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Emotion recognition and social/role dysfunction in non-clinical psychosis

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ABSTRACT

As researchers continue to understand non-clinical psychosis (NCP-brief psychotic-like experiences occurring in 5–7% of the general population; van Os et al., 2009), it is becoming evident that functioning deficits and facial emotion recognition (FER) impairment characterize this phenomenon. However, the extent to which these domains are related remains unclear. Social/role functioning and FER were assessed in 65 adolescents/young adults exhibiting low and high-NCP. Results indicate that FER and social/role functioning deficits were present in the High-NCP group, and that the domains were associated in this group alone. Taken together, findings suggest that a core emotive deficit is tied to broader social/role dysfunction in NCP.

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1. Introduction

A growing body of evidence indicates that a proportion of individuals in the general population experience subclinical psychotic symptoms, which suggests that psychosis occurs along a continuous phenotype (Kelleher and Cannon, 2011). These fleeting psychotic symptoms (often specifically referenced as psychotic-like symptoms; Kelleher and Cannon, 2011) occur in the absence of formal psychosis, and are indicative of what is broadly termed non-clinical psychosis (NCP; Mittal et al., 2011, 2012a, 2012b). Recent research has highlighted the significance of NCP. There is some evidence that individuals experiencing NCP are at heightened risk of developing a psychotic disorder (Welham et al., 2009). In addition, NCP has been linked with a variety of risk factors for schizophrenia such as low socio-economic status, urbanicity, and cannabis use (for a review, see Kelleher and Cannon, 2011). Overall, NCP research is important due to its potential to clarify our understanding of the developmental trajectory of psychosis, and specifically, vulnerability markers associated with the onset of a psychotic disorder (Roddy et al., 2012). Because of NCP's potential to clarify risk for psychosis, and the evidence showing that individuals experiencing NCP show a significantly heightened risk for developing formal psychosis, improving the scientific understanding of NCP should be a priority (Zammit et al., 2009).

Recent research links NCP with several areas of impairment. For example, although NCP is defined by the absence of a formal psychotic disorder, the literature suggests that it is associated with other clinical disorders including depression and anxiety (Yung et al., 2006; Varghese et al., 2011), as well as behavioral issues such as problematic Internet use (Mittal et al., in press). In further support of these specific findings, there is some evidence to suggest that individuals experiencing NCP in the general population usually have at least one non-psychotic Axis I psychiatric diagnosis (Kelleher et al., 2012). Additionally, Yung et al. (2006) found that in a non-psychotic help-seeking population, NCP symptoms were associated with poorer functioning (functioning was examined in terms of general functioning, peer relationships, and family functioning).

Consistent with these broader areas of dysfunction, a recent study reported facial emotion recognition (FER) deficits in individuals reporting NCP (Roddy et al., 2012). The relationship between NCP and FER is interesting on numerous accounts. First, FER, one domain of social cognition, has been widely acknowledged to be impaired in individuals with a psychotic disorder (Pinkham et al., 2007). Despite the general agreement that deficits exist in emotion recognition in formal psychosis, there is some discrepancy as to when the impairment first develops (i.e., prodromal stage, first episode, etc.; see Green et al., 2011 for a review). It is also worth noting that the only other study (in addition to Roddy et al., 2012) to evaluate NCP and FER did not find a significant relationship between NCP and FER (Thompson et al., 2011). Thus, further evaluation of emotion recognition in an NCP population may help clarify the relationship of psychosis and social cognition from a developmental perspective. Another reason that the study of FER is warranted is due to its relationship with functioning. The ability to correctly recognize and process facial expressions is necessary in order to facilitate behavior and have

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successful social functioning (Amminger et al., 2012). To date, there is no investigation into this relationship in an NCP population.

There is growing evidence suggesting that deficits and vulnerability markers linked with psychosis are present in NCP (Mittal et al., 2012a, 2012b); however, the research is still new, and associations between core deficits such as FER and broader processes such as global social/role functioning remain unclear. The present study examined global social/role functioning (GF:S and GF:R, respectively) and FER in 65 non-clinical adolescents/young adults reporting high and low-NCP to determine whether any deficits were present, and if so, the extent to which FER and GF:S/GF:R were related. The current investigation differs from the Yung et al. (2006) study in that we have chosen to examine functioning in regard to specific social and role domains commonly evaluated in psychosis-risk populations (Cornblatt et al., 2007), rather than peer, social, and general functioning. Furthermore, to the authors' knowledge, the only two studies to assess FER in an NCP population evaluated individuals with a mean age ≤ 11.5 (Thompson et al., 2011; Roddy et al., 2012). The current study attempts to expand on these findings by assessing an older sample (older adolescents and young adults) and examine functioning and FER in the sample.

