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Neuropsychological functioning and jumping to conclusions in recent onset psychosis patients

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ABSTRACT

Background: The reasoning bias of jumping to conclusions (JTC) consists of a tendency to make assumptions having little information.

Objective: The aim of this study was to estimate the differences in neuropsychological functioning between recent onset psychotic patients who jump to conclusions and those who do not jump to conclusions.

Materials and methods: One hundred and twenty-two patients with a recent onset of a psychotic disorder were assessed with three JTC tasks and a neuropsychological battery exploring verbal learning, memory, attention, psychomotor speed, visuoperceptual abilities, working memory, problem solving, executive functioning.

Results: A total of 29.7% ($n = 36$) of the individuals jumped to conclusions in Task 1, 14.0% ($n = 17$) in Task 2, and 15.7% ($n = 19$) in Task 3. People who jump to conclusions in three tasks scored significantly worse in many neuropsychological domain deficits, including attention ($p < 0.001$ – 0.020), psychomotor speed ($p < 0.001$), working memory ($p < 0.001$ – 0.040), and executive functioning ($p < 0.001$ – 0.042).

Discussion: The present study demonstrates that JTC is present even in early stages of the illness, and that there is a relationship between JTC and neuropsychological functioning.

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1. Introduction

1.1. Jumping to conclusions

The reasoning bias of jumping to conclusions (JTC) consists of a tendency to have an impaired decision process in which assumptions are made having little information. There are several methods to assess JTC data gathering bias, but the most common is presenting the individual with two jars with varying proportions of colored beads. The individuals are told that one of the containers has been chosen and that he or she has to decide, when sure, from which jar the elements have been extracted (Dudley et al., 1997; Garety et al., 1991).

Jumping to conclusions is one of the most widely studied cognitive biases in psychosis (Freeman, 2007; Garety and Freeman, 1999; Moritz and Woodward, 2005) due to its higher prevalence in people with psychosis in comparison to healthy participants as found by So et al. (2016) in her meta-analyses and by Dudley et al. (2016) in his systematic review and meta-analysis. Furthermore, it is well established that JTC is more frequent in deluded patients than in non-deluded patients (Garety and Freeman, 2013), while it has also been reported in people in remission and in the general population at risk of psychosis (Broome et al., 2007; Freeman et al., 2008; Gawęda and Prochwicz, 2015; Van Dael et al., 2006).

There is evidence that suggests that the JTC bias does not improve when symptoms are reduced (So et al., 2010). However, some psychological interventions such as Metacognitive Training have demonstrated that JTC can be reduced by being aware of its presence (Aghotor et al., 2010; Moritz et al., 2014; Pankowski et al., 2016).

1.2. Psychotic disorders and neuropsychological functioning

The evidence shows that neuropsychological functioning, particularly verbal memory, mental processing speed, and executive functions, are altered even in the initial phases of the disease (Bilder et al., 2000; Woodward, 2016). Keefe et al. (2005) found that almost all patients with schizophrenia performed below expectations in neuropsychological evaluations when compared to their unaffected families.

Nevertheless, people at risk of being affected are associated with impaired working memory (WM) when compared with healthy individuals (Broome et al., 2007).

1.3. Jumping to conclusions and neuropsychological functioning

There are some studies indicating that there is a relationship between JTC and alterations in the results of neuropsychological assessment. Examinations of associations between intelligence quotient (IQ) and JTC yielded mixed results. Some studies have found lower IQ score in people with greater predisposition to JTC (Bentham et al., 1996; Falcone et al., 2015a, 2015b; Freeman et al., 2014; Van Dael et al., 2006). However, this association was not found in some other investigations (Garety et al., 2005; Garety et al., 2013; Ochoa et al., 2014). Executive functioning has been widely associated with JTC (Ochoa et al., 2014; Rubio et al., 2011; Woodward et al., 2009). Regarding WM, the results of previous studies are not conclusive. Many researchers have found that people who jump to conclusions have impaired functioning in WM tasks (Broome et al., 2007; Falcone et al., 2015a, 2015b; Freeman et al., 2014; Garety et al., 2013), but some others have not (Buck et al., 2012; Ochoa et al., 2014). In relation to verbal memory, Ochoa et al. (2014) found that participants who jump to conclusions had significantly different performance when recalling rare words from a list compared with participants without this reasoning bias.

