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Emotion recognition latency, but not accuracy, relates to real life functioning in individuals at ultra-high risk for psychosis

Louise Birkedal Glenthøj [a,b,*], Nikolai Albert [a], Birgitte Fagerlund [b,c], Tina Dam Kristensen [a,b], Christina Wenneberg [a,b], Carsten Hjorthøj [a], Merete Nordentoft [a,b], Jens Richardt Møllegaard Jepsen [a,b,c,d]

[a] Mental Health Centre Copenhagen, Copenhagen University Hospital, DK-2900 Hellerup, Denmark
[b] Centre for Clinical Intervention and Neuropsychiatric Schizophrenia Research, CINS, DK-2600 Glostrup, Denmark
[c] Centre for Neuropsychiatric Schizophrenia Research (CNSR), Mental Health Centre Glostrup, Copenhagen University Hospital, DK-2600 Glostrup, Denmark
[d] Child and Adolescent Mental Health Centre, Mental Health Services, Capital Region of Denmark, University of Copenhagen, Denmark

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ABSTRACT

Background: Emotion recognition deficits are essential features of psychotic disorders and the ultra-high risk state of psychosis (UHR), that are known to relate to functional outcome. The potential associations between aspects of emotion recognition deficits and functioning are, however, understudied in UHR individuals.
Method: Emotion recognition accuracy and latency were assessed in 132 UHR individuals and 60 healthy controls using the CANTAB emotion recognition task along with multiple measures of real life functioning. Multiple regression analyses assessed the potential relations between emotion recognition accuracy, latency, and measures of functioning.
Results: A consistent finding was that emotion recognition latency, but not accuracy, was associated with the four observer-rated measures of functioning (β in the range −1.57 to −16.20), which remained significant on one measure after controlling for neurocognitive processing speed. Neither emotion recognition accuracy, nor latency related to real life functioning in healthy controls.
Discussion: The results suggest that processing speed of social cognitive information is an important correlate to real-life functioning in UHR individuals which may be a relevant target in social cognitive remediation programs for patients at risk for psychosis.

1. Introduction

Emotion recognition deficits constitute a hallmark of social cognitive deficits in individuals at ultra-high risk (UHR) for psychosis (Lee et al., 2015; van Donkersgoed et al., 2015) and patients with established psychosis (Comparelli et al., 2013). Additionally, emotion recognition deficits have been suggested to be a psychosis endophenotype (Allott et al., 2015). Emotion recognition accuracy has been found to correlate cross-sectionally to functioning in UHR individuals; that is both overall functioning (Amminger et al., 2013; Barbato et al., 2013; Cotter et al., 2015), role functioning (Glenthøj et al., 2016), and quality of life (Glenthøj et al., 2016). Furthermore, emotion recognition may be a predictor of psychosis development in the UHR population (Corcoran et al., 2015), although evidence is mixed (Piskulic et al., 2016). Impairments in emotion recognition accuracy are well established in the UHR population (Amminger et al., 2012; Comparelli et al., 2013; Glenthøj et al., 2016), but evidence is sparse on potential deficits in emotion recognition processing speed in the UHR state. Slower facial affect recognition has been found in individuals at familial high-risk for psychosis (Calkins et al., 2010; Eack et al., 2010), but evidence is mixed (Li et al., 2010). To our knowledge, only two studies (Glenthøj et al., 2017; Seiferth et al., 2008) have examined facial emotion recognition response latencies within the UHR/clinical high-risk population. Using data from 77 and 12 UHR individuals, respectively, these studies did not reveal significant deficits in emotion recognition response latencies. This is though initial findings, hence potential deficits in emotion recognition latency in the UHR population need further scrutiny.

It is well known, that UHR individuals suffer significant and persistent impairments in functioning (Addington et al., 2011; Cotter et al., 2014). Links between emotion recognition accuracy and functioning have been established, but to our knowledge, no prior study has examined the possible contribution of both emotion recognition accuracy and emotion recognition processing speed to functioning in UHR individuals. Examining whether social cognitive processing speed may be a potentially important and unique factor relating to the functional outcome of UHR individuals is essential, as it may guide intervention approaches that aim at improving the real life functional outcome of UHR individuals.

* Corresponding author at: Mental Health Centre Copenhagen, Research Unit, Kildegaardsvej 28, 15, 4, DK-2900 Hellerup, Denmark.
E-mail address: louise.birkedal.glenthoej@regionh.dk (L.B. Glenthøj).

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The current study aimed at examining the relative contribution of facial emotion recognition accuracy and facial emotion recognition processing speed to multiple aspects of functioning in UHR individuals (i.e. overall, social- and role functioning, and quality of life). A priori, we hypothesized that both emotion recognition accuracy and latency would significantly relate to functioning measures in UHR individuals.

2. Methods

Participants were recruited as part of a randomized clinical trial examining the effect of cognitive remediation in UHR individuals (Glenthøj et al., 2015). The study was carried out at the Mental Health Centre Copenhagen, Denmark. Patients were recruited from the psychiatric in- and outpatient facilities in the catchment area of Copenhagen, between April 2014 and December 2017. This report includes baseline data on emotion recognition and functioning. The study protocol was approved by the Committee on Health Research Ethics of the Capital Region Denmark (study: H-6-2013-015). All participants provided informed consent prior to inclusion in the study.

