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Predictors of referential thinking: analyses of clinical subjects and controls

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Abstract

Background. Referential thinking (RT) is a common characteristic of human mentation. In psychopathology, RT has been traditionally associated with psychosis. In this study we analyze RT (self-references, SR) differences between clinical and control samples, and we identify variables to predict RT. **METHODS**. 120 adults (70 patients and 50 control subjects from the general population), with a mean age of 34.49 (SD, 10.63); 60% female. **RESULTS**. The number of SR among patients, especially patients with diagnosed psychoses, was significantly greater than that among controls. No significant differences in RT were observed among patients characterized by axis II diagnoses or between patients characterized on different axes. The variables that were most predictive for SR were psychotic thinking (MCMI-II personality inventory, thought disorder), conceptual disorganization (BPRS psychiatric scale), age, and vulnerability indicators of mood disturbances (DAS scale). This set of state and trait variables accounted for 56.4% of the RT variance. **CONCLUSIONS**. There were more differences between patients and controls in terms of frequency of SR than of content (RT processes occur along a continuum). RT may be both a manifestation of state (with an additive effect on other psychopathologies), and a manifestation of trait (a characteristic of psychotic processes, one possibly associated with vulnerability indicators of mood disorders).

Key words: referential thinking; self-references; psychosis; clinical predictors; vulnerability predictors.

INTRODUCTION

Referential thinking (RT) consists of self-attributions (or self-references, SR) about social events, objects or other people in the person's immediate environment. A gaze, a gesture or any other expression by another individual is over-interpreted by the subject, who begins to feel observed, criticized, laughed at, or blamed for something (American Psychiatric Association, 2000).

The development of the appropriate RT is a natural process that gives meaning to our experiences in relation to others. Social interactions and self-referential emotions such as shame or guilt regulate the way self-concepts develop. They increase awareness of one's own perspectives and those of others and serve as the basis for attributing the propositional content of the mental states of others (theory of mind)

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(Zinck, 2008). As a cognitive process, RT is prominent during adolescence because of emerging concerns with one's look and appearance, continual evaluation of the self and others, and heightened participation in emotionally-laden social interactions. The frequency of RT (or self-references, SR) among women and men is often similar (Lenzenweger, Bennett, & Lilenfeld, 1997), especially when individuals are confronting emotionally charged situations.

RT is related to the natural human effort to give meaning to social and emotional experience. So-called "intuitive thinking" (rapid, holistic, and associationistic information processing) is positively correlated with SR, and predicts RT by its relationship with positive affect. Particularly when things are going well, RT may play a role in affirming a sense that life is meaningful, regardless of the non-rational content of the thoughts (King & Hicks, 2009). In psychopathology, SR are traditionally associated with psychotic disorders; moderate SR are present in paranoid personality disorder, schizotypal personality disorder, social phobia (Meyer & Lenzenweger, 2009), as well as in other disorders (e.g., body dysmorphic disorder or avoidant personality disorder).

Unstable SR (self-centrism) are relevant in psychopathologic diagnoses, especially in cases of psychosis (Gross, Huber, Klosterkötter, & Linz, 2008). SR may represent attenuated symptoms of psychosis, observed among ultra high-risk criteria and basic symptoms, both with a significant index of transition to psychosis (Schultze-Lutter, Ruhrmann, Berning, Maier, & Klosterkötter, 2010). A reduced presence of SR is observed in the residual phase of schizophrenia, as with other prodromal indicators (Wong et al., 2012). Thus, SR are an essential predictive tool for early therapeutic psychological intervention.

