure, has been hypothesized to be a core feature of schizophrenia (Meehl, 1962; Rado, 1962; Blanchard et al., 1998). Since Meehl's early writings, anhedonia has been posited as either a contributing or potentiating

factor in the development of schizophrenia. The Chapmans developed the Social Anhedonia Scale (Chapman et al., 1976; Eckblad et al., 1982) as a self-report measure to assess Meehl's (1962) descriptions of asociality.

Kwapil (1998) indicated that individuals with deviantly high scores on the revised Social Anhedonia Scale (Eckblad et al., 1982) are disproportionately more likely to develop a schizophrenia–spectrum disorder than controls. This finding suggests that the Social Anhedonia Scale independently predicts the development of schizophrenia–spectrum disorders. Comparative studies of social anhedonics and controls have indicated that the former group reports more psychotic-like experiences (Gooding et al., 1999), and is more likely to demonstrate neuropsychological

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^{*} Corresponding author. Tel.: +1-608-262-3918; fax: +1-608-262-4029.

E-mail address: dgooding@facstaff.wisc.edu (D.C. Gooding).

(Gooding et al., 1999; Tallent and Gooding, 1999) and psychophysiological abnormalities (Gooding and Miller, 1998; Gooding, 1999; Gooding et al., 2000) displayed by many individuals with schizophrenia. Finally, Blanchard et al. (2000) applied taxometric procedures to the revised Social Anhedonia Scale and found evidence of a taxonic latent structure, consistent with the notion that this scale is an indicator of schizotypy. Taken together, these findings buttress support for further research interest in individuals reporting extreme levels of social anhedonia.

Social anhedonia, by definition, involves a deficit in affective experience. Individuals with anhedonia are purportedly hypo-responsive to pleasurable stimuli. According to Lang (1995), affective response can be measured in three different systems, namely, by subjective report, physiological reactivity, and behavioral actions. Presently, the nature of the affective deficit that characterizes social anhedonia is not well understood. The startle probe response is a useful measure for analyzing affective states (Vrana et al., 1988; Bradley et al., 1999).

1.1. *The startle paradigm*

The acoustic startle response in humans has behavioral plasticity, such that the response magnitude can be experimentally manipulated (Koch, 1999). Lang and others (c.f. Lang, 1995; Bradley et al., 1993) have used pictures to manipulate affective state. The magnitude of defensive eyeblink reflexes in response to auditory probes is typically greater in the presence of negatively valenced, highly arousing pictures compared to the reflexive response elicited during the presence of neutral, low-arousal pictures (Vrana et al., 1988). The magnitude of defensive eyeblink reflexes is attenuated during the presentation of positively valenced, highly arousing pictures relative to their magnitude during the presentation of neutral, low-arousal pictures.

Although there are no studies of socially anhedonic individuals' startle response, there have been a few studies of startle response in individuals with schizophrenia. Studies of individuals with schizophrenia (Schlenker et al., 1995; Curtis et al., 1999) indicate that schizophrenia is associated with normal affective modulation of startle. However, not all individuals with schizophrenia will have social anhedonia (Oli-

vares and Berrios, 1998). It is possible that an emotion-modulated startle deficit may only be apparent in schizophrenic individuals with social anhedonia. Studying socially anhedonic individuals on the startle paradigm may shed further insights into the relationship between social anhedonia and schizophrenia. According to a developmental conceptualization of schizophrenia (c.f. Gooding and Iacono, 1995), it is reasonable to assume that at least some of the socially anhedonic individuals are schizotypes, i.e. they possess the liability for the development of schizophrenia, and hence, those individuals would be expected to perform similarly to schizophrenia patients on the startle paradigm. However, given the observation that social anhedonia is predictive of schizophrenia-spectrum disorders, and not necessarily predictive of schizophrenia per se, individuals with social anhedonia may display somewhat different patterns from individuals with schizophrenia. Thus, the differences between putatively at-risk individuals and affected individuals may be as revealing as the similarities between the two groups.

To date, there have been no investigations of affective response in individuals reporting social anhedonia. The first objective of this study was to test whether the socially anhedonic individuals would fail to show the normative attenuation of the startle blink during the presentation of positive stimuli. Given Meehl's (1962) conceptualization of the construct, we expected that the difference between the normally hedonic individuals and the socially anhedonic individuals would be greatest when comparing the groups' response to positive stimuli with social-interpersonal content. We were also interested in determining whether individuals reporting social anhedonia would show affective modulation of the startle blink response in response to aversive or unpleasant stimuli. Assessment of the startle response enables us to investigate the nature and extent of affective deficits in socially anhedonic individuals.

The second aim of this study was to evaluate the relationship between social anhedonia and trait dimensions of anxiety, positive affect, and negative affect. Given that the Social Anhedonia Scale was developed to be independent of social anxiety, we expected that there would be little, if any, correlation between social anhedonia and social anxiety. In Meehl's (1962) conceptualization of hedonic capacity,

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