2.1. Participants

The sample consisted of 146 help-seeking individuals aged 18–40 years who fulfilled one or more of the UHR criteria as assessed by the Comprehensive Assessment of At-Risk Mental State (CAARMS) (Yung et al., 2005): attenuated psychotic symptom group; brief limited intermittent psychotic symptoms group; and/or trait and vulnerability group along with a significant drop in functioning or sustained low functioning for the past year. The 146 UHR individuals represent the total sample from the RCT study with available data on cognition and psychopathology. Due to a hardware failure, we have missing data on 14 UHR individuals, i.e. out of the 146 UHR individuals, 132 completed the emotion recognition task.

Exclusion criteria were 1. Past history of a psychotic episode of ≥ one week duration. 2. Psychiatric symptoms explained by a physical illness with psychotropic effect (e.g. delirium) or acute intoxication (e.g. cannabis use). 3. A diagnosis of a serious developmental disorder (e.g., Asperger's syndrome or mental retardation (i.e. IQ <70)). 4. Currently receiving methylphenidate.

A total of 63 healthy controls were included and matched at group level to the UHR individuals on sex, age (+/−2 years), and ethnicity. The healthy controls did not meet criteria for any DSM-IV disorder and did not have a first degree relative with a psychotic disorder. Sixty of the healthy controls completed the emotion recognition task.

2.2. Assessments

The clinical assessments were conducted by experienced psychologists or medical doctors trained in conducting the CAARMS interview by the creator of the instrument, professor Alison Yung. Additionally, a large proportion of the CAARMS ratings were based on consensus ratings by two clinicians to secure similar ratings among the raters.

2.2.1. Emotion recognition

Emotion recognition was assessed using the Emotion Recognition Task from the Cambridge Neuropsychological Test Automated Battery (CANTAB ERT) (Sahakian and Owen, 1992). This is a computerized test comprising the recognition of six, basic facial emotional expressions: happiness, sadness, anger, disgust, fear, and surprise. Following a quick presentation (200 ms) of a facial expression, the participant must make a selection between the six emotional expressions presented on the screen by pressing the touch screen. The faces are presented in two blocks (90 stimuli each). The task outcome is total percent correctly identified, along with a mean response latency (ms) for all emotions correctly identified.

2.2.2. Functioning

Broad, interview-based ratings served as measures of overall functioning consisting of the Social and Occupational Functioning Assessment Scale (SOFAS) (Hilsenroth et al., 2000), Global functioning: Social and Role Scales (Cornblatt et al., 2007), and the Personal and Social Performance Scale (PSP) (Morosini et al., 2000). These measures assess functioning in areas such as occupational functioning, social functioning, and self-care. A self-report measure of quality of life was obtained using the Assessment of Quality of Life (AQoL-8D) (Richardson et al., 2014).

2.2.3. Neurocognitive processing speed and estimated IQ

Neurocognitive processing speed was indexed using the symbol-coding subtest from the Brief Assessment of Cognition in Schizophrenia (BACS) battery (Keefe et al., 2008).

Current IQ was estimated using four subtests from the Third version of the Danish Weschler Adult Intelligence Scale (WAIS-III); Vocabulary and Similarities providing indices of verbal IQ and Block Design and Matrix reasoning providing indices of performance IQ (Wechsler, 1997). The four subtests are strongly correlated with Full Scale IQ (Axelrod, 2002).

2.2.4. Cannabis use

The ASSIST (World Health Organisation ASSIST Working Group, 2002) was used to assess current cannabis use. Patients with a score of 4, 5, or 6, corresponding to a monthly, weekly or daily use of cannabis within the last year were included in the analyses.

2.3. Statistical analysis

Analyses were performed using SPSS version 22.0. Raw data was checked for normality and outliers. ERT response latencies were transformed with log 10. A univariate general linear model was used to compare performance on the emotion recognition tasks (ERT accuracy and latency) and functioning measures in UHR individuals with healthy controls. We used age and sex as covariates.

Univariate regression analyses were calculated to investigate the relationship between ERT accuracy and ERT latency to the five functioning measures (SOFAS, PSP, GF: social, GF: role, and AQoL) in UHR and healthy controls. To exploratively investigate whether effects of ERT latency were influenced by general or neurocognitive processing speed; we conducted secondary multiple regression analyses including ERT latency and BACS symbol-coding as predictors.

3. Results

The UHR sample consisted of 54.8% females. The UHR group had a mean age of 24.3 years (SD 4.2), and an average of 14.5 years of education (SD 2.8). The majority of the UHR individuals (75.3%) fulfilled the CAARMS criteria of attenuated psychotic symptoms, followed by 18.5% fulfilling the criteria of APS plus trait/state, and 4.1% fulfilling the trait/state criteria, 1.4% APS + BLIPS criteria, and lastly 0.7% fulfilling the trait + BLIPS criteria. The UHR individuals displayed significant deficits on all the functioning measures ($p < .001$) and on the emotion recognition latency task ($p = .04$), and emotion recognition accuracy task ($p = .004$) (Table 1).

Sensitivity analyses were conducted to control for cannabis use as a potential explanation for the slower response latencies observed in UHR individuals. Controlling for a monthly, weekly, or daily cannabis use in UHR individuals did not change the significant between-group differences on ERT latency total.