Investigators consider RT an indicator of proneness to psychosis, and some forms of AR (about observation: "they look at me") more related to other indicators psychotic symptoms such as hallucinations and persecutory delusions, than other AR (about communication: "talk or whisper about me") (Startup, Sakrouge, & Mason, 2010). Freeman (2007) considers SR an indicator of the development of delusional disorder along with anxiety and excessive interpersonal sensitivity. In such disorder, SR range from intentionally attributed to slightly menacing or severely threatening. RT is not synonymous with paranoia (Cicero & Kerns, 2010). Unpleasant SR indicate a threat to self (and are therefore related to paranoia) in contrast to pleasant SR (which are related to other emotional states or disorders). It is argued that the RT process may depend on a central mechanism such as aberrant salience (Kapur, 2003), moderated by self-esteem issues; the process may lead to pleasant (high self-esteem) or unpleasant (low self-esteem) SR (Cicero & Kerns, 2011).

According to Lenzenweger (2006), RT, magical ideation, and perceptual aberrations constitute the schizotypy construct, a personality organization that harbors a latent liability to schizophrenia. RT can be considered an aspect of positive schizotypy because it involves attenuated delusional cognition. This positive schizotypy appears to be more related to deficits in the theory of mind than to a broad form of schizotypy (Gooding & Pflum, 2011).

Self-referential processing is automatic; therefore, subjects suffering from paranoid delusions show a lower threshold of automatic control over self-referential information. Mood plays a relevant role in this context, highlighting the importance of cognitive attribution biases (i.e., self-serving biases) to safeguard a subject's self-esteem. Thus, an externalizing (and personalizing) bias leads one to blame others for one's own failures (Diez-Alegría, Vázquez, Nieto-Moreno, Valiente, & Fuentenebro, 2006; Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001; Wing, Cooper, & Sartorius, 1974) referred to this form of RT (related to depressive moods and feelings of shame) as "blame."

In summary, RT is related to an increased sense of self-defensiveness (a trait or a sensitivity), substantial affective involvement (reactivity), and the relevance we attribute to the social environment (universal reactivity to social stimuli).

Although RT was recognized many years ago, there is a lack of empirical data in this field, specifically in clinical populations. The aims of this study were (1) to analyze RT (or SR) differences (qualitatively and quantitatively) between clinical and control samples, and (2) to identify vulnerabilities and socio-demographic, clinical, and dispositional variables predictive of RT. We predicted, an RT continuum between patients and controls that could be identified on the basis of quantitative measures (SR) and qualitative analysis (content); we hypothesized, first, that there would be quantitative differences between patients and controls (higher scores in patients) but there would be no qualitative difference between patients and controls in terms of SR content (universal reactivity to social stimuli). As a diagnostic condition, RT is most evident as a precursor or symptom of psychosis, especially as an indicator for positive schizotypy, disorganization, or continuous cognitive defense traits or sensitivity. Therefore, as a second hypothesis, the AR would be higher among psychotic patients. Related to the above, the third hypothesis predicts that there will be higher scores in SR among cluster A patients with personality disorders, i.e., those patients closest to the psychotic spectrum. In relation with the RT continuum (and components of state and trait), the fourth hypothesis predicts that there would be quantitative differences between diagnosis in axis I, II, or both (higher scores in diagnosis of both axis); participants with a psychopathological history or not (higher scores in participants with history), and with or without use of psychotropic medication (higher scores in participants with medication). We also suggest, as fifth hypothesis, that RT is a cognitive vulnerability factor (trait or sensitivity) linked to mood.

Methods

Participants

A total of 128 subjects (60% female) from Seville, southern Spain, participated in the study. The patients (n = 70, 58%) were from a private psychological clinic and included 25 males and 45 females (age range, 19–58; mean age, 35.2, standard deviation: SD = 10.5). The control group (n = 50, 42%), included 23 males and 27 females (age range, 18–61; mean age, 33.5 years, SD = 10.8). All participants were informed of the goals of the study and each participant gave written consent.

Table 1 compares general measures between patients and controls. The analysis showed no statistically significant differences between the selected variables for the comparison of groups of participants. The variances are homogeneous in all variables (age: 0.036; SDS: 0.399; sincerity: 2.642; and durations of symptoms - men-women-comparison-: 1.94, F_{Levene} p > .05).

