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The effect of task difficulty on decision-making: Differences between obsessive–compulsive disorder and non-affective psychosis

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Abstract

The aim was to determine whether there are differences between groups in jumping to conclusions and the number of beads required to make a decision based on task difficulty. An assessment was made of 19 patients with non-affective psychosis, 19 with obsessive–compulsive disorder (OCD), and 19 healthy controls. The Beads Task scale was used in its two versions. Patients with non-affective psychosis jumped to conclusions. There was significant interaction between group and task difficulty. Increased difficulty of the task did not affect the number of beads patients with non-affective psychosis or OCD needed to make their decision. However, healthy controls needed to see more beads before they could make a decision in the hard test than in the easy one. Patients with non-affective psychosis jump to conclusions, but neither this group nor the OCD patients benefit from the changes in task difficulty when making their decisions.

Keywords

Decision-making, jumping to conclusions, non-affective psychosis, obsessive–compulsive disorder, task difficulty

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Introduction

Throughout history, explanatory theories have been put forward to describe obsessive–compulsive disorder (OCD) as a form of psychosis, and its placement in diagnostic classifications of mental disorders has been a controversial issue (Jacobsen, Freeman, & Salkovskis, 2012; Nasrollahi, Bigdelli, Reza, &

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Makvand, 2012; Poyurovsky, Fuchs, & Weizman, 1999; Solyom, DiNicola, Phil, Sookman, & Luchins, 1985). Such an idea would support the theory proposed by Strauss on the existence of a psychosis-neurosis continuum (Straus, 1948), theory which was later studied by other authors (Weiss, Robinson, & Winnik, 1975).

It has been suggested that many attenuated psychotic experiences in the general population, such as ideas of reference, hallucinatory experiences, magical thinking, or delusional experiences, lead to the notion of a continuum with the extreme in psychotic symptomatology (Linscott & van Os, 2013; van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). This continuity from normal functioning spans anxiety or depressive symptomatology (Fusar-Poli, Yung, McGorry, & van Os, 2014) and dissociative and obsessive symptomatology (Sass & Parnas, 2003) during the early (basic symptoms) and late (attenuated psychotic symptoms) prodromal stages, culminating in a relevant transition to psychotic disorders (van Os & Reininghaus, 2016).

Several studies have demonstrated that patients with psychosis who have delusional beliefs show a probabilistic reasoning bias called "jumping to conclusions." This is defined as making hasty, fully convinced decisions with very little contextual evidence (Garety et al., 2005; Rubio et al., 2011; So, Siu, Wong, Chan, & Garety, 2016; Van Dael et al., 2006). In view of the connections made historically between psychosis and OCD, some studies have attempted to determine whether individuals diagnosed with OCD who also have strong convictions had the same bias in reasoning. The results have been contradictory. Thus, Jacobsen, Freeman, and Salkovskis (2012) hypothesized that patients who have strong conviction about the truth of their intrusive thoughts would jump to conclusions. However, Fear and Healy (1997) and Jacoby, Abramowitz, Buck, and Fabricant (2014) found that due to OCDs characteristics, the patients would need more contextual proof for their decision. Therefore, it seems that this is still an open question and subject to new research due to the scant number of publications clarifying the contradictions mentioned above, which justifies the purpose of our study.

To explore the bias in reasoning known as jumping to conclusions (JTCs), previous studies have used the Beads Task (Phillips & Edwards, 1966), a test involving probabilistic judgments (Garety, 1991; Garety & Freeman, 1999; Garety & Hemsley, 1994; Garety, Hemsley, & Wessely, 1991; Huq, Garety, & Hemsley, 1988). It consists of two versions in which different ratios of colored beads (85:15 and 60:40) represent different levels of difficulty (easier or harder, respectively). Dudley, John, Young, and Over (1997) found that participants asked for less contextual proof in the 85:15 version of the Beads Task (easier) and more contextual proof for the 60:40 version (harder), but execution by patients with psychosis and healthy controls was similar. These results show that both groups took into consideration the demands of the task but did not conclude whether the difficulty of the task could be an explanatory variable in JTCs (Dudley, John, Young, & Over, 1997). In our study, results from the two versions enabled us to respond to this question.

