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The Moderating Effects of Perceived Intentionality: Exploring the Relationships Between Ideas of Reference, Paranoia, and Social Anxiety in Schizotypy

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Abstract

Introduction—Ideas of reference (IOR), paranoia, and social anxiety are features of schizophrenia-spectrum disorders, which appear to be conceptually related; however, the precise nature of these relationships is unclear. These relationships may be partially explained by perceived intentionality (PI), a social-cognitive bias for perceiving other people's actions during unpleasant situations as being directed at oneself in an intentionally malicious manner. Our primary aim was to examine the moderating role of PI on the relationships between IOR and paranoia, and between IOR and social anxiety amongst individuals with psychometrically-defined schizotypy.

Methods—We assessed IOR, paranoia, and social anxiety amongst individuals with psychometrically-defined schizotypy ($n = 44$) and controls ($n = 36$), and examined the moderating effects of PI within each group.

Results—As hypothesized, PI moderated the relationship between IOR and paranoia such that higher PI predicted higher levels of paranoia as IOR increased. Additionally, we found that PI moderated the relationship between IOR and social anxiety such that higher PI predicted lower levels of social anxiety as IOR increased.

Discussion—Theoretical and practical implications are discussed including the potential for assessing PI as a proxy for paranoia when clinicians suspect a client is underreporting paranoia due to positive impression management.

Keywords

Schizophrenia-spectrum; schizotypy; intentionality; paranoia; ideas of reference

Ideas of reference, paranoid ideations, and social anxiety are three symptoms commonly observed in schizophrenia-spectrum disorders. Conceptually, these three symptoms appear to be related to each other (e.g., they can all involve thoughts that others are taking special notice of themselves); however, the precise nature of these relationships is unclear. Past research has provided support for the notion that paranoia and ideas of reference are related to one another and preliminary evidence suggests that ideas of reference may also be related

to social anxiety, particularly amongst individuals with schizotypy (Meyer & Lenzenweger, 2009) – a personality organization associated with an elevated risk for developing schizophrenia-spectrum disorders (Meehl, 1962).

Our conceptualization of schizotypy is informed by Meehl's model of schizophrenia-spectrum disorders, a diathesis-stress model that conceptualizes schizophrenia-spectrum disorders as existing on a continuum. Meehl postulates that a subset of healthy individuals possess a genetic predisposition for developing schizophrenia-spectrum disorders, and these individuals exhibit traits similar to those seen in schizophrenia, although less severe (Meehl, 1962, 1990; Lenzenweger, 2006). A substantial body of research supports a continuum model of schizophrenia-spectrum disorders (e.g., Lenzenweger, 2010; Cochrane et al., 2012).

Ideas of reference (IOR) are described by the DSM-IV-TR as “the feeling that casual incidents and external events have a particular and unusual meaning that is specific to the person” (American Psychiatric Association, 2000, p. 824). Referential thinking occurs in about 67% of schizophrenia patients (World Health Organization, 1973), and studies have found that IOR occur more frequently in individuals with psychometrically-defined schizotypy (Meyer & Lenzenweger, 2009) and relatives of schizophrenic probands (Yaralian et al., 2000) compared to controls.

Paranoid ideations, which include thoughts that one is being harassed, mistreated, or plotted against (American Psychiatric Association, 2000, p. 826), are also common in schizophrenia-spectrum disorders. Paranoid ideations occur in approximately 50% of individuals with schizophrenia (Sartorius et al., 1986), and are more common in relatives of schizophrenic probands (Yaralian et al., 2000) and individuals with psychometrically-defined schizotypy (Spitznagel & Suhr, 2004) compared to controls. Although some IOR exhibit paranoid features, this is not always the case. Wing, Cooper, and Sartorius (1974) described two different types of IOR, *guilty* and *simple* IOR, but only *guilty* IOR exhibit paranoid features. *Simple* IOR, on the other hand, can exhibit socially anxious themes characterized by self-consciousness and thoughts that others are taking special notice of their flaws.