Table 1. Descriptive statistics: gender, marital status, age, socio-demographic status, sincerity (EPI), and duration of symptoms (months) (patients only).

Variable		Group; n (%)		Statistical	df	p
		Patients	Controls			
Gender	male(1)	25 (35.7)	23 (46)	$\chi2 = 1.286$	1	.257
	female (2)	45 (64.3)	27 (54)			
Marital status		frequency (%)				
single(1)		33 (47.14)	26 (52)			
married/living with partner(2)		27 (38.57)	24 (48)	7.893	3	.048
widow/widower(3)		1 (1.43)	0 (0.0)			
divorced separated(4)		9 (12.85)	0 (0.0)			
		mean (SD)		t		
Age		35.21 (10.50)	33.48 (10.83)	0.880	118	.381
Socio-demographic status (SDS)		35.82 (18.82)	32.20 (21.70)	0.976	118	.331
Sincerity (S-EPI)		7.87 (0.94)	7.56 (0.99)	1.741	118	.084
Duration of symptoms (months)	male(1)	41.64 (72.79)		−0.652	68	.516
	female(2)	52.97 (67.88)				

Instruments

The subjects completed an initial self-administered survey that identified socio-demographic status (SDS) (Hollingshead, 1975), current illnesses, psychopathological antecedents, histories and duration of symptoms, psychopharmacologic treatments, and other drug use.

Brief Psychiatric Rating Scale (BPRS) (Lukoff, Liberman, & Nuechterlein, 1986). The BPRS is a 24-item measure for clinicians to determine the presence and severity of psychopathological symptoms: suspiciousness; unusual thought content; grandiosity; hallucinations and hostility; somatic concern; anxiety; depression; guilt; elated mood; suicidality; conceptual disorganization; excitement; tension; mannerisms and posturing; uncooperativeness; self-neglect; bizarre behavior; motor hyperactivity; distractibility; motor retardation; blunted affect; emotional withdrawal. In a 7-point scale, lower BPRS scores reflect absence of symptomatology, higher scores indicate severe psychopathology. The scale provides construct validity for the monitoring of schizophrenic indicators (Andersen, 1989). It has been validated for Spanish populations with alpha reliability (.59 to .70) and reliability retest (.70) (Peralta, Martín, & Cuesta Zorita, 1994).

Beck Anxiety Inventory (BAI) (Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-question self-report (0 to 3) inventory used to assess the intensity symptoms (mostly physiological) of anxiety. The alpha reliability of the BAI is .93, and has been validated for Spanish populations (Magán, Sanz, & García-Vera, 2008).

Beck Depression Inventory (BDI) (Beck, Rush, Shaw, & Emery, 1979). Spanish translation by Vazquez and Sanz (1999). The BDI is a 21-question self-report (0 to 3) inventory that assesses the strength of depressive symptoms with reliability (alpha, .83, and retest reliabilities ranging from .60 to .72) and validity (convergent and discriminant) for Spanish populations.

Penn State Worry Questionnaire (PSWQ) (Meyer, Miller, Metzger, & Borkovec, 1990). The PSWQ is a 16-item (1 to 5) questionnaire that rates worry or cognitive anxiety. In Spanish populations, the internal consistency is .90 ; the test–retest reliability is .82, and the validity (convergent and discriminant) ranges from .44 to .67 (Sandín, Chorot, Valiente, & Lostao, 2009).

Dysfunctional Attitudes Scale (DAS) (Weissman & Beck, 1978). Spanish translation by Sanz and Vazquez (1994; 1993). The DAS is a 40-item (1 to 7) scale that assesses cognitive vulnerability to depression. In Spanish populations, reported internal consistency (.84), and validity. The scale has three factors: attitudes about achievement, dependency, and autonomy.

