

Social cognition and social functioning in nonclinical paranoia

Dennis R. Combs¹, Jacob A. Finn², Whitney Wohlfahrt¹,
David L. Penn³, and Michael R. Basso²

¹Department of Psychology, University of Texas at Tyler, Tyler, TX,
USA

²Department of Psychology, University of Tulsa, Tulsa, OK, USA

³Department of Psychology, University of North Carolina at Chapel
Hill, Chapel Hill, NC, USