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Deficits in anticipatory but not consummatory pleasure in people with recent-onset schizophrenia spectrum disorders

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ABSTRACT

The majority of studies examining self-reported anticipatory and consummatory pleasure in schizophrenia, as measured on the Temporal Experience of Pleasure Scale (TEPS), have been conducted on chronically ill people with the disorder. In this study, people with a recent-onset schizophrenia spectrum diagnosis (first psychotic episode within one year of study participation) ($n = 88$) and people without a schizophrenia spectrum diagnosis ($n = 66$) were administered the TEPS. People with a schizophrenia spectrum diagnosis reported significantly lower scores of anticipatory, but not consummatory, pleasure on the TEPS compared to the control group. TEPS anticipatory pleasure scores were also significantly, negatively correlated with negative symptoms, but neither TEPS anticipatory nor consummatory pleasure scores were significantly correlated with functioning measures. Our results replicate previous findings with chronically ill people with schizophrenia on the TEPS.

1. Introduction

Recent evidence indicates that people with schizophrenia or schizoaffective disorder experience deficits in anticipatory pleasure, or pleasure related to future activities, but not in consummatory pleasure, or pleasure experienced in-the-moment (for a review see Kring and Elis, 2013). The Temporal Experience of Pleasure Scale (TEPS) is a self-report measure of the general propensity to experience anticipatory and consummatory pleasure (Gard et al., 2006). Studies in the U.S., China, Switzerland, and France have found that people with schizophrenia or schizoaffective disorder reported lower anticipatory pleasure but comparable consummatory pleasure on the TEPS compared to healthy controls (Gard et al., 2007; Favrod et al., 2009; Loas et al., 2009; Chan et al., 2010; but see Strauss et al., 2011 for different results). Prior studies have also found that TEPS anticipatory and consummatory pleasure scores are positively correlated with functional outcome (Gard et al., 2007; Chan et al., 2010; Buck and Lysaker, 2013) and negatively correlated with negative symptoms (Gard et al., 2007; Favrod et al., 2009; Loas et al., 2009; Chan et al., 2010). TEPS anticipatory, but not consummatory, pleasure is negatively correlated with subclinical negative symptoms (Engel et al., 2013) and is lower in people who score higher on social anhedonia measures compared to those who do not (Xie et al., 2014).

Studies that utilize the TEPS have thus far almost exclusively included chronically ill people with schizophrenia. However, studies using other self-report measures of anhedonia, such as the Chapman scales of physical and social anhedonia, have found that people early in the course of schizophrenia report more physical anhedonia than the controls (Horan et al., 2008) and people experiencing their first lifetime episode of psychosis report more social anhedonia compared to the controls (Katsanis et al., 1990). To date, two studies have administered the TEPS to people early in the course of a schizophrenia spectrum disorder (SSD). Cassidy et al. (2012) found no differences in TEPS anticipatory pleasure between people with and without a psychotic disorder. However, most participants in the study had used cannabis throughout the lifetime, thus making conclusions about the contributions of psychosis versus cannabis use on TEPS scores difficult to disentangle. Schlosser et al. (2014) found that people with recent-onset (within the last five years) schizophrenia reported less anticipatory than consummatory pleasure on the TEPS but did not differ on either scale compared to a younger, healthy control group. However, people at clinical high risk for schizophrenia reported less anticipatory pleasure than a demographically matched healthy control group.

In the current study, we examined people with a recent-onset SSD to determine if and when deficits in reported anticipatory pleasure emerge in the course of the illness. We defined "recent-onset" in our study as experiencing a first episode of psychosis within one year of study

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participation. Based on previous studies with more chronically ill samples, we hypothesized that people with an SSD would show deficits in anticipatory pleasure but not in consummatory pleasure compared to people without an SSD. We also included measures of symptom severity, occupational functioning, and social functioning in order to examine the correlates of anticipatory pleasure.

2. Method

2.1. Participants

People with schizophrenia ($n = 71$), schizophreniform disorder ($n = 11$), or schizoaffective disorder ($n = 13$) who had their first episode of psychosis within one year of study participation were invited to participate (see Table 1 for demographic information). All SSD participants were clinically stable, defined as no inpatient hospitalization within three months of study participation. People who had never experienced a psychotic episode and did not meet the criteria for a current Axis I (DSM-IV-TR) diagnosis ($n = 66$) were included as the control group. All but eight participants with an SSD were taking at least one psychiatric medication: 72 were taking a second generation antipsychotic medication, four were taking both first and second generation antipsychotic medications, and four were taking non-antipsychotic psychiatric medication(s). Fifty-five participants were taking multiple psychiatric medications at time of testing. The participants were excluded from analysis ($n = 7$ people with an SSD) if they met criteria for current alcohol/substance abuse, a history of alcohol/substance dependence, or history of neurological disorder. In sum, 88 participants with an SSD and 66 control participants were included in the analyses.

