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Anhedonia in schizophrenia: Distinctions between anticipatory and consummatory pleasure ☆

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Abstract

Research on anhedonia in schizophrenia has revealed mixed results, with patients reporting greater anhedonia than healthy controls on self-report measures and semi-structured interviews, but also reporting comparable experiences of positive emotions in response to pleasurable stimuli. Basic science points to the importance of distinguishing between anticipatory and consummatory (or in-the-moment) pleasure experiences, and this distinction may help to reconcile the mixed findings on anhedonia in schizophrenia. In two studies, we tested the hypothesis that anhedonia in schizophrenia reflects a deficit in anticipatory pleasure but not consummatory pleasure. In Study 1, we used experience sampling methodology to assess reported experiences of consummatory and anticipated pleasure among schizophrenia patients and controls. In Study 2, schizophrenia patients and controls completed a self-report trait measure of anticipatory and consummatory pleasure and interviews that assessed negative symptoms, including anhedonia, and community functioning. In both studies, we found evidence for an anticipatory but not a consummatory pleasure deficit in schizophrenia. In addition, anticipatory pleasure was related to clinical ratings of anhedonia and functional outcome. Clinical and research implications of these findings are discussed.

Keywords: Schizophrenia; Pleasure; Anhedonia; Anticipation; Consummatory; TEPS

1. Introduction

Although anhedonia, defined as an inability to experience pleasure, has long been considered a core feature of schizophrenia, recent research raises fundamental questions about the nature of this emotional disturbance. On the one hand, patients report experiencing lower levels of pleasure than controls on self-report trait measures and in semi-structured interviews (see Horan et al., 2006b for a review). On the other hand, patients report experiencing as much pleasant

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emotion as controls in response to emotionally evocative stimuli (e.g., Berenbaum and Oltmanns, 1992; Kring and Earnst, 1999; Kring and Neale, 1996).

In an effort to reconcile these findings, we have proposed that the nature of the anhedonia deficit in schizophrenia is more circumscribed (Germans and Kring, 2000; Kring, 1999). Drawing on neurobehavioral models that distinguish between components of hedonic experience (e.g., Berridge and Robinson, 2003; Depue and Collins, 1999; Gard et al., 2006; Knutson et al., 2001), we proposed that schizophrenia patients experience normal levels of pleasure when directly engaged in an enjoyable activity, or *consummatory* pleasure, but experience disturbances in the experience of pleasure related to future activities, or *anticipatory* pleasure. These aspects of hedonic experience have distinguishable neural circuitry, neurotransmitter involvement, and behavioral sequelae. Anticipatory pleasure appears to rely heavily, though not exclusively, on dopamine and the mesolimbic pathway whereas serotonergic and opioid systems appear to be more centrally involved in consummatory pleasure (Berridge and Robinson, 1998; Schultz, 2002; Wise, 2002). Anticipatory pleasure can be further parsed into two components: (1) predicting the future experience of pleasure, and (2) the concurrent experience of pleasure knowing that a future activity is going to occur — that is, the pleasure experienced *in anticipation* of things to come. In addition, anticipatory pleasure is linked to motivational processes that promote goal-directed behaviors aimed at achieving desired rewards (Carver, 2001; Dickinson and Balleine, 1995; Schultz, 2002). Thus, to the extent that schizophrenia patients exhibit deficits in anticipatory pleasure, we would expect this to be linked to a decrement in goal-directed behavior.

In the current studies, we used convergent methods to evaluate the hypothesis that schizophrenia patients have an anticipatory but not consummatory pleasure deficit. In Study 1, we examined daily reports of anticipatory and consummatory pleasure in schizophrenia patients and healthy controls over the course of one week. Using the experience sampling method, we assessed participants' ability to predict future pleasure from both goal-directed and non-goal-directed activities. In Study 2, we administered a battery of self-report and interview-based measures, including a trait measure of anticipatory and consummatory pleasure, to schizophrenia patients and healthy controls. The trait measure used in Study 2 assesses the experience of pleasure in anticipation of future events. To further establish the validity of this pleasure distinction in schizophrenia, we examined the correlates of anticipatory and consummatory pleasure in schizophrenia patients, including other measures of anhedonia, approach motivation, and functional outcome.

2. Study 1

2.1. Method

2.1.1. Participants

Outpatients with either schizophrenia ($n=10$) or schizoaffective disorder ($n=5$) participated. Diagnoses were confirmed using the Structured Clinical Interview for DSM-IV (First et al., 1994). Individuals were excluded from the study if they reported current alcohol or drug abuse, a history of head trauma or loss of consciousness, poor fluency in English, or an active mood episode. All patients were taking medication, either typical ($n=10$) or atypical ($n=5$) antipsychotics.[1] Healthy controls ($n=12$) were recruited via flyers in the community and were screened with a phone interview. Controls were excluded if they reported a personal or family history of mental illness or psychiatric hospitalization, past head trauma or loss of consciousness, current substance abuse or dependence, English fluency problems, or prescription medication that might have affected mood. All participants were paid $50.00 for their participation. This study received IRB approval for all procedures, and all participants gave written informed consent to participate.

Patients and controls did not significantly differ in age t (25)=1.81, ns, education t (25)=.12, ns, gender χ^2 (1, N=27)=1.69, ns, ethnicity χ^2 (3, N=27)=2.13, ns, marital status χ^2 (3, N=27)=6.63, ns, or employment status χ^2 (2, N=27)=4.33, ns (see Table 1).

2.1.2. Measures and procedure

We followed typical experience sampling study procedures by using pagers and booklets for participants to enter information regarding their daily experience. Participants were paged seven times a day for seven days (49 observations per participant). The times of the pages were pseudo-random between 8 a.m. and 10 p.m. such that no two pages occurred within 45 min of each other and that pages occurred at least once every 3 h. Once paged, participants wrote down what they were doing and rated the amount of enjoyment they were experiencing (i.e., their consummatory pleasure) using a 5 point Likert scale (0 = not at all to 5 = very much). Participants rated anticipatory pleasure by indicating what they were

[1] Given the small number of patients taking atypical neuroleptics in Study 1, we felt it imprudent to examine patients' responses based on medication type or dosage. Indeed, the most optimal test for medication effects is to test the same patients both on and off medication (Blanchard and Neale, 1992).