This description of *simple* IOR exemplifies the notion that IOR are not always paranoid in nature, but instead can exhibit socially anxious themes. Social anxiety, which involves fears of being embarrassed or negatively evaluated by others, is common in schizophrenia-spectrum disorders. It has been estimated that roughly one-third of schizophrenia patients meet criteria for social anxiety disorder (Pallanti, Quercioli, & Hollander, 2004), and elevated levels of social anxiety have been observed in siblings of schizophrenia patients compared to controls (Torgersen, Onstad, Skre, Edvardsen, & Kringlen, 1993). Although research examining how social anxiety relates to IOR is minimal, at least one study has found that healthy participants with elevated levels of social anxiety experienced more IOR than non-anxious controls (Meyer & Lenzenweger, 2009). Specifically, they experienced more thoughts about other people laughing at them, commenting on their behavior, and feeling guilty or ashamed.

Social anxiety also appears to be related to paranoid ideation. Gilbert, Boxall, Cheung, and Irons (2005) found that individuals with paranoia and social anxiety both tend to devote more of their attentional resources to detecting potentially anxiety-inducing stimuli in social situations. Additionally, the authors explain that both symptoms can involve IOR. There is, however, at least one characteristic required for paranoia that is not necessarily present in social anxiety: the belief that another person is *intentionally* trying to harm them (Freeman & Garety, 2000). For example, if an individual believes that his coworkers are secretly mocking him behind his back because they think he is odd, as opposed to mocking him in an intentional attempt to hurt his feelings, then this thought would not necessarily reflect paranoia. Instead, this thought may be better characterized as being socially anxious in nature. The concept of a perceived intentionality bias, a social-cognitive bias for interpreting people's actions during unpleasant social situations as being directed at oneself in an intentionally malicious manner (Combs, Penn, Wicher, & Waldheter, 2007), may shed some light on how IOR, social anxiety, and paranoia relate to one another in individuals with schizotypy.

The Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007) assesses this perceived intentionality bias by instructing participants to imagine that they are a character in several vignettes depicting unpleasant social scenarios, and describe the degree to which they believe another character's actions were directed at themselves in an intentionally malicious manner. The AIHQ has been employed in a handful of studies that have provided intriguing results suggesting a relationship exists between perceived intentionality and paranoia. Combs et al. (2007) found that a perceived intentionality bias was positively correlated with paranoia in a healthy college sample, and this relationship was strongest in ambiguous scenarios wherein the characters' intentions were exceptionally vague. A different study found that psychiatric patients with persecutory delusions exhibited higher levels of perceived intentionality in ambiguous scenarios compared to non-delusional psychiatric controls and healthy controls (Combs et al., 2009). Similarly, An et al. (2010) found that first-episode schizophrenia patients and individuals at "ultra-high risk" for psychosis exhibited higher levels of perceived intentionality compared to healthy controls, and perceived intentionality was positively related to paranoia. Overall, these findings suggest that perceived intentionality is related to elevated levels of paranoia; however, it is unclear if perceived intentionality is related to other schizophrenia-spectrum symptoms like social anxiety or IOR.

To the authors' knowledge, no other studies have examined how perceived intentionality relates to social anxiety or IOR within a schizotypy sample. It is not surprising that perceived intentionality correlates with paranoia considering that paranoia is defined in part by the belief that another person is intentionally acting maliciously toward oneself; however, this belief is not a requirement of socially anxious thoughts, and this intentionality bias may relate to social anxiety in a completely different way than it does to paranoia. Investigating how perceived intentionality relates to other symptoms like social anxiety and IOR is a logical next step in understanding the interconnected nature of the relationships between IOR, paranoia, and social anxiety.

The primary aim of our study was to examine the role of perceived intentionality in explaining how IOR, paranoia, and social anxiety relate to each other amongst individuals with psychometrically-defined schizotypy. We expected IOR, paranoia, and social anxiety would positively correlate with each other amongst individuals with schizotypy. Additionally, we hypothesized that perceived intentionality would moderate the relationship between IOR and social anxiety such that a tendency to perceive other people's actions in unpleasant social situations as being less intentional would predict higher levels of social anxiety. Lastly, we hypothesized that perceived intentionality would moderate the relationship between IOR and paranoia such that perceiving other people's actions in unpleasant social situations as being more intentional would predict higher levels paranoia.