General Health Questionnaire (GHQ-28) (developed by David Goldberg; Spanish edition by Lobo, Pérez-Echeverría and Artal, 1986). The GHQ is a 28-item (0 to 3) questionnaire used to rate symptomatology. It has four scales: depression, anxiety, social dysfunction and somatization. In Spanish populations, reported reliability retest (.90), the sensitivity ranges from 44% to 100%, and the specificity ranges from 74% to 93%.

Referential Thinking Scale (REF) (Lenzenweger et al., 1997) The REF is a 34-item self-report true/false questionnaire about SR, with an internal consistency ranging from .83 to .85, a test–retest reliability of .86 (4 week interval), and adequate validity. The scale provides strong indicators of schi-

zotypy (such as magical thinking and perceptual aberrations) (between .75 and .85 on the first two principal components) and weaker indicators of anxiety and depression (between .33 and .17). Startup et al. (2010) created a strong validity indicator that separates the RT of other pathological symptoms (e.g., hallucinations were associated with RA of observation, while the AR of communication not) into two parts, and with a cut-off value of 6 points for the whole scale. The Spanish translation of the REF achieves an internal consistency of .90 (.83 and .82 for each half) and a test–retest reliability of .76 (average interval of 44 days in patients). The validation criterion (with reference to the BPRS) was a cut-off of 7 points for a specificity of 66% and a sensitivity of 58% (Senín-Calderón et al., 2010).

Eysenck Personality Inventory Sincerity Scale (S-EPI) (Eysenck & Eysenck, 1990). The EPI Sincerity Scale is a 9-item true/false self-reporting measure that quantifies the social desirability and sincerity.

Millon Clinical Multiaxial Inventory (MCMI-II) (Spanish version) (Millon, 1999). The MCMI-II is a 175-item true/false inventory that includes 10 basic personality scales (schizoid, avoidant, dependent, histrionic, narcissistic, antisocial, aggressive-sadistic, compulsive, passive-aggressive and self-defeating) and three severely pathological personality scales (schizotypal, borderline and paranoid); it also integrates control scales, scales for axis I (anxiety, somatoform, bipolar manic, dysthymia, alcohol dependence, drug dependence), and scales for the most severe disorders on axis I (thought disorder, major depression, delusional disorder).

Design, procedures, and statistical analyses

We applied an ex-post-facto design, with a comparison measures method (mainly AR) as a function of the conditions patients/controls or general diagnostics, and finally determine RT predictors using a model regression.

Patients were selected by incidental sampling from a patient group receiving cognitive therapy at a private psychological clinic, between February 2008 and September 2010. The control group was selected using snowball sampling, which was done by two collaborators from the University of Seville during the same time interval. One-third of the clinical sample was randomly selected to repeat the REF in order to determine the test–retest reliability.

Assessment instruments were delivered to the patient group in the second therapy session in the following order: initial interview made for authors, BAI, BDI, PSWQ, DAS, GHQ-28, REF, EPI Sincerity (EPI), MIPS, MCMI-II. Patients completed tests at his home, and they delivered the instruments in the subsequent therapy session. The BPRS Scale was applied in the first session by the psychologist who performed the therapeutic process. The control group completed an initial interview, REF scale, the sincerity scale (EPI) and MIPS questionnaire. All tests were carried out in self-report format.

Descriptive statistics and comparisons of means (t-test) were used to compare the following characteristics of patients and controls: age, socio-demographic status (SDS), EPI Sincerity (meeting the homoscedasticity criterion, F_{Levene}), and the Pearson chi-squared using gender x group (2×2) contingency tables. Responses to the items in the REF were compared using chi-squared 2×2 contingency tables (true/false, patient/control), with Fisher's corrections in some cases. We conducted comparisons of means (t-test, F or H), with post hoc analyses and assumptions about the homogeneity of variance. In some comparisons, because of the small sample size and the likelihood of type II errors, the Bonferroni procedure was used.

