Psychiatry Research 228 (2015) 166–169

Contents lists available at ScienceDirect

Psychiatry Research

journal homepage: www.elsevier.com/locate/psychres

Brief report

Subjective pleasure experience in patients with recent-onset schizophrenia: A preliminary report

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ARTICLE INFO

Article history:
Received 22 January 2015
Received in revised form
3 April 2015
Accepted 9 April 2015
Available online 16 April 2015

Keywords:
Anticipatory pleasure
Consummatory pleasure
Schizophrenia

ABSTRACT

Little is known about subjective pleasure experience in recent-onset schizophrenia, and its relationship with neurocognitive functions. Twenty-seven recent-onset schizophrenia people and 26 controls completed the TEPS and neuropsychological tests. The results showed that schizophrenia people self-reported less anticipatory pleasure than controls. Semantic verbal fluency was apparently correlated with anticipatory pleasure.

1. Introduction

Anhedonia refers to the diminished ability to experience pleasure, and constitutes one of the negative symptoms of schizophrenia (Kirkpatrick et al., 2006). Hedonic capacity has been conceptualised as a construct comprising the "anticipatory" component (wanting) and the "consummatory" component (liking) (Berridge, 2003, 2007; Kring and Barch, 2014). People with schizophrenia commonly report difficulties in experiencing pleasure in everyday life (Horan et al., 2008), but have intact affective experiences in response to emotionally evocative stimuli (Cohen and Minor, 2010; Llerena et al., 2012). The evidence appears to support a dissociation of anticipatory and consummatory pleasure experience in people with schizophrenia. Compared to consummatory pleasure, anticipatory pleasure has been proposed to be more closely related to motivated behaviour (Barch and Dowd, 2010; Kring and Barch, 2014). The Temporal Experiences of Pleasure Scale (TEPS; Gard et al., 2006, 2007) was developed to tap into the anticipatory–consummatory differentiation of anhedonia.

Using the TEPS, Gard et al. (2007) found that people with chronic schizophrenia anticipated less pleasure from everyday activities, whereas Strauss et al. (2011) found that people with chronic schizophrenia reported experiencing less consummatory pleasure. In another study, Chan et al. (2010) administered the TEPS on people with chronic schizophrenia and found that people with prominent negative symptoms anticipated less pleasure than those without, but the two groups did not differ in consummatory pleasure. To date, only three studies (Cassidy et al., 2012; Schlosser et al., 2014; Mote et al., 2014) have recruited people with recent-onset (duration of illness <5 years) schizophrenia and the findings reported have been inconsistent. Using the TEPS, Schlosser et al. (2014) and Cassidy et al. (2012) found that people with recent-onset schizophrenia self-reported similar anticipatory and consummatory pleasure as controls. However, Mote et al. (2014) reported that people with early schizophrenia-spectrum disorders anticipated less pleasure than controls, but had intact consummatory pleasure.

The inconsistent findings may be related to several methodological limitations, i.e., the group difference in age (Schlosser et al., 2014; Mote et al., 2014) and the confounding effect of active cannabis misuse (Cassidy et al., 2012). In this study, we re-examined the important issue of anticipatory and consummatory pleasure in recent-onset schizophrenia, using samples that were better matched in demographics and having no past history of illicit substance misuse. Gooding and Pflum (2012) have begun to examine the relationship between the ability to experience anticipatory and consummatory pleasure, and working memory, in individuals reporting higher level of social anhedonia. However,

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http://dx.doi.org/10.1016/j.psychres.2015.04.013
0165-1781/

there is a paucity of evidence for people with schizophrenia in this interesting area. We also examined the relationship between neurocognitive functions, and anticipatory and consummatory pleasure, in people with recent-onset schizophrenia. We hypothesised that (1) people with schizophrenia have difficulties in experiencing pleasure, and that these deficits would be apparent in the anticipatory rather than the consummatory domains of pleasure experience; and (2) working memory, rather than other neurocognitive functions, is correlated with the ability to experience anticipatory pleasure but not consummatory pleasure.

2. Methods

2.1. Participants

We recruited 27 clinically stable outpatients with a DSM-IV diagnosis of schizophrenia from an early psychosis intervention programme in Hong Kong. Diagnoses were based on structured interviews (First et al., 1995), supplemented by information from medical records. Exclusion criteria were (1) a life-time history of substance abuse, (2) a history of electroconvulsive therapy in the past six months, (3) neurological disorder, (4) a history of head injury with loss of consciousness for more than 30 min, and (5) mental retardation. We also recruited 26 healthy individuals from nursing schools and community youth centres as controls. Interviews by a qualified psychiatrist ascertained that no controls had any lifetime or family history of psychosis. All participants were Chinese in ethnicity. Demographics, treatment histories, and antipsychotic medications in terms of chlorpromazine equivalent (Gardner et al., 2010) were ascertained from case records. All the people with recent-onset schizophrenia (duration of illness <5 years) had medication history, with two receiving first-generation antipsychotics, 23 receiving second-generation antipsychotics and two receiving clozapine. Thirteen people additionally received anticholingerics (benzhexol) at a daily dosage range of 2–8 mg. None received any benzodiazepines. Table 1 shows the participants' characteristics.