In view of the above, the objectives of this study were to (1) find out whether there are differences in the JTCs bias between patients with non-affective psychosis, patients with OCD, and healthy controls on both versions of the Beads Task. It was hypothesized that patients with OCD and controls would not jump to conclusions, unlike patients with non-affective psychosis, and (2) find out whether there are differences among the three groups in the number of beads necessary to make decisions based on the difficulty of the task. It was expected to find that an easier task (85:15 version of the Beads Task) would lead participants in all three groups to make quicker decisions, viewing fewer beads than if the task were harder (60:40 version of the Beads Task).

Method

Design

This is an ex post facto cross-sectional design comparing groups found by non-randomized sampling by accessibility. Comparisons are made between groups without manipulating the independent variable because they were assigned based on whether or not the diagnosis was present: two groups with clinical diagnoses and one for comparison.

Participants

A total of 57 subjects participated in the study. The clinical group was made up of 19 subjects diagnosed with non-affective psychosis, specifically, paranoid schizophrenia, and 19 subjects diagnosed with OCD, with strong awareness of their illness and of its symptoms, according to the DM-IV-TR diagnostic

Table 1. Comparison of sociodemographic variables of the different groups.

	OCD ($n = 19$)		Non-affective psychosis ($n = 19$)		Control ($n = 19$)			
	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*(2.54)	*p*
Age	43.7	14.4	37	14	38.8	13.8	1.162	. 321
	Number (%)		Number (%)		Number (%)		χ^2 (2.57)	*p*
Gender								
Male	12 (63)		15 (79)		14 (74)		1.216	.544
Female	7 (37)		4 (21)		5 (26)			

OCD = obsessive–compulsive disorder; SD = standard deviation.

classification (American Psychiatric Association, 2000). The control group was made up of 19 healthy subjects with no history of psychiatric pathology at the time of evaluation, who were found through their proximity to the medical and nursing staff and resident physicians, with the condition that they come from the general nonuniversity population. Exclusion criteria for all participants at the time data were collected were brain damage or intellectual deficit. The two study groups and the control group were evaluated by clinicians with wide experience using the *structured clinical interview for DSM-IV axis I disorders, clinician version* (SCID-CV; First, Spitzer, Gibbon, & Williams, 1999) clinical interview to corroborate the absence of brain damage and intellectual deficit which figured in the hospital unit's files and the presence of non-affective psychotic disorders and OCD in the two study groups, disqualifying any mental disorder in the comparison group.

Of all the participants, 15 patients with non-affective psychosis (79%), 12 patients with OCD (63%), and 14 healthy controls (74%) were men. The three groups were predominantly middle-class (according to the evaluation done during the interview by the clinicians) and Caucasian race. The subjects with non-affective psychosis had a mean age of 37.05 (standard deviation [SD] = 14.04), ranging from 17 years to 63 years; OCD of 43.78 (*SD* = 14.41), ranging from 23 years to 68 years; and healthy controls of 38.84 (*SD* = 13.88), ranging from 16 years to 63 years (see Table 1).

The mean number of years since patients with non-affective psychosis had been diagnosed with the illness was 15.21 years (*SD* = 12.88), while for patients with OCD, it was 21.05 years (*SD* = 11.05), with no differences between these two groups: $t(36) = 1.307$, $p = .199$ ($F_{\text{Levene}} = .619$); 10% of the participants in the first group had experienced a first psychotic episode. All the participants in the clinical group had been prescribed psychopharmacological treatment at the time of their evaluation and did not have any other comorbid diagnosis.

Instruments

Beads Task (Phillips & Edwards, 1966). This test has two versions distinguished by the number of each of two well-differentiated colored beads contained in jars. The first version has a wider difference in the ratio of the two colors (85:15) than the second (60:40), thus representing different levels of difficulty. In more detail, the first version consists of showing the subject two jars which each have 100 beads of two different colors distributed in opposite ratios of 85:15 (one of the jars has 85 orange beads and 15 black and the other has 85 black beads and 15 orange). The second version is a modification of the ratios in the original test, going from 85:15 to 60:40 (one of the jars has 60 green beads and 40 purple and the other jar has 60 purple beads and 40 green). It is harder to make a decision in the second version because there is less difference in the distribution of the beads than in the first version.