2. Method

2.1. Participants

All participants were adolescents/young adults (mean age = 19.1) recruited through the Adolescent Development and Preventive Treatment (ADAPT) research program at the University of Colorado, Boulder (CU Boulder). Individuals in an undergraduate research pool ($n = 1{,}248$) were screened using the Launay-Slade Hallucination Scale (LSHS) (Bentall and Slade, 1985). The option to participate in the study was made available to those scoring in the top and bottom 10th percentiles (scores of ≥23 or ≤3 respectively). The research pool is a volunteer research database in which undergraduate students enrolled in an introductory psychology course participate in research studies for course credit. Several studies recruit from this subject pool and to limit potential sampling bias (i.e., individuals knowingly selecting studies for which they are most suited or in which they are most interested), available studies are listed as numbers without descriptions (study details were provided and informed consent was obtained upon arrival to ADAPT). From the possible 250 invited at total of 65 elected to participate (undergraduate volunteers choose randomly from a variety of studies in which they are invited to participate), and upon arrival to ADAPT no one declined to participate after learning the details of the study.

2.2. Clinical measures

The LSHS is a 12-item self-report scale used to measure hallucinatory predisposition by assessing clinical and sub-clinical hallucinatory phenomena (the scores for each item range from 0 to 4 and the range for the total scale is 0–48). The scale has been validated (Bentall and Slade, 1985), and is one of the most widely used instruments in examining symptoms of non-clinical psychosis in healthy populations (van 't Wout et al., 2004; Vellante et al., 2012). It should be noted that the LSHS is specifically designed to gauge hallucination proneness, and that there are other facets to the overall construct of non-clinical psychosis including unusual thoughts and suspiciousness. However, the items on this scale have been reliably linked to the non-clinical end of a psychosis spectrum (Levitan et al., 1996; Serper et al., 2005). It is also one of the more widely used instruments that is validated for assessing symptoms of non-clinical psychosis (van 't Wout et al., 2004; Vellante, et al., 2012). Individuals who selected our study were instructed to indicate NCP symptoms (as captured by the LSHS) in the past month, and asked not to include experiences that occurred solely while under the influence of alcohol, drugs, or non-prescribed medications.

As noted, the LSHS results were then screened to select for those students scoring in the top and bottom 10th percentiles of the LSHS (scores of ≥23 or ≤3 respectively), and these individuals were given the option to participate. The choice of design (selecting two extreme groups; the top and bottom 10th percentiles) was made in order to optimize our ability to detect potentially subtle differences between individuals endorsing NCP and the general population without these symptoms. The 65 participants were placed into groups: High-NCP ($n = 35$) and Low-NCP ($n = 30$). The Brief Psychiatric Rating Scale (BPRS) (Overall and Gorham, 1976) was administered to ensure that participants exhibiting formally psychotic symptoms would not be included, as this could potentially confound results (no participants were excluded based on this screening). The BRPS was chosen due to its use as a brief clinical interview designed to track currently present psychotic symptoms. Scores on the BPRS range from 18 to 126. Based on methods established in our previous work (Mittal et al., 2012a, 2012b), a score of 4 ("moderate") or higher on any item was grounds for exclusion, although as noted, it was not necessary to exclude any participants from the study. The Institutional Review Board approved the protocol and informed consent procedures.

2.3. Social functioning and role functioning

Social functioning and role functioning were administered by trained graduate students using the Global Functioning Scale: Social (GF:S; Auther et al., 2006) and the Global Functioning Scale: Role (GF:R; Niendam et al., 2006). These instruments are valid and reliable in assessing psychosocial functioning in high-risk populations and were developed specifically for adolescents/young adults (Cornblatt et al., 2007). These scales provide ratings of social/role functioning on two separate 10-point Likert scales, which are scored independent of symptom severity (higher scores correspond to better functioning).

2.4. Emotion recognition

The Penn Emotion Recognition-40 Test (ER-40; Gur et al., 2001) is comprised of adult faces displaying one of four emotions (i.e., happy, sad, anger, fear) or a neutral expression. The facial images are presented in a random order via computer and require the participant to determine which emotion is being expressed. The ER-40 has demonstrated good test–retest reliability (Carter et al., 2009), and was selected due to its use in a variety of studies across the psychosis spectrum, as this would facilitate comparison of results (e.g., Dickey et al., 2011; Roddy et al., 2012). Furthermore, evaluation of specific emotions in the FER task was warranted as previous studies have shown one emotion can drive results (Amminger et al., 2012). See Table 1 for demographic characteristics and assessment information regarding this sample.

2.5. Statistical analysis

Demographics were analyzed to test for significant group differences using Pearson chi-square tests for categorical variables and independent *t*-tests for continuous variables (see Table 1 for demographic results). A logarithmic transformation was applied to normalize the distribution of the data for the GF:S and GF:R (see Fig. 1 for uncorrected functioning scores). Group differences in FER and social/role functioning were analyzed using independent *t*-tests. Significant differences discovered in FER and social/role functioning were then analyzed in each group separately using post-hoc bivariate correlational analyses. Fisher r-to-z transformations were applied to determine whether any significant differences appeared in the post-hoc correlational analyses.

3. Results

There were no significant group differences on demographic characteristics including age, ethnicity, and parental education. Furthermore,

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