For the multiple linear regression analyses, we used variables with similar content; these included socio-demographic measures (age, SDS), clinical measures (BPRS, BAI, BDI, PSWQ, and GHQ-28), vulnerability measures (DAS global and factors), and dispositional measures (MCMI-II, axes I and II). Statistical significance was established by a 95% confidence interval ($p < 0.05$) criterion. Statistic analyses were conducted using SPSS v. 15 for Windows.

Results

In the measure of RT, there are no statistically significant differences between gender or SDS (Table 2); similarly, there are no significant differences between age groups, F (4, 115) p < .05, but the data are heteroscedastic. The Kruskal-Wallis H test did not reveal any significant differences between age groups, χ^2 (4, N = 120) = 8.22, p = .084. In addition, there were no significant differences between the SR values in age categories, even excluding subjects age 56 or older, F (3, 116) = 1.893, p = .135, and homogeneity criteria are met: F_{Levene} = 2.681, p = .050.

As expected, the SR scores of patients and controls are significantly different (although the comparisons involved heteroscedastic data). SR are present on 13 of 34 survey items in more than 20% of participants, and in more than 40% on items number 9 and number 31 (Table 3). Although SR are more frequent in patients than in controls, the difference is significant on only 12 items.

There are significant differences in SR between diagnostic groups, F (7, 70) = 4.476, p = .0001, homoscedasticity: F_{Levene} = 1.505, p = .183. When excluding categories with only a few cases (eating disorders and addictions), statistically significant differences are noted between groups (with homoscedasticity) once again (ANOVA, Table 4 for 5 df). There were significant differences in SR between patients with different psychotic disorders and those in the various diagnostic

Table 2. Comparisons of socio-demographic and group measures of self-references (SR)

Gender	n	mean (SD)	t /F	df	p	FLevene
male(1)	48	5.52 (6.30)	−0.732	118	.465	0.388
female(2)	72	6.35 (5.89)				
Socio-demographic status (SDS) (ranges)						
11-17 (very high)(1)	26	4.23 (4.18)				
18-27 (high)(2)	25	5.12 (5.65)				
28-43 (mean)(3)	34	8.50 (8.03)	1.653	4	.166	2.39
44-60 (low)(4)	20	6.07 (5.71)				
61 or more (very low)(5)	15	6.02 (6.04)				
Age (ranges)						
18-25 (1)	34	7.35 (6.45)				
26-35 (2)	31	4.64 (4.35)				
36-45 (3)	34	7.17 (7.42)	1.991	4	.100	2.77*
46-55 (4)	18	4.50 (4.20)				
56 or more(5)	3	1.00 (1.00)				
Groups						
Patients(1)	70	7.79 (6.72)	3.522	118	.001	11.097**
Controls(2)	50	3.82 (4.08)				

Significant: * p < .05; ** p < .01

groups (Bonferroni test, p < .05), except those with somato-form and dissociative disorders. The elimination of "other conditions that may be a focus of attention in Axis I" (the category closest to normal functioning), did not significantly alter the results: $F_{(4, 65)} = 5.240$, p = .001, $F_{Levene} = 1.434$ (p > .05).

There were no statistically significant differences in the SR of patients with different personality disorder groups (based on non-parametric comparisons, Table 4). Outstanding scores were observed in group C and this was most pronounced in those classified with non-specified forms (i.e., combinations of personality disorders).

We found no significant differences in the SR of patients represented on axis I, axis II, and on both axes (Table 4). However, the average SR value is lowest in axis I patients and highest in patients that occur on both axes; the latter combines diagnosis (suggesting severity); the difference between the first axis and the combined axis category is not statistically significant, $t_{(67)} = −1.908$, p = .061, $F_{Levene} = 0.841$, p = .362.

Concerning the overall sample, the SR of subjects with a psychopathological history (M = 9.00, SD= 7.77) were significantly greater than the SR of subjects without a psychopathological history (M = 5.11, SD = 5.13), $t_{(120)} = −2.49$, p = .018. Given that most subjects with antecedents were patients, the analysis was repeated by comparing patients and controls, with the same result (M = 10.39, SD = 7.91 vs. M =

6.21, SD = 5.66, respectively), $t_{(28)} = −2.53$, p = .013.