Method

Participants

Undergraduate students ($n = 6,887$) were invited via e-mail to participate in an online survey for a chance to win a prize of \$25. Approximately one-sixth ($n = 1,148$) of those invited participated in the online survey which included a consent form, demographic items, validity items (Chapman & Chapman, 1983), and the Schizotypal Personality Questionnaire-Brief Revised (SPQ-BR; Cohen, Mathews, Najolia, & Brown, 2010). The SPQ-BR was used to identify individuals meeting inclusion criteria for the schizotypy and control groups. Schizotypy subjects were defined as individuals scoring at or above the 95th percentile on at least one of the three SPQ-BR subscales: positive (cognitive-perceptual), negative, or disorganized. Participants in the control group scored below the mean on all three subscales.

Participants who met the above criteria to be included in the study were invited to participate in the laboratory phase of the study. During the laboratory phase, which lasted about two hours, several computer-based measures were administered as part of a larger data collection project. Participants received class participation credits or monetary compensation (\$20) for their participation. Of the 84 participants that completed both phases of the study, four were excluded due to missing data. The final sample consisted of 44 schizotypy participants and 36 controls.

Measures

The Schizotypal Personality Questionnaire-Brief Revised (SPQ-BR; Cohen et al., 2010) is a 32-item self-report questionnaire based on a longer questionnaire commonly used in schizotypy research to assess a broad range of schizotypy traits (SPQ; Raine, 1991). Compared to the full SPQ, fewer incomplete responses have been observed on the shorter SPR-BR (Cohen et al., 2010). Items are answered using a five-point Likert scale ranging from "strongly disagree" to "neutral" to "strongly agree", and items load onto one of three subscales: positive (cognitive-perceptual), negative, and disorganized traits. The current study employed this measure to identify participants that were eligible for the schizotypy group and the control group (see *Participants* section for group selection criteria).

The Referential Thinking Scale (REF; Lenzenweger, Bennett, & Lilienfeld, 1997) is a 34-item questionnaire designed to assess a broad range of IOR with true/false questions about

participants' perceptions of daily life events (e.g., "When I overhear a conversation, I often wonder if people are saying bad things about me"). The REF total score is calculated by summing the number of items marked "true" with the exception of one reverse-keyed item, which adds one point to the REF total score when marked false. Lenzenweger et al. (1997) found the REF exhibited strong psychometric properties with regards to test-retest reliability (.86), internal reliability (alpha coefficients of .80+), and good convergent and discriminant validity.

The Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) is a 20-item questionnaire that assesses social anxiety. Participants are asked to rate the degree to which each item is true of their own experiences using a Likert scale ranging from 0 "never" to 4 "extremely". A total score is calculated with higher scores indicating higher levels of social anxiety. The SIAS has demonstrated high test-retest reliability after 4 weeks ($r = 0.92$) and 12 weeks ($r = 0.92$), high internal consistency ($\alpha = 0.93$), and adequate convergent and discriminant validity (Mattick & Clarke, 1998).

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) is a 53-item questionnaire that assesses a broad range of psychopathological symptoms. Participants rate how distressing each item has been for them during the past week using a Likert scale ranging from 0 "not at all" to 4 "extremely." The BSI yields nine subscales: Somatization, Obsessive-Compulsivity, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Psychoticism, and Paranoid Ideation. The present study measured paranoia with the Paranoid Ideation subscale, which has demonstrated good internal reliability ($\alpha = 0.77$), test-retest reliability ($r = 0.79$), and acceptable discriminate, convergent, and construct validity (Derogatis & Melisaratos, 1983).

The Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs et al., 2007) was created to assess a social-cognitive bias for perceiving other people's actions in unpleasant social scenarios as being directed at oneself in an intentional and malevolent way. The AIHQ consists of 15 short vignettes depicting negative social interaction, which vary in the degree of intentionality. There are five "intentional" scenario and five "accidental" scenarios in which it is relatively obvious whether or not the character's actions were done on purpose. Additionally, there are five "ambiguous" scenarios in which the character's intentions are unclear (e.g., "you are supposed to meet a new friend for lunch at a restaurant but he/she never shows up"). In this study, participants were asked to pretend that each scenario was actually happening to them, and describe what they thought was the "real reason" for why the character acted as they did. Two blind research assistants independently rated these responses on a 5-point Likert scale ranging from 1 ("accidental/not at all hostile") to 5 ("intentionally inflicting harm/very hostile") in order to obtain a "hostility index". The research assistants received didactic training, which included reviewing scoring criteria and example responses. Four weekly consensus meetings were held to discuss discrepant ratings. The present study exhibited good inter-rater reliability with kappa values ranging from .62 to .72. We used the "hostility index" to measure participants' social-cognitive biases for perceiving intentionality in only the five "ambiguous" vignettes in light of previous findings that this bias is most apparent in ambiguous scenarios (Combs et al., 2007). Possible total

scores ranged from 5 to 25 with higher scores indicating a stronger perceived intentionality bias.