In both versions, the participants were told beforehand the distribution of the beads in each of the jars, which they were shown in slides on a computer. In the instructions for each test, they were explained that the researcher was going to take away one of the jars and leave the other, from which he was going to show them beads taken out of it one by one. The task consisted of determining which jar the beads came from, the one that contained mostly orange or black in the first version or mostly purple or green in the second, when shown as many beads as necessary to do so, up to a maximum of 20. The participant could see as many beads as he needed to make the decision and was told not to decide until completely sure.

Once the instructions had been explained, the examiners made sure that the participants understood the procedure before going on to the first version. Both tests were given in a single session to avoid a practice effect. As each test progressed, the beads and comments already shown the participant continued to appear on the computer screen as a reminder so he wouldn't forget and cause a bias.

Two measures of JTCs could be calculated with the application of these tests. The first measure was JTCs itself, and the second measure was the number of beads necessary to come to a decision (BTD). The JTC measured the proportion of subjects in each group who only needed to be shown one bead to be completely sure of their decision. The BTD was the mean number of beads needed for each group to be absolutely sure of their decision.

The internal consistency found in this study for the entire sample and the two tests at the same time were .898. The internal consistency for each group was .722 for patients with OCD, .952 for the group with non-affective psychosis, and .858 for the healthy controls.

La Escala de Síndromes Positivo y Negativo (*The Positive and Negative Syndrome Scale, PANSS*; Kay, Fiszbein, & Opler, 1987), Spanish version by Peralta and Cuesta (1994). The PANSS is comprised of 30 items scored on a Likert-type scale (0–7 points) and distributed in three scales: positive (7 symptoms), negative (7 symptoms), and general psychopathology (16 symptoms). Eight factors are found with this scale: negative, positive, disorganized, excited, anxious, worried, depressed, and somatization. The internal consistency of the positive scale is .62, for the negative scale it is .92, and for the general scale is .55. The criterion validity is high on the positive ($r = .70$) and negative ($r = .81$) scales. This scale was applied to the non-affective psychosis group, reaching an overall reliability of .74, .82 if the positive and negative scales are taken together, and .86 for general psychopathology.

Escala para la Evaluación Comunitaria de las Experiencias Psíquicas (*Community Assessment of Psychic Experiences-42*; Stefanis et al., 2002). This is a self-report for evaluating positive and negative psychotic experiences as well as depressive symptomatology characteristic of these disorders. Each one of the 42 items which make up the scale is evaluated in two dimensions, frequency and distress, on a Likert-type scale. This test has adequate internal consistency (.79–.82) and validity (with respect to the SCL-90 or the SPQ) (Brenner et al., 2007; Hanssen et al., 2003; Stefanis et al., 2002). In the Spanish population, the overall internal consistency found for frequency was .89 with university students to .93 with patients (Fonseca-Pedrero, Paino, Lemos-Giráldez, & Muñiz, 2012). In our study, it was applied to the OCD and control groups and only the frequency dimension, which had a reliability of .95, was used.

Inventario de Obsesiones y Compulsiones Revisado (*Obsessive–Compulsive Inventory Revised*; Foa et al., 2002), Spanish version by Fullana et al., 2005. This scale is comprised of six subscales or dimensions for typical OCD behaviors (washing, obsessing, hoarding, ordering, checking, and neutralizing). It is scored on a Likert-type scale (0–4 points) and has an internal consistency of .92 and a retest reliability of .87–.89. This test was applied to all three groups of participants, reaching an overall reliability of .92.

SCID-CV (First et al., 1999). This semi-structured interview is used in both psychiatric and general populations. It collects information on sociodemographic data, employment history, current and past psychiatric history, treatments, and evaluation of current functioning. The reliability for psychiatric patients is .61 and for nonpsychiatric patients it is .37. The validity shows that over 85% of patients with a known psychotic disorder showed most of their symptomatology during the interview. In our study, the Spanish version of this semi-structured clinical interview was used for the schizophrenia diagnostic classes and other psychotic disorders, for OCD and for the healthy controls.

Procedure

The clinical history and sociodemographic information were acquired by health-care professionals at two hospitals in the Region of Andalusia (Spain). The information on the patients with non-affective psychosis was acquired when they were hospitalized in a Mental Health Hospitalization Unit. The information on patients with OCD was taken from a Community Mental Health Unit. Data on healthy controls were acquired from those who voluntarily decided to participate in the study and who were recruited by accessibility from among the hospital unit staff. The three groups were characterized by professional diagnosis using clinical interviews and psychometric instruments. The authors, ESG and MRV, diagnosed the participants with non-affective psychosis and OCD, respectively, using the SCID-CV diagnostic

interview and confirming that there were no cases of brain damage or intellectual deficit based on access to their history, interview with the patient's family, and own evaluation of the patient.