2.2. Measures and procedure

Participants completed the Temporal Experience of Pleasure Scale (TEPS) (Gard et al., 2006, 2007). The Chinese version of the TEPS (Chan et al., 2012) modified the original 18-item questionnaire, and used nine items to generate the anticipatory pleasure subscale score, and 10 items to generate the consummatory pleasure subscale score. Chan et al. (2012) found a four-factor rather than two-factor solution for the TEPS (contextual anticipatory, abstract anticipatory, contextual consummatory, abstract consummatory), based on a non-clinical Chinese sample comprising 1119 students. The Chinese version of the TEPS was demonstrated to have satisfactory validity and reliability, internal consistency in factor structure and discriminatory ability in the Chinese population (Chan et al., 2010, 2012).

The Positive and Negative Syndrome Scale (PANSS; Kay et al., 1987) was administered by trained psychiatrists. We estimated intelligence using a prorating method based on the arithmetic, similarity and digit span subscales of the Chinese version of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Gong, 1992).

Participants also completed a battery of neurocognitive tests. For the Logical Memory (LM) and Visual Reproduction (VR) subtests of the Chinese version of the Wechsler Memory Scale-Revised (Gong et al., 1989), we read out a story and presented two figures, one at a time, to the participants, and the participants were required to recall the materials immediately and after 30 min. In the Letter-Number Span Test (LNT; Gold et al., 1997), a series of alternating numbers and letters were read to the participants, and they were asked to rearrange the letters and numbers in successive order. We recorded the LNT accuracy and LNT category passed. The one-minute semantic (animal) Verbal Fluency Test (VF; Henry and Crawford, 2004) was used to assess initiation ability. In the VF Test, participants were asked to generate as many items (belonging to the animal category) as they could in a one-minute period. The modified version of the Wisconsin Card Sorting test (WCST; Nelson, 1976) was used to assess cognitive flexibility and task switching. We recorded the WCST perseverative error and the WCST category passed. The local ethics committee approved all study procedures.

2.2.1. Data analysis

To examine group difference in the ability to experience anticipatory and consummatory pleasure, the four TEPS subscale scores (abstract anticipatory, contextual anticipatory, abstract consummatory, contextual consummatory) between the groups were compared by a series of univariate ANOVAs. Because of the trend of significance that the schizophrenia group consisted of more males than the control group, we conducted follow-up ANCOVAs, with gender as a covariate. To examine the contribution of neurocognitive functions to anticipatory and consummatory pleasure in the schizophrenia group ($n=27$), we entered the independent variable (estimated IQ, immediate and delayed LM, immediate and delayed VR, LNT accuracy, LNT category passed, VF, WCST perseverative error, WCST category passed) into "force-entry" linear regression models, with either the TEPS abstract anticipatory, the TEPS contextual anticipatory, the TEPS abstract consummatory, or the TEPS contextual consummatory subscale score as the dependent variable. Finally, we report the psychometric properties of the TEPS in healthy sample and in people with schizophrenia in terms of Cronbach's alpha, split-half

Table 1
Characteristics of participants.

	Healthy controls ($n=26$)		Recent-onset schizophrenia ($n=27$)		F/χ^*	p	Cohen's d
	Mean	S.D.	Mean	S.D.			
Age	21.35	2.897	22.96	4.50	2.40	0.127	
Gender (male v female)	12 v 14		19 v 8		3.20*	0.074	
Handedness (right v left)	25 v 1		25 v 2		0.98*	0.612	
Education	13.35	1.81	12.19	1.96	5.00	**0.030**	
Estimated IQ	119.27	11.16	110.07	13.61	7.20	**0.010**	
Immediate logical memory	15.38	3.06	14.15	4.53	1.35	0.251	−0.319
Delayed logical memory	14.46	3.84	11.93	4.87	4.41	**0.041**	−0.577
Immediate visual reproduction	21.85	2.56	19.96	3.08	5.84	**0.019**	−0.664
Delayed visual reproduction	21.85	2.41	19.81	3.36	6.34	**0.015**	−0.692
LNT correct response	7.00	1.20	6.19	1.15	7.83	**0.007**	−0.695
LNT category passed	36.31	1.09	34.78	3.76	6.40	**0.015**	−0.549
WCST perseverative error	0.35	0.75	0.22	0.51	0.51	0.481	−0.195
WCST category passed	5.96	0.20	5.74	0.90	1.49	0.228	−0.335
Verbal fluency	22.00	6.13	16.37	4.93	13.62	**0.001**	−1.014
TEPS abstract anticipatory	4.87	0.65	4.30	1.26	6.84	**0.012**	−0.563
TEPS contextual anticipatory	3.65	0.77	3.10	0.79	4.20	**0.045**	−0.718
TEPS abstract consummatory	3.77	0.91	3.43	0.84	2.06	0.158	−0.394
TEPS contextual consummatory	3.77	0.91	3.43	0.84	2.06	0.158	−0.394
PANSS positive subscale			11.52	3.66			
PANSS negative subscale			16.16	6.68			
PANSS neutral subscale			23.52	5.80			
Duration of illness (years)			1.33	0.73			
Medications (chlorpromazine equivalent) (mg)			306.7	302.1			

$p<0.05$ are bold.
Note: IQ=intelligence; LNT=Letter-number span test; WCST=the Wisconsin Card Sorting test; TEPS=the Temporal Experience of Pleasure Scale; PANSS=the Positive and Negative Syndrome Scale, $p=p$-value.
* $=\chi^2$ test