Analyses

Three main sets of analyses were conducted. First, we compared groups on demographic and clinical variables. Second, correlational analyses were conducted examining the relationships between IOR, social anxiety, and paranoia within the schizotypy group. Third, two hierarchical linear regressions were conducted to test whether perceived intentionality moderated the relationship between IOR and social anxiety, and the relationship between IOR and paranoia amongst individuals in the schizotypy group. Significant interactions were followed up with post hoc examinations of the simple slopes using Holmbeck's (2002) approach. Similar moderator analyses were also conducted amongst controls. All variables were normally distributed (skew >1.5 ; kurtosis >1.5) unless otherwise stated.

Results

Group Differences on Demographic and Clinical Variables

Participants in the schizotypy group were similar to controls with regard to gender, ethnicity, and age (Table 1). A multivariate analysis of variance (MANOVA) was used to examine group differences in IOR, social anxiety, paranoia, and perceived intentionality. The Roy's largest root multivariate test of overall differences among groups was significant, $\Theta = 1.72$, $F(4, 75) = 32.30$, $p < .001$. Separate univariate ANOVA's were then conducted for each dependent variable (Table 1).

Correlations Between IOR, Social Anxiety, and Paranoia Within the Schizotypy Group

Within the schizotypy group, significant positive correlations were observed between IOR and paranoia, $r = .40$, p (one-tailed) $< .01$, and between social anxiety and paranoia, $r = .48$, p (one-tailed) $< .01$. Social anxiety was not significantly related to IOR, $r = .12$, p (one-tailed) $= .22$. A potential confound was discovered regarding the dramatically larger correlations between these variables amongst males in the schizotypy group compared to females (Table 2). All three variables were normally distributed amongst males, females, and the combined sample indicating that this was not an issue of normality. In light of these findings, and prior findings of gender differences in paranoia and social anxiety (Combs et al., 2009; Gilbert et al., 2005), we controlled for gender in the following analyses.

The Moderating Role of Perceived Intentionality on IOR and Social Anxiety

To examine whether perceived intentionality moderated the relationship between IOR and social anxiety within the schizotypy group we conducted a hierarchical linear regression using the procedures described by Barron and Kenney (1986), and further clarified by Frazier, Tix, and Barron (2004). We controlled for paranoia and gender by entering these variables into Step 1. Both the predictor variable (IOR) and the moderator variable (perceived intentionality) were centered and then entered into Step 2. The two centered variables were used to create an interaction term (IOR X perceived intentionality), which was entered into Step 3. The addition of the interaction term significantly improved the

model explaining an additional 7.4% of the variance (Table 3). The effect size of the interaction term was in the small range, $f^2 = .11$.

To examine the nature of this interaction we calculated regression equations to depict how the level of social anxiety changes as IOR increases (low IOR = 1 *SD* below the mean; high IOR = 1 *SD* above the mean) using the methodology described by Holmbeck (2002). Separate simple slopes (Figure 1) were calculated for low and high perceived intentionality (low PI = 1 *SD* below the mean; high PI = 1 *SD* above the mean). Post hoc probing of the interaction revealed a significant simple slope for high PI ($t = -2.00, p = .05$), but not low PI ($t = 0.84, p = .41$).

The Moderating Role of Perceived Intentionality on IOR and Paranoia

An additional hierarchical linear regression was conducted to examine whether perceived intentionality moderated the relationship between IOR and paranoia within the schizotypy group. We controlled for social anxiety and gender in Step 1. Perceived intentionality and IOR were centered and entered into Step 2, and the interaction term (IOR X perceived intentionality) was entered into Step 3. The addition of the interaction term significantly improved the model explaining an additional 9.1% of the variance (Table 4). The effect size of the interaction term was in the medium range, $f^2 = .17$.