An ANOVA was conducted on the RT values of patients in the following categories: relapse, current psychopathologies, and no psychopathology history. The results showed significant differences between the groups, but variances were not homogeneous (Table 4). When we applied the t-test for unequal variances, we did not find any statistically significant differences between the groups ($t_{0,1} = 0.070$, $t_{0,2} = 0.075$, $t_{1,2} = 0.121$; p > .05). The same results were obtained using only the group of patients, $F_{(2, 70)} = 6.639$, p = .002, $F_{Levene} = 3.974$, p < .05; none of the post hoc analyses revealed a category with SR values significantly different than those of the other categories: $t_{0,1} = 0.091$, $t_{0,2} = 0.136$, $t_{1,2} = 0.170$; p > .05.

To verify the effects of psychotropics on REF scores, we applied a difference of means test. This test revealed that subjects taking psychotropic medications scored higher on SR than those not taking medications (data with non-homogeneous variances). The same analysis, conducted only for patients, also revealed significant differences between these two groups, $t_{(70)} = −2.42$, p = .020; data with non-homogeneous variances: $F_{Levene} = 8.385$, p < .05.

Finally, we applied a stepwise multiple linear regression analysis to analyze socio-demographic, clinical, vulnerability to depression, and dispositional variables on RT (SR). Based on this analysis, we found that 56.4% of the total SR variance could be explained by a combination of the thought disorder MCMI-II sub-scale (40.5%), the conceptual disorganization

Table 3. Percentage of responses for each item on the REF scale, and a comparison of the responses between patients and controls.

REF Scale items	% response	Chi-Squared	More common in…
1	31.7	22.187**	Patients
2	13.3	6.462*	Patients
3	21.7	15.762**	Patients
4	8.3	7.792*!	Patients
5	9.2	2.748!	Patients
6	10	6.095*	Patients
7	9.2	5.287*!	Patients
8	24.2	1.779	Patients
9	43.3	6.206*	Patients
10	18.3	0.312	Patients
11	19.2	1.477	Patients
12	16.7	1.344	Patients
13	10	1.524	Patients
14	12.5	3.311	Patients
15	3.3	2.956!	Patients
16	28.3	3.944*	Controls
17	6.7	0.980!	Patients
18	21.7	9.433**	Patients
19(R)	20	0.000	No differences
20	5	1.624!	Patients
21	6.7	0.980!	Patients
22	4.2	0.006!	Patients
23	4.2	1.008!	Patients
24	23.3	2.577	Patients
25	7.5	0.031!	Patients
26	9.2	1.032!	Patients
27	7.5	0.031!	Patients
28	31.7	5.392*	Patients
29	30	8.000**	Patients
30	35.8	5.220*	Patients
31	45	2.805	Patients
32	22.5	0.995	Patients
33	34.2	7.648**	Patients
34	7.5	3.737!	Patients

Statistical significance: *$p < .05$; ** $p < .01$; ! = Fisher correction; (R) = item reverse.

BPRS subscale (5.9%), age (6.2%), and the DAS global (3.8%) (Table 5).

Discussion

As noted by Meyer and Lenzenweger (2009), a person might be more sensitive to the immediate environment if he/she has experienced a psychopathological disorder (axis I or axis II) or has psychopathological antecedents. However, this difference (i.e., patients versus controls; with or without psychopathology history) is quantitative (frequency-dependent) and not qualitative; in addition, it is common for most kinds of SR to also occur in controls (i.e., they are universal reactivity to social stimuli). These results confirm our first hypothesis, that an RT continuum exists between patients and controls,

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Table 4. Comparisons of self-references (SR) among patients with diagnosed disorders.