The research protocol was approved by the Ethics Committee of both hospitals (Virgen del Rocío University Hospital Units and Andalusian Government Ethics Committee) and all the participants were informed and signed their written informed consent to participate.

Statistical analysis

Statistical analyses were done using SPSS version 21.0. In each analysis, results of the three groups (patients with non-affective psychosis, patients with OCD, and healthy controls) were compared (IBM Corp. Released, 2012).

The differences among the three groups in quantitative variables were determined by analysis of variance (ANOVA) with Bonferroni post hoc analysis. The differences related to qualitative variables, that is, JTCs and the gender variable, were found by Pearson's chi-square. To determine group differences on the various tests (Group Factor × Task Difficulty), a model was calculated by repeated measures ANOVA. To find the Simple Group Interaction × Task Difficulty Effects, a Student's *t*-test for related samples was used. In addition, an MANOVA was done for the number of beads needed to make a decision and group variables and incorporated as an antecedent for discriminant analysis. The effect size was measured by omega squared (Ω^2). The clinical significance level of all results was $p < .05$.

Finally, a discriminant analysis was done to determine the discriminatory variables (number of beads used and task difficulty) which explained group differences the best. The capacity for classifying solutions generated by this analysis was tested with a confusion matrix.

Results

For the purposes of this study, information was collected for 19 patients diagnosed with non-affective psychosis, 19 with OCD highly aware of the disease and its symptoms, and 19 healthy individuals who made up the control group. No significant differences were found in age ($p = .321$) or gender ($p = .544$) among the three groups of participants (see Table 1).

Differences among the groups in JTCs under the first objective showed that for the 85:15 version, nine patients with non-affective psychosis (47%), zero patient with OCD (0%), and two healthy controls (11%) jumped to conclusions and were absolutely sure about their decision when the first bead was shown to them. In the 60:40 version, 10 patients with non-affective psychosis (53%), 0 patient with OCD (0%), and 1 healthy control (5%) jumped to conclusions (see Table 2). The analysis showed significant differences between the three groups, such that a significantly higher percentage of patients with non-affective psychosis jumped to conclusions in the 85:15 test, $\chi^2(2.57) = 15.095$, $p = .001$, and in the 60:40 test, $\chi^2(2.57) = 20.502$, $p < .000$, than the patients with OCD or healthy controls. Specifically, statistically significant differences were observed in the comparison of the group of patients with non-affective psychosis and the OCD group in the 85:15 test, $\chi^2(1.38) = 11.793$, $p = .001$, and in the 60:40 test, $\chi^2(1.38) = 13.571$, $p < .000$, as well as between the group of patients with non-affective psychosis and the control group in the 85:15 test, $\chi^2(1.38) = 6.269$, $p = .012$, and in the 60:40 test, $\chi^2(1.38) = 10.364$, $p < .001$, but there were no differences in the comparison of the OCD group and the control in the 85:15 test, $\chi^2(1.38) = 2.111$, $p = .146$, and in the 60:40 test, $\chi^2(1.38) = 1.027$, $p < .311$.

Several analyses were done for the second objective concerning the number of beads participants needed to be absolutely sure of their decision (BTD; see Table 2 and Figure 1):

Intergroup differences (group factor) regardless of the difficulty of the task (both versions of the Beads Task): The results showed generally significant differences among them, $F(2.54) = 16.823$, $p = .0001$, $\Omega^2 = .61$ (large effect size). Given the homogeneity of the variance of this contrast, Bonferroni's post hoc analysis was performed based on the difference in observed means. The group with non-affective psychosis was significantly different from the OCD group ($t = 8.605$, $p < .000$, CI 4.888–12.322) and the control group ($t = -5.552$, $p = .002$, CI −9.269 to −1.835), while there were no significant differences between the patients with OCD and the control group in the number of beads, they needed to be absolutely sure of their decision ($t = 3.052$, $p = .142$, CI −.664 to 6.769). The results thus showed that compared to the OCD patients and healthy controls, the patients with non-affective psychosis required significantly fewer beads to be absolutely sure about their decision.