We calculated regression equations depicting how paranoia changes as IOR increases (low IOR = 1 *SD* below the mean; high IOR = 1 *SD* above the mean). Simple slopes (Figure 2) were calculated for low and high perceived intentionality (low PI = 1 *SD* below the mean; high PI = 1 *SD* above the mean). Post hoc probing of the interaction revealed a significant simple slope for high PI ($t = 3.63, p < .001$), but not low PI ($t = 0.20, p = .84$).

The Moderating Role of Perceived Intentionality Within the Control Group

Hierarchical linear regressions were conducted within the control group following the same steps as those described above in the original models. Amongst controls, perceived intentionality did not significantly moderate the relationship between IOR and social anxiety, $R^2 = .02$, $F(1, 30) = 0.52, p = .48$, nor the relationship between IOR and paranoia, $R^2 = .04$, $F(1, 30) = 1.53, p = .23$.

Discussion

The present study explored the role of perceived intentionality as it relates to IOR, social anxiety, and paranoia amongst individuals with psychometrically-defined schizotypy. To the authors' knowledge, this is the first study of its kind to examine the moderating effects of perceived intentionality on the relationships between IOR and social anxiety, and between IOR and paranoia amongst individuals at risk for developing schizophrenia.

Correlations Between IOR, Social Anxiety, and Paranoia Within the Schizotypy Group

Within the schizotypy group, paranoia was positively correlated with social anxiety and IOR; however, contrary to what we expected, a statistically significant relationship was not observed between IOR and social anxiety. One possible explanation for this null finding

may be related to the aspects of social anxiety measured by the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998), which measures discomfort caused by interacting with other people. Conceptually, the types of IOR that one might expect to have social anxious themes would probably involve incorrectly believing that one is being observed by other people (i.e., paying special attention to them); however, in situations that involve interacting with another person (i.e., the types of scenarios used in the SIAS) an individual would be correct in believing that they are being observed (by the person with whom they are interacting). Future studies may consider employing measures that assess several different aspects of social anxiety to examine whether different facets of social anxiety relate to IOR. For example, the Social Phobia Scale (Mattick & Clarke, 1998) may be more appropriate because it assesses fears of being negatively evaluated by others while performing everyday activities, which would presumably involve beliefs that others are paying attention to oneself even while engaging in relatively banal activities in which it is unlikely that they are actually being observed.

We also found that males in the schizotypy group exhibited stronger positive correlations between IOR, social anxiety, and paranoia compared to females. Amongst males, all correlations were significant (at trend level or higher) despite these analyses being underpowered due to the small number of male schizotypy participants ($n = 10$), and all correlations exhibited large effect sizes. Females, on the other hand, exhibited fewer and weaker significant correlations than males. To the authors' knowledge no such gender effects have been demonstrated in prior studies, and it is unclear what may be underlying these effects. Considering the small number of male schizotypy participants, we are hesitant to draw any conclusions about this unexpected finding.

The Moderating Role of Perceived Intentionality on IOR and Paranoia

Consistent with our hypothesis, within the schizotypy group perceived intentionality moderated the relationship between IOR and paranoia such that perceiving other people's actions in negative social situations as being more intentional predicted higher levels of paranoia as IOR increased amongst schizotypy participants. These results are consistent with past findings that IOR and paranoia are positively related (Leon, Bowden, & Faber, 1989; Startup & Startup, 2005); however, our results suggest that this relationship occurs specifically as a function of high PI. Amongst schizotypy participants with low PI there was virtually no change in paranoia as IOR increased, whereas those with high PI and high IOR obtained paranoia scores roughly four times higher than the scores obtained by schizotypy participants with high PI and low IOR. One possible explanation for this effect being present for high, but not low, PI may be that individuals with high PI experience different types of paranoid ideations compared to those with low PI. For example, those with low PI may experience paranoid ideation that are not necessarily self-referential and thus are unrelated to IOR (e.g., "the world is dangerous"). On the other hand, individuals with high PI may be experiencing paranoia as it is more traditionally conceptualized (i.e., thoughts that others are trying to cause them harm), which may be more heavily affected by IOR.