2.2. Procedure

Prior to study participation, the participants completed informed verbal and written consent.

The participants were administered the Structured Clinical Interview for DSM-IV Patient Version (SCID-P; First et al., 1994) or the SCID-non-patient version (SCID-NP) to confirm diagnoses. People with an SSD were also administered the Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962) and the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1982) to assess current symptoms; the Strauss Carpenter Outcome Scale (Strauss and Carpenter, 1972) to assess social functioning (item 2) and work functioning (item 3); and the Global Assessment of Functioning (Hall, 1995).

All participants completed the TEPS (Gard et al., 2006), which is comprised of ten items assessing trait dispositions of anticipatory pleasure experiences and eight items assessing trait dispositions of consummatory pleasure experiences. An example of an anticipatory pleasure item is, "I get so excited the night before a major holiday I can hardly sleep." An example of a consummatory pleasure item is, "The smell of freshly cut grass is enjoyable to me." The participants rated each on a scale from one (very false for me) to six (very true for me) how true each item was for them "in general."

Table 1
Demographics, symptoms, medications and TEPS scores.

	SSD ($n = 88$)	Controls ($n = 66$)	p value
% male	77%	47%	$p < 0.001$
Age	20.99 (3.55)	22.54 (2.96)	$p = 0.005$
(range)	(16–33)	(16–32)	
Education (years)	12.59 (1.70)	14.27 (2.60)	$p < 0.001$
TEPS anticipatory	4.24 (0.83)	4.48 (0.57)	$p = 0.04$
TEPS consummatory	4.30 (0.91)	4.39 (0.70)	$p = 0.49$
% White	59%	52%	$p = 0.35$
% African-American/Black	19%	0%	$p < 0.001$
% Hispanic	2%	11%	$p = 0.03$
% other/multiple ethnicities	19%	38%	$p = 0.01$
Second generation antipsychotic	81%		
First and second generation antipsychotics	5%		
Other psychiatric medication(s)	5%		
No psychiatric medication	9%		
BPRS positive	2.32 (0.80)		
BPRS negative	2.04 (0.85)		
BPRS depression	1.84 (0.83)		
SANS	1.36 (0.64)		
Social functioning	2.15 (1.51)		
Work functioning	1.72 (1.26)		
Global functioning	45.05 (8.23)		

Notes. SSD = schizophrenia spectrum diagnosis; TEPS = Temporal Experience of Pleasure Scale; BPRS = Brief Psychiatric Rating Scale; SANS = Scale for the Assessment of Negative Symptoms.

3. Results

3.1. Demographics

As shown in Table 1, the SSD group significantly differed in age and education compared to the control group. However, age and education were not significantly correlated with TEPS anticipatory or consummatory pleasure scores either within or across groups ($p > 0.05$). There were no differences in the proportion of white participants between the two groups (χ^2 (2, $N = 154$) = 0.88, $p = 0.35$). However, the groups differed in proportions of ethnic minority participants (all χ^2 tests significant, $p < .05$). There were significantly more men than women in the SSD group (χ^2 (2, $N = 88$) = 26.18, $p < 0.001$), but not in the control group (χ^2 (2, $N = 66$) = 0.24, $p = 0.62$).

3.2. TEPS anticipatory and consummatory scores

As shown in Table 1, independent samples t tests revealed that the SSD group had a significantly lower TEPS anticipatory pleasure score compared to the control group, t (152) = 2.06, $p = 0.04$. However, the SSD group did not differ in the TEPS consummatory score compared to the control group, t (152) = 0.66, $p = 0.49$.

Given that there were fewer women in the SSD group compared to the control group, we examined sex differences within each group. Independent samples t tests revealed no differences between men and women on either TEPS anticipatory or consummatory pleasure scores ($p > 0.05$) in either the SSD or control group, with one nonsignificant exception: female controls tended to report experiencing more consummatory pleasure ($M = 4.54$, $SD = 0.69$) than male controls ($M = 4.23$, $SD = 0.68$), t (64) = 1.81, $p = 0.08$. There were no significant ethnicity differences in either TEPS score.

3.3. Symptom and functioning measures

TEPS anticipatory and consummatory pleasure scores were significantly, positively correlated with one another, $r = 0.65$, $p < 0.001$. Correlations between TEPS anticipatory and consummatory pleasure scores with symptoms and functioning measures are presented in Table 2. TEPS anticipatory pleasure was significantly, negatively correlated with BPRS negative symptoms and the SANS blunted affect subscale. TEPS consummatory pleasure was significantly, negatively correlated with BPRS negative symptoms, BPRS depression, SANS total, and SANS alogia. Correlations between TEPS anticipatory and consummatory pleasure scores with the functioning measures were nonsignificant.