Differences between the two versions of the Beads Task (task difficulty factor) after performing a

Table 2. Group comparison of results in the Beads Task.

	OCD ($n = 19$)		Non-affective psychosis ($n = 19$)		Control ($n = 19$)				
	Number (%)		Number (%)		Number (%)		χ^2 (2.57)	p	
JTC									
85:15	0 (0)		9 (47)		2 (11)		15.095	.001	
60:40	0 (0)		10 (53)		1 (5)		20.502	.000	
Group Factor × Task Difficulty									
	Mean	*SD*	Mean	*SD*	Mean	*SD*	*F*(2.54)	*p*	Ω^2
BTD									
85:15	13.1	4.4	3.4[a,b]	4.6	8.2	6.3	5.147	.009	.15
60:40	11.9	4.0	4.3[a,b]	5.1	10.6	4.9			
	Mean		SD		*F*(1.54)		*p*	Ω^2	
Task difficulty factor[†]									
85:15	8.2		6.4		2.477		.121	.02	
60:40	8.9		5.7						
			F(2.54)		*p*		Ω^2		
Group factor			16.823		.0001		.61		

OCD = obsessive–compulsive disorder; JTC = jumping to conclusion; BTD = beads to decision.
[a] Significant difference between schizophrenia and OCD; $p < .05$.
[b] Significant difference between schizophrenia and control; $p < .05$.
[†] Task difficulty factor: version 1 (85:15) versus version 2 (60:40).

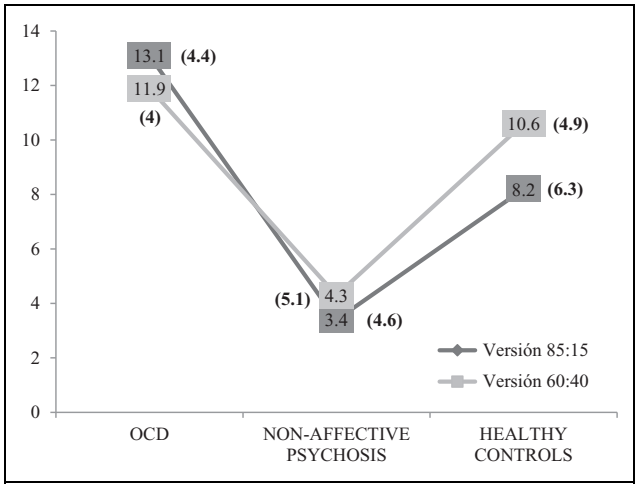

Figure 1. Interactive effects between group and task difficulty factors.

repeated measures ANOVA in which the first measure was 85:15 and the second 60:40: The results showed that all the participants, except those with OCD, required a high number of beads in the 60:40 tests than in the 85:15 test; however, these differences were not significant, $F(1.54) = 2.477$, $p = .121$, $\Omega^2 = .02$ (small effect size). Thus, regardless of the differences among the groups, more or less difficulty of the task did not significantly influence JTCs.

Differences between groups in the two tests (Group Factor × Task Difficulty): Significant group–task difficulty interaction was found, $F(2.54) = 5.147$, $p = .009$, $\Omega^2 = .15$ (large effect size). The increase in task difficulty did not affect the number of beads necessary for patients with non-affective psychosis, $t = -1.876$, $p = .077$, or OCD, $t = 1.283$, $p = .216$, to make a decision but did for healthy patients. Thus, when the test was harder, significantly more beads were necessary for healthy patients to make a decision than when the test was easier, $t = -2.645$, $p = .016$ (see Figure 1).

Finally, in harmony with previous results, the MANOVA task difficulty, number of beads for the group variable showed that the two measures related to the number of beads necessary to make a decision may be considered a statistically significant dependent macro-variable (Wilks' $\lambda = .530$, $F = 9.901$, $p = .0001$; $\Omega^2 = .15$ (medium effect size); observed power = 1), whereas the gender and age covariates were not significant. The consequent discriminant analysis showed that two significant discriminant canonical functions were found explaining 100% of the total variance. Function 1 explained 80.1% and Function 2 19.9%. The canonical correlation with the first function was .62 with a Wilks' λ of .53 and χ^2 of 33.96 ($gl = 4$;

$p < .000$). The canonical correlation with the second function was .37, with Wilks' λ of .86 and χ^2 of 7.79 ($gl = 1$; $p = .005$). These results show that there is a difference between the three groups based on two significant functions which are properly clustered around 68.4% of the participants.