Grouped diagnoses from Axis I	n	mean (SD)	F/H/t	df	p	FLevene
Depressive disorders(1)	14	6.57 (7.39)				
Adjustment Disorders(2)	13	5.23 (4.19)				
Dissociative and somatoform disorders(3)	4	7.75 (5.56)				
Anxiety disorders(4)	20	7.35 (4.90)	5.056	5	.001	1.900
Schizophrenia and other psychotic disorders(5)	6	18.33 (9.56)				
Other Conditions that may be a focus of clinical attention(6)	5	3.20 (1.92)				
Clusters of Personality Disorders (Axis II)						
Cluster A(1)	2	15.50 (9.19)				
Cluster B(2)	1	16.00	2.272	3	.518	1.834
Cluster C(3)	7	8.71 (4.02)				
Personality Disorder NOS(4)	6	10.33 (9.89)				
Axes I and II diagnoses						
Axis I(1)	54	6.68 (6.37)				
Axis II(2)	3	9 (4.58)	1.929	2	.153	0.656
Both(3)	13	10.62 (7.83)				
Case History in Psychopathology						
None(1)	92	5.11 (5.12)				
A case history different from the one…(2)	5	16.60 (10.5)	10.78	2	.000	6.420**
A case history already treated (3)	23	7.35 (6.17)				
Psychopharmacologic Treatment						
With prescription(1)	88	4.73 (4.49)	−3.20	38.1	.003	17.716**
Without prescription(2)	32	9.56 (9.56)				

Statistical significance: *p < .05; **p < .01

identified on the basis of quantitative measures, but SR contents qualitatively similar.

According to Johns and Van Os (2001) heterogeneity could be evidence of a continuum between patients and the general population, and among patients themselves. Also imply that

Table 5. Predictive analysis of referential thinking (RT)

Significant variables	R2 Adjusted	Beta	T	Sig.
Constant				
MCMI – thought			-.690	.494
disorder	.405	.333	2.617	.012
BPRS – conceptual	.464	.375	3.399	.002
disorganization	.526	-.259	-2.510	.016
Age	.564	.251	2.153	.037
DAS – global				

The SR values are much less homogenous in patients than in control groups; this must be studied carefully. It is possible that psychopathology is a highly heterogeneous process that reflects personal states and/or traits, and not just a measure of the schizotypy trait as Lenzenweger (2006) proposed when he created the REF Scale. A diagnostic or psychopathological condition (state) may strengthen the SR contents already present or make them harder to cope with when they begin to manifest.

if we refer to schizotypy, differences between patients, and between controls, may be less pronounced and stable than expected On the other hand, the variability in RT scores among the patients themselves underscores the importance of SR instability as a pre-delusional stage, a precursory symptom (and therefore a latent condition for the classical development of psychotic process) (Schultze-Lutter et al., 2010) or a risk symptom (or syndrome) associated with different psychopathologic pathways (McGorry, 2010).

There were some differences in SR between the diagnostic groups, particularly highlights in schizophrenic patients and patients with other psychotic disorders; this confirmed our second hypothesis i.e., that RT is most evident as a precursor to or a symptom of psychosis (positive schizotypy, disorganization, continuous cognitive defense traits). Moreover, we found differences in SR between patients in different phases of psychosis disorder manifestation: two patients were in an active phase, two were in a stable disease stage, and the rest were in a residual stage. Therefore, RT develops during the prodromal stage, reaches its peak during the active phase, and is retained during the residual stage. During the residual stage, SR is a useful predictor of improvement or deterioration, which is why, in a previous work, we noted a decrease of SR in the remission stage, and a recuperation of the scores in the monitoring stage of psychotic patients, with a necessary increase of neuroleptic dosis (Rodríguez-Testal et al., 2009). This strengthens the notion that RT can be a state (psychopathology) or a trait (pre-delusional stage).

Some conditions from axis I, such as adjustment disorders and relational problems (e.g., other conditions that may be a focus of clinical attention on axis I) have SR scores that are closer to the scores characteristic of controls. Other psychopathologies, such as anxiety, depression, eating disorders, etc., show markedly high self-referential values.