Regarding the clinical implications of these findings, our results suggest that measuring IOR and perceived intentionality may be one way of indirectly assessing paranoia. For example,

if a patient exhibited elevated IOR and perceived intentionality scores, a clinician may be able to predict that this patient is also more likely to exhibit elevated paranoia. This may be particularly useful when working with at-risk patients whom clinicians suspect may be minimizing their paranoid ideations. This is a reasonable concern considering that at-risk population may exhibit more insight regarding their atypical beliefs compared to patients with more severe disorders (e.g., schizophrenia), and they may be more likely to engage in impression management (Morrison et al., 2004). These at-risk patients may respond more truthfully to measures of perceived intentionality and IOR since these measures may be viewed as less threatening and less likely to elicit impression management behaviors. Additionally, these findings may have implications for treating paranoia when working with at-risk patients with high PI and high IOR. It is conceivable that cognitive restructuring and psychoeducation may decrease the severity of their IOR and provide them with less distorted beliefs about the intentions of others (i.e., lower PI), which may, in turn, decrease the severity of their paranoid ideations. Lastly, if our findings are replicated in a schizophrenia sample, the aforementioned clinical implication may be applicable to the assessment and treatment of schizophrenia patients as well as at-risk populations.

The Moderating Role of Perceived Intentionality on IOR and Social Anxiety

Our results did not support our hypothesis that within the schizotypy group perceived intentionality would moderate the relationship between IOR and social anxiety such that perceiving other people's actions in negative social situations as being less intentional (low PI) would predict higher levels of social anxiety as IOR increases. Instead, we found that amongst schizotypy participants with high PI, lower levels of social anxiety correlated with higher levels of IOR.

These findings suggest that amongst schizotypy participants with high PI, high IOR may serve as a protective factor against discomfort in social interactions. One possible explanation for this is that these individuals may exhibit an exaggerated self-serving bias, a phenomenon linked to persecutory delusions (Bentall, Corcoran, Howard, Blackwood, & Kinderman, 2001). For example, when schizotypy participants with high PI and high IOR experience unpleasant social interactions they may tend to make external attribution rather than blaming themselves, which might allow those individuals to avoid feeling embarrassed or socially anxious. Future research may consider examining how IOR, social anxiety, and perceived intentionality relate to self-serving attributional biases.

Limitations and Future Research

The present study had several limitations. First, our sample consisted exclusively of college undergraduates, and the majority of our participants were Caucasian and female. This raises some concern regarding the generalizability of our findings to broader schizotypy populations. Although this issue is rather typical of schizotypy research, future studies would benefit from selecting participants from a more diverse community-based sample in order to examine whether our findings are generalizable to a wide range of individuals with schizotypy. Additionally, considering the small number of male schizotypy participants in this study, there is considerable uncertainty regarding the generalizability of the gender effects we observed in the correlational analyses. Future studies should strive to obtain a

more balanced number of male and female participants. Second, as was previously mentioned, the SIAS (Mattick & Clarke, 1998) may have not been an ideal measure of social anxiety for this study. It may be beneficial for future research to employ measures that assess different aspects of social anxiety to examine if different facets of social anxiety correlate with IOR. Lastly, this study assessed perceived intentionality with a measure that uses hypothetical vignettes, which raises some concerns about ecological validity. Future studies may consider creating role-play measures, methodologies involving contrived social interactions with a confederate during the testing session, and/or retrospective reports of ambiguous social situations to improve ecological validity.

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Figure 1.

Interaction effects of perceived intentionality (low perceived intentionality = 1 *SD* below the mean; high perceived intentionality = 1 *SD* above the mean) and ideas of reference (low ideas of reference = 1 *SD* below the mean; high ideas of reference = 1 *SD* above the mean) on social anxiety amongst individuals with schizotypy.

Figure 2.

Interaction effects of perceived intentionality (low perceived intentionality = 1 *SD* below the mean; high perceived intentionality = 1 *SD* above the mean) and ideas of reference (low ideas of reference = 1 *SD* below the mean; high ideas of reference = 1 *SD* above the mean) on paranoia amongst individuals with schizotypy.