4. Discussion

In the current study, we assessed whether deficits in the propensity to experience anticipatory pleasure are evident early in the course of schizophrenia spectrum disorders. We found that people in the early course of an SSD reported lower dispositional anticipatory pleasure

Table 2
Correlations between TEPS anticipatory and consummatory scales and symptom and functioning measures.

	BPRS positive ($n = 85$)	BPRS negative ($n = 85$)	BPRS depression ($n = 85$)	SANS total ($n = 88$)	SANS blunted affect ($n = 86$)	SANS alogia ($n = 86$)	SANS avolition ($n = 86$)	SANS asociality/ anhedonia ($n = 78$)	Global func. ($n = 86$)	Social func. ($n = 86$)	Work func. ($n = 86$)
TEPS ant.	0.08	−0.22*	−0.09	−0.17	−0.26*	−0.08	−0.02	−0.09	0.03	0.04	0.09
TEPS cons.	−0.10	−0.24*	−0.24*	−0.25*	−0.19	−0.21*	−0.17	−0.19	0.08	0.06	0.18

Notes. TEPS = Temporal Experience of Pleasure Scale; Ant. = anticipatory pleasure; Cons. = consummatory pleasure; BPRS = Brief Psychiatric Rating Scale; SANS = Scale for the Assessment of Negative Symptoms; Func. = functioning.
* Significant at the $p \leq 0.05$ level.

but did not differ in reported dispositional consummatory pleasure compared to healthy controls. These findings are consistent with studies of more chronically ill people with schizophrenia (Gard et al., 2007; Favrod et al., 2009; Loas et al., 2009; Chan et al., 2010). However, our findings differ from two recent studies with people early in the course of an SSD (Cassidy et al., 2012; Schlosser et al., 2014).

Identifying reasons why some studies find deficits in anticipatory pleasure and others do not is an important direction for future research. Likely explanations include the characteristics of the clinical and control groups. With respect to clinical characteristics, our sample did not include any participants with current substance use disorder, whereas most participants in the Cassidy et al. (2012) study did (as the purpose of their study was to assess cannabis use in psychotic disorders).

Another explanation may be related to how anticipatory deficits are described. We considered "deficits" in anticipatory pleasure as a significantly lower score on the TEPS anticipatory pleasure measure in people with an SSD compared to the controls. However, this assumes that the control group is homogeneous in a variety of factors that may influence self-reported anticipatory pleasure. There are likely unstudied individual differences that influence TEPS scores within different groups that may partially account for why some studies fail to find anticipatory pleasure deficits in people with schizophrenia. For example, in Strauss et al. (2011), the control group had a consummatory pleasure score of 4.96, while the control group in our study had a score of 4.39, a seemingly significant difference between the two groups. This may partially account for why Strauss et al. (2011) did not find the same pattern of differences in anticipatory and consummatory pleasure scores on the TEPS in people with and without schizophrenia as our study did.

While Schlosser et al. (2014) did not find that people with recent onset schizophrenia differed from younger healthy controls in anticipatory pleasure, they found that people with recent onset schizophrenia reported significantly lower TEPS anticipatory pleasure than consummatory pleasure. Future studies may wish to adopt both within and between-group comparisons in defining "deficits" in self-reported pleasure. Furthermore, as studies continue to include the TEPS, meta-analysis will prove useful in better understanding differences between people with and without schizophrenia on this measure.

We found that both anticipatory and consummatory pleasure scores were related to negative (but not positive) symptoms, consistent with prior studies including more chronic samples (Gard et al., 2007; Favrod et al., 2009; Loas et al., 2009; Chan et al., 2010). These results suggest that even in the early stages of the illness, people with an SSD who report lower dispositional anticipatory pleasure are also likely to exhibit negative symptoms. Deficits in the propensity to experience anticipatory pleasure may be an indicator of early negative symptoms that may not be otherwise detectable. On the other hand, greater dispositional consummatory pleasure was related to lower negative symptom scores and depression, suggesting that while diminished experience of consummatory pleasure may also be an indicator of negative symptoms, it may additionally be more sensitive to state-dependent factors (current mood). It will be informative to assess the linkage between dispositional anticipatory and consummatory pleasure and symptom-level anticipatory and consummatory pleasure in future studies using measures that distinguish these types of pleasure, such as the Clinical Assessment Interview for Negative Symptoms (CAINS; Kring et al., 2013).