In addition, there are few studies about neuropsychological functioning in people who jump to conclusions in the early stages of the illness. Only two studies have evaluated these alterations in first episode psychosis (Falcone et al., 2015a, 2015b; Ormrod et al., 2012). Falcone et al. (2015a, 2015b), despite only assessing WM and IQ, found that IQ

was independently associated with JTC. Ormrod et al. (2012) found that patients who jumped to conclusions performed better in visual working memory than those who did not.

1.4. Aim of the study

The aim of this study was to assess the differences in neuropsychological functioning in recent onset psychotic patients comparing individuals with JTC bias with those without it.

2. Materials and methods

2.1. Design

A cross-sectional study was performed based on baseline data from the main multicenter clinical trial. More details on the study design are described elsewhere (Ochoa et al., 2017).

2.2. Participants

The sample was composed of patients with psychosis of recent onset (Breitborde et al., 2009) treated at one of the nine participating mental health centers: Servicio Andaluz de Salud of Jaén, Málaga and Motril (Granada), Salut Mental Parc Taulí (Sabadell), Hospital de Santa Creu i Sant Pau (Barcelona), Centro de Higiene Mental Les Corts (Barcelona), Institut d'Assistència Sanitària Girona, Hospital Clínic Universitario de Valencia, and Parc Sanitari Sant Joan de Déu (Coordinating center).

Inclusion criteria were patients with 1) a diagnosis of schizophrenia, psychotic disorder not otherwise specified, delusional disorder, schizoaffective disorder, brief psychotic disorder, or schizophreniform disorder (according to DSM-IV-TR); 2) <5 years from the onset of symptoms; 3) scores during the previous year ≥ 3 in delusions, grandiosity, or suspicions item of PANSS; and 4) an age between 17 and 45. Exclusion criteria were 1) traumatic brain injury, dementia, or intellectual disability (pre-morbid IQ ≤ 70); 2) substance dependence; and 3) PANSS score ≥ 5 in hostile and uncooperative and ≥ 6 in suspiciousness.

Fifty-four patients had a current diagnosis of schizophrenia (44.3%), thirty-one of unspecified schizophrenia spectrum and other psychotic disorders (25.4%), thirteen of schizoaffective disorder (10.7%), nine of brief psychotic disorder (7.4%), seven of schizophreniform disorder (5.7%), and six of delusional disorder ($n = 6$, 4.9%). It was not possible to assess the specific diagnosis of two individuals (1.6%).

2.3. Assessments

The order of assessment was clinical symptoms, JTC and neuropsychological tests in all the subjects of the sample.

2.3.1. Jumping to conclusions

Jumping to conclusions (JTC) was assessed with three different computer tasks. The subjects were shown two jars that contained different ratios of color beads or words and had to decide from which of the two jars, hidden from view, the extracted element had come. They could take out from the jar as many balls as they needed to make a decision, until they had enough information. In neutral Task 1 a jar was presented with a ratio of 85% black balls and 15% orange balls and another jar with an inverse proportion. Task 2 was similar to Task 1, but the ratio was 60% to 40% (Garety et al., 1991). Lastly, Task 3 had the same proportion as Task 2, but instead of balls, the jars contained negative and positive affective adjectives (Dudley et al., 1997). In the salient task (Task 3) patients extract adjectives as: "cowardly" (negative) or "enthusiastic" (positive). The individuals had the information from the previous beads at all times, in order to control the memory effect. The order of presentation of each task was: Task 1 (85:15), Task 2 (60:40) and Task 3 (60:40) salient task. JTC extreme was considered when the participants made a decision with two or less beads seen (Brett-Jones

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