Table 1

Group Differences on Demographic and Clinical Variables

Variable	Schizotypy (<i>n</i> = 44)	Controls (<i>n</i> = 36)	χ^2 or <i>F</i>	<i>p</i>
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)		
% female	77.27	69.44	.63	.43
% Caucasian	86.36	75.00	1.68	.20
Age	19.45 (1.58)	19.97 (6.27)	669.50 ^a	.21
REF	11.86 (5.11)	5.14 (3.78)	43.02 *	<.01
SIAS	34.07 (16.23)	9.92 (7.16)	68.65 *	<.01
BSI Paranoia	7.11 (3.26)	1.31 (1.39)	99.41 *	<.01
AIHQ	8.20 (2.01)	7.64 (1.78)	1.74	.19

Note. REF = Referential Thinking Scale, SIAS = Social Interaction Anxiety Scale, BSI = Brief Symptom Inventory, AIHQ = Ambiguous Intentionality Hostility Questionnaire

^a Mann-Whitney U

* *p* < .001

Table 2

Intercorrelations, Means, and Standard Deviations for Ideas of Reference, Social Anxiety, and Paranoia for Male (n = 10) and Female (n = 34) Participants in the Schizotypy Group

Measure	1	2	3	M	SD
1. REF	-	.51 ^t	.76 ^{**}	11.60	6.04
2. SIAS	-.02	-	.61 [*]	35.00	17.14
3. BSI Paranoia	.25 ^t	.43 ^{**}	-	6.80	3.82
M	11.94	33.79	7.21		
SD	4.91	16.21	3.13		

Note. Intercorrelations for male participants in the schizotypy group (n = 10) are displayed above the diagonal, and intercorrelations for female participants in the schizotypy group (n = 34) are displayed below the diagonal. Means and standard deviations for male participants in the schizotypy group are displayed in the vertical columns. Means and standard deviations for female participants in the schizotypy group are displayed in the horizontal rows. REF = Referential Thinking Scale, SIAS = Social Interaction Anxiety Scale, BSI = Brief Symptom Inventory.

^t p < .10, one-tailed.
^{*} p < .05, one-tailed.
^{**} p < .01, one-tailed.

Hierarchical Linear Regression Analyses Examining the Moderating Effects of Perceived Intentionality Between Ideas of Reference and Social Anxiety Controlling for Paranoia and Gender Within the Schizotypy Group (n = 44)

Predictor	R ²	F _{inc}	df	β	t	p
Dependent Variable: Social Anxiety						
Step 1	.229	6.08	41			<.01**
Paranoia				.48	3.48	<.01**
Gender				-.06	-.041	.68
Step 2	.006	1.284	39			.02*
Perceived Intentionality				-.01	-.0.09	.93
Ideas of Reference				-.08	-.0.53	.60
Step 3	.074	0.15	38			<.01**
Perceived Intentionality X Ideas of Reference				-.35	-2.02	.05*

Note. Social anxiety measured by the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998); Paranoia measured by the Brief Symptom Inventory (BSI; Derogatis, 1993); Perceived intentionality measured by the Ambiguous Intentionality Hostility Questionnaire (AIHQ; Combs et al., 2007); Ideas of reference measured by the Referential Thinking Scale (REF; Lenzenweger et al., 1997).

* p < .05;
** p < .01

Table 4

Hierarchical Linear Regression Analyses Examining the Moderating Effects of Perceived Intentionality Between Ideas of Reference and Paranoia Controlling for Social Anxiety and Gender Within the Schizotypy Group (n = 44)

Predictor	R ²	F _{inc}	df	β	t	p
Dependent Variable: Paranoia						
Step 1	.23	6.13	41			.01*
Social Anxiety				.48	3.48	<.01**
Gender				.07	0.50	.62
Step 2	.14	4.44	39			<.01**
Perceived Intentionality				.17	1.32	.20
Ideas of Reference				.33	2.58	.01*
Step 3	.09	6.42	38			.06
Perceived Intentionality X Ideas of Reference				.38	2.54	.02*

Note. Social anxiety measured by the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998); Paranoia measured by the Brief Symptom Inventory (BSI; Derogatis, 1993); Perceived intentionality measured by the Ambiguous Intentionality Hostility Questionnaire (AIHQ; Combs et al., 2007); Ideas of reference measured by the Referential Thinking Scale (REF; Lenzenweger et al., 1997).

* p < .05;

** p < .01