Contrary to our findings, studies of chronically ill people with schizophrenia have found that social functioning is related to TEPS anticipatory and consummatory pleasure (Gard et al., 2007; Chan et al., 2010; Buck and Lysaker, 2013). It is possible that people in our SSD group had other resources or support (e.g., living with their parents) that help guide their functioning that chronically ill people with schizophrenia do not have, thus deficits in anticipatory pleasure may not be as tightly linked with their functioning. Another possibility is that the strength of the relationship between anticipatory pleasure deficits and functional outcome increases over time, even if both constructs remain independently stable. Herbener et al. (2005) found that over a 20-year period, neither physical anhedonia nor functional outcome became significantly more severe in a sample of people with schizophrenia; however, over time the strength of the correlation between physical anhedonia and functional outcome increased. They suggested that physical anhedonia may be one factor that contributes to the heterogeneity in functional outcome scores in schizophrenia samples and that the co-occurrence of both may reflect a common underlying deficit. The relationship between anticipatory pleasure and functional outcome may follow a similar trajectory over time, and future studies that examine the longitudinal nature of anticipatory pleasure and functioning in schizophrenia can help answer this open question.

Although we administered the TEPS to a group of people who had experienced a psychotic episode, future studies should continue to examine other populations, including clinical high risk (CHR) samples, to further pinpoint when anticipatory pleasure deficits may emerge during the development of an SSD. Schlosser et al. (2014) found that CHR individuals reported less TEPS consummatory and anticipatory pleasure compared to demographically matched healthy controls, suggesting that such deficits may reflect a vulnerability towards a future psychotic episode. Future studies should continue to administer the TEPS during multiple time points as the illness progresses, both in between and within-group designs, to help understand the longitudinal course of anticipatory pleasure in schizophrenia.

One limitation of our study is that our SSD group differed from our control group on demographic factors, including sex and ethnicity. While there were no significant sex differences in reports of either TEPS anticipatory or consummatory pleasure within our two groups, future studies will want to include more women with an SSD in their samples to replicate this finding and address the under-representation of women with schizophrenia in research more generally (Longenecker et al., 2010). A second limitation is that we only included one (self-report) measure of anticipatory and consummatory pleasure. Augmenting the understanding of the temporal experience of emotion by including other measures, such as a behavioral measure of anticipatory and consummatory pleasure, is an important next step (e.g., Trémeau et al., 2010).

This study extends our understanding of one aspect of the emotion deficits observed in schizophrenia — deficits in anticipatory pleasure — to those early in the course of the illness. A related emotion deficit that

has been observed in samples of more chronically ill people with schizophrenia is the ability to maintain emotion experience (Kring et al., 2011; Ursu et al., 2011). Ursu et al. (2011) found that emotion maintenance, specifically viewing an emotionally evocative picture and reporting emotion experience after a delay, was associated with diminished dorsolateral prefrontal cortex activation among people with schizophrenia. This suggests that emotion maintenance relies upon neural processes that not only support emotion but also cognitive control processes. Anticipation likely recruits similar brain regions, as anticipation requires a host of similar cognitive operations, such as creating and maintaining visual images and accessing "mental time travel" processes. While we did not include any neuropsychological measures (e.g., IQ or working memory) or fMRI in our study, future studies may wish to include these measures to help answer such questions as a) whether people early in the course of a schizophrenia spectrum disorder also experience difficulties in emotion maintenance and b) whether similar brain regions are involved in both emotion anticipation and maintenance.

There has been some preliminary work showing that directly targeting anticipatory deficits in treatment is related to increases in self-reported anticipatory pleasure on the TEPS (Favrod et al., 2010). Treating anticipatory deficits in newly diagnosed people with a schizophrenia spectrum disorder may be a particularly important time period for administering such interventions, as it is before deficits in anticipatory pleasure are related to functioning but after such deficits are correlated with negative symptoms. An interesting yet unexplored question is whether an intervention targeting anticipatory deficits during the early stages of the illness would not only increase self-reported anticipatory pleasure, but whether the intervention would also be related to improved functional outcome or negative symptomatology over time.

In summary, people with a recent-onset schizophrenia spectrum diagnosis reported lower levels of trait anticipatory pleasure but not consummatory pleasure on the TEPS when compared to a healthy control group. During the early stage of the illness, both anticipatory and consummatory pleasure scores appear to be related to negative symptom measures, but not to functional outcome measures. Future studies should continue to examine when anticipatory deficits emerge in schizophrenia, when such deficits relate to both symptoms and outcome measures, whether there are other individual differences that may account for such differences, and whether directly targeting anticipatory deficits in the early course of the illness would improve functional outcome or symptom severity as the illness progresses.

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Contributors

Authors Minzenberg, Carter, and Kring contributed to the study design and data collection. Authors Mote and Kring contributed to data analysis, interpretation of data analysis, and writing of this report. All authors contributed to and have approved the final manuscript.

Conflict of interest

None.

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