Figure 2 shows the two functions found from discriminant canonical analysis. The scores for the first function are shown on the *x*-axis and the scores for the second function on the *y*-axis. This plot also shows the function distribution of the three groups of participants. According to the first function, which represents the number of beads used, patients with non-affective psychosis or OCD behaved similarly but were differentiated by the negative and positive value of the function, respectively. The second function, which represents the level of task difficulty, discriminates the groups the best. Specifically, a difference in action is observed, as patients with non-affective psychosis moved significantly toward the negative pole, while patients with OCD and healthy controls did so toward the positive pole.

Discussion

In our study, in agreement with the first objective, it was shown that patients with non-affective psychosis jumped to conclusions while OCD patients and healthy controls did not. Specifically, patients with OCD, unlike those with non-affective psychosis, were very reticent about making hasty decisions, which led them to request a large number of beads before making a decision. In other words, OCD patients' variability in the number of beads needed for making a decision increased from the first to the second task, but with very little within-group variability (*SD* from 4.040 to 4.390), which is the same thing that happens with the group of non-affective psychosis patients (*SD* from 4.598 to 5.110), although they used significantly fewer beads. In the control group, in the contrary to OCD group, within-group variability diminished with task difficulty (*SD* from 6.303 to 4.923; see Figure 1). That is, OCD patients showed a more monotonous response characterized by a higher number of beads in both tasks, which is therefore more characteristic of this group, while the controls showed more variability in one task than the other, although between these two groups, no statistically significant differences by task difficulty were observed (as shown by the post hoc tests done between these two groups).

Furthermore, in agreement with the second objective, we found that there were differences among the three groups in the number of beads necessary for making a decision depending on task difficulty. In particular, the patients with non-affective psychosis needed a significantly lower number of beads to make a decision than patients with OCD or healthy controls, while no differences were found between these two groups.

No significant differences were found either in the action by patients with non-affective psychosis or OCD with the change in task difficulty, so this variable did not affect decision-making in the two groups of patients with mental pathology in the study. On the other hand, the healthy controls behaved differently when task difficulty changed. That is, when the task was harder (60:40 version of the Beads Task, where there is less difference between proportions), they needed to make sure of the proportion using a significantly larger number of beads to make the decision than when the task was easier (version 85.15 of the Beads Task, where the difference between the proportions is more noticeable).

As mentioned above, the patients with non-affective psychosis jumped to conclusions while the control group did not. This coincides with the results of other studies (Evans, Averbeck, & Furl, 2015; Freeman, Pugh, & Garety, 2008; Moore & Sellen, 2006; Moritz, Van Quaquebeke, & Lincoln, 2012; Moritz & Woodward, 2005; Moritz, Woodward, & Lambert, 2007; Ormrod et al., 2011; Rubio et al., 2011; So et al., 2016; Speechley, Whitman, & Woodward, 2010; Veckenstedt et al., 2011; Woodward, Mizrahi, Menon, & Christensen, 2009). However, few studies have compared this bias in reasoning in persons affected by an OCD to a control group (Fear & Healy, 1997; Jacobsen et al., 2012). Specifically, Jacobsen et al. (2012) hypothesized that patients with OCD who have strong convictions about the veracity of their intrusive thoughts would jump to conclusions as did patients with psychosis, unlike healthy controls; however, they did not find any significant difference from healthy controls in either JTCs or number of beads needed to make decisions, which coincides with the results of our study. They concluded that individuals with OCD and strong conviction on the veracity of their thoughts could not be classified as patients with a psychotic disorder (Jacobsen et al., 2012).