One way to check the status of traits that have been carried over from personality disorders is to see whether the patients' SR scores are high; in fact, these clinical conditions can be considered pre-psychotic (specially cluster A). Unfortunately, although the total number of axis II diagnoses in the sample of this study (23%) represents a reasonable proportion of these cases in a clinical setting, it is not large enough to be conclusive about the results. The high average SR in patients from group A is consistent with the observations of Lenzenweger et al. (1997) and Meyer and Lenzenweger (2009) regarding subjects with schizotypal and paranoid disorders. However, in the NOS category (combination of personality disorders), it appears once again that the interpretation of additives (conditions of severity) must take into account conditions of both state and trait. Therefore can not support the hypothesis 3.

Hypothesis 4 was confirmed, suggesting that there may be a combination of state and trait factors in increased AR. Thus, psychopathology history (patients or controls) can be an indicator of vulnerability. Taking psychotropic drugs (patients or controls) a status condition that affects some extent. And having diagnoses in both axes, can be an indicator of psychopathological additivity (state and trait).

In regression analyses, we observed that the first two parameters were represented by the clinical variables (trait or state) of psychotic thinking (MCMI-II thought disorder) and conceptual disorganization (BPRS), both of which reflect the onset of positive symptoms. The first component is connected with the development of suspicion, mistrust, and distorted thinking, but not with delusional activity. The second component, conceptual disorganization, indicates the onset of a breakdown of coherent thought (i.e., formal thought disorders). Therefore, the REF Scale detects the developmental progression of psychoses. In addition, as noted by Startup et al. (2010) the REF Scale is useful because it identifies the severity of psychotic disorders. The last two variables in the regression equation, age and DAS, represent "trait" conditions; the first is related to developmental maturity, underscoring the importance of SR in younger subjects, and the second indicates vulnerability to depression (possibly related to guilt items on the REF Scale), thus confirming our fifth hypothesis, that RT is a cognitive vulnerability factor (trait or sensitivity) linked to mood (the involvement of affective variables in the development of RT).

Some limitations of the present study should be considered. A broader sampling of participants would allow analyses for more thorough diagnostic assessments, instead of global categories of disorders. For example, the inclusion of patients who suffer from obsessive-compulsive disorder and from social phobia (within the "anxiety disorders" category) may also dilute the information about RT, because of the continuous self-referential activity in social phobia disorders is very different than obsessive-compulsive disorder. Moreover, we applied only one measure (cross design). As mentioned above, RT is a pre-delusional element and in order to establish the progression of psychosis, at least two different measurements should be taken: one in the pre-delusional stage and another in the delusional stage. Finally, we encountered some difficulties when applying the REF Scale to assess RT. For example, a woman was diagnosed with delusional disorder (jealous type). This patient rated only 1 on the REF Scale, and after she had completed the test, she commented: "What wears me down is the fact that people start whispering something about me when I am on the bus, or when I am walking down the street, and people laugh at me in my face." Therefore, RT requires a self-report about internal mentation, which is difficult to otherwise articulate or categorize. Inevitably, self-reporting introduces distortions in the dataset.

CONCLUSIONS

The fact that control subjects and patients do not distinguish the content of SR implies that there is a continuum in the process of RT development. On the other hand, our data suggest that, in the absence of diagnosis, the pathological effects of SR are weakened by internal resources or coping in emotionally-laden social interactions. We found that subjects with pathologies either lack resources or become more vulnerable when SR defensive schema appears; this is especially prevalent in cases of psychosis, and with psychopharmacologic treatments.

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Regular Article
Predictors of referential thinking: analyses of clinical subjects and
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Referential thinking may be both a state manifestation (its presence itself possibly has an additive effect on other pathologies), and a trait manifestation (a characteristic of psychotic processes, and also possibly associated with mood disorders). Future work should focus on the nature of the trait/state condition of RT in psychopathology.

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