There have also been few studies on JTCs comparing patients with psychosis to patients with OCD

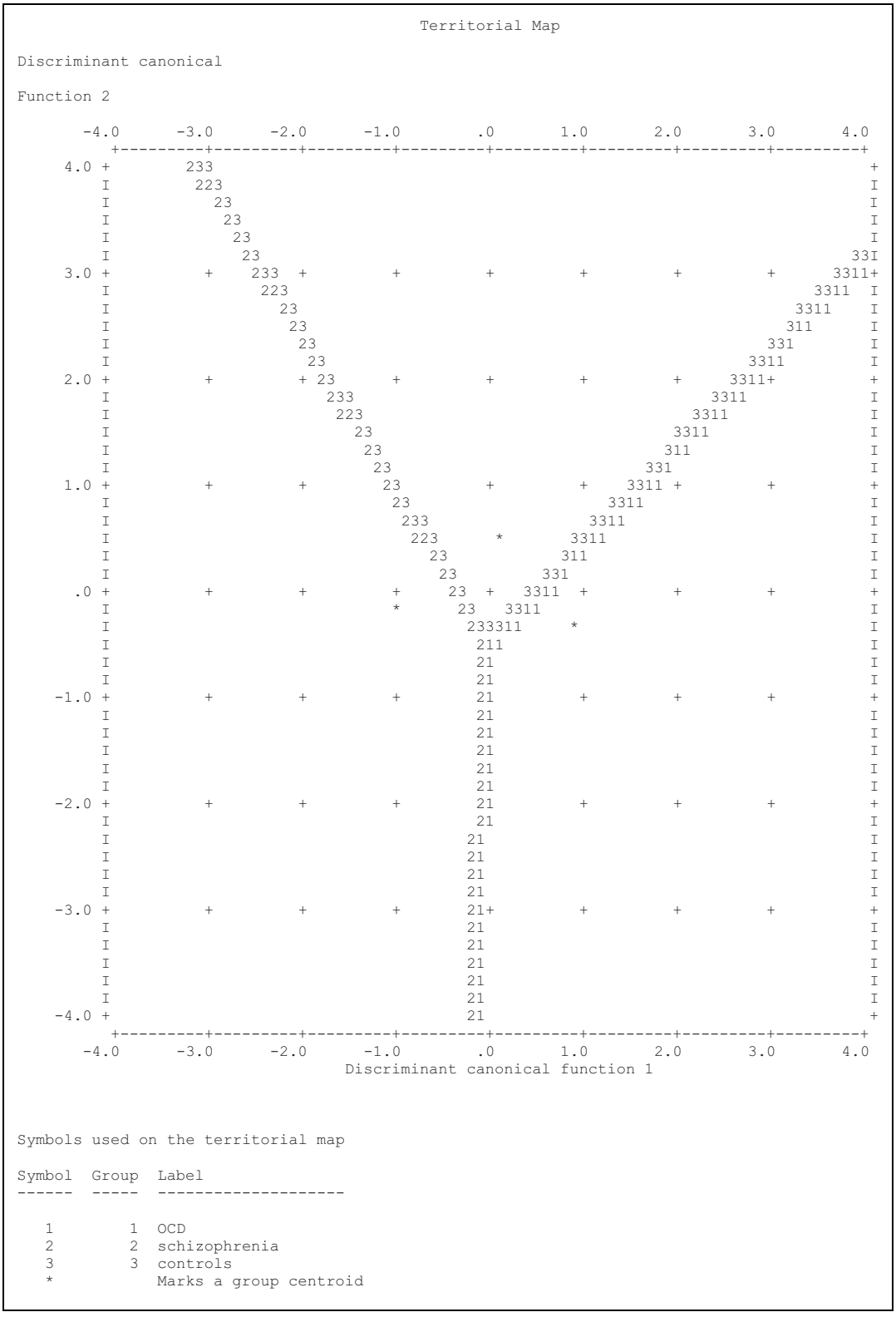

Figure 2. Diagram of the participant groups based on the number of beads used to make a decision and task difficulty.

(Jacobsen et al., 2012). In our study, a significant difference was found in JTCs between OCD and non-affective psychosis. Specifically, patients with non-affective psychosis jumped to conclusions, and when they did not have this bias, they still needed significantly fewer beads for making completely

convinced decisions. On the contrary, patients with OCD not only did not jump to conclusions on the first bead shown but required significantly more beads than patients with non-affective psychosis to make their decisions.

This result is reinforced by those found in other studies, such as the one by Fear and Healy (1997) and by Jacoby et al. (2014), according to which patients with OCD do not show this reasoning bias because they would make sure of their decision by requesting a larger number of beads. These results were also finally confirmed by Jacobsen et al. (2012), even though they had originally hypothesized that individuals with OCD strongly convinced of the veracity of their intrusive thoughts would show this bias. One of the possible hypotheses which might explain this result would be the presence of an excessive behavioral inhibition system in OCD patients with strong need for reassurance. This system would be ineffective in psychosis (Gray & McNaughton, 2000).

The results shown establish differences in JTCs between OCD and non-affective psychosis and go somewhat beyond theories relating the first as a form of psychosis (Jacobsen et al., 2012; Nasrollahi et al., 2012; Poyurovsky et al., 1999; Solyom et al., 1985) and the theory suggested by Straus (1948) on the existence of a psychosis-neurosis continuum. Thus, it would be necessary to enquire about the underlying OCD mechanisms which impede hasty decision-making and would explain the differences from non-affective psychosis. One variable to be considered would be the patient's awareness of the illness and OCD symptoms. In this study, the patients evaluated were highly aware of the illness and its symptoms, which could explain their responses being similar to healthy controls and significantly different from those of the patients with non-affective psychosis. It would remain to be seen in future studies whether patients with OCD with little awareness of the illness and its symptoms jump to conclusions.

Our study examined the influence of task difficulty on JTCs. The results showed a common facet of non-affective psychosis and OCD, since neither of the groups benefited from the changes in task difficulty in decision-making. In other words, performing a less difficult task did not facilitate making a fully convinced decision. On the contrary, healthy controls reacted differently to changes in difficulty. Thus, when the task was less difficult, they were able to make fully convinced decisions more quickly than when the task was more difficult, which led them to require more beads before deciding. In view of all of the above, it seems that JTCs are independent of task difficulty for patients with non-affective psychosis or OCD.

These results contradict those found by Dudley et al. (1997), who found that both patients with psychosis and healthy controls required less contextual proof to make a decision in less difficult tasks (version 85:15 of the Beads Task) and more contextual proof when the task was more difficult (version 60:40 of the Beads Task), showing that patients and controls took the demands of the task into account.

Conclusions

This study corroborates that non-affective psychosis and OCD do not share the reasoning bias known as JTCs but do share impermeability to changes in task difficulty. It remains to be found what internal mechanism impedes patients who have alterations of thought, such as OCD and non-affective psychosis, from benefiting from a change in difficulty of the tasks they are faced with.

The results found in this study should be interpreted considering the following limitations. In the first place, the small size of the sample affects generalization of the findings. This was only a preliminary study, so the sample size will have to be enlarged to know whether the results are consistent. In the second place, it is a cross-sectional study comparing groups assigned by clinical decision, which also limits generalization of the results. In the third place, no relationships existing between JTCs and emotional state and mood or between JTCs and OCD patient awareness of the illness and its symptoms, both of which could be considered factors explaining this reasoning bias, were analyzed. Fourth, there are studies which have questioned the retest reliability and internal consistency of the Beads Task and also suggest that participants may find it hard to understand the instructions (Balzan, Delfabbro, Galletly, & Woodward, 2012; Moritz et al., 2017; Moritz & Woodward, 2005; Ross, McKay, Coltheart, & Langdon, 2015). Therefore, future studies could use other tests, such as the box task (Andreou et al., 2015; Balzan, Ephraums, Delfabbro, & Andreou, 2016, Moritz et al., 2017), the fish task (Moritz et al., 2012; Speechley et al., 2010), or other tests in which the influence of more than one emotional component is evaluated (Dudley et al., 1997) to find out whether the results coincide with those in our study. In the fifth place, the

reason why many patients with non-affective psychosis did not jump to conclusions was not explored, and this should be subject to future studies. One possible hypothesis is that it is due to the differences in time of evolution of the illness within this group, probably a cognitive bias associated with patients who have had more psychotic episodes, or else because JTCs are linked to more proneness to delusions, psychosis severity, or the extent to which there is negative symptomatology (Dudley, Taylor, Wickham, & Hutton, 2016), aspects which were not analyzed. Finally, and given the importance of variables such as cognitive flexibility, these results may require this process to verify both the appearance of the jump to conclusions and why more cases of this cognitive bias did not appear in a group of patients with non-affective psychosis (Ross et al., 2015).

Summarizing, it may be concluded that patients with non-affective psychosis jumped to conclusions, while patients with OCD and healthy controls did not. Furthermore, neither disorder, both of which involve alterations of thought, benefited from the changes in task difficulty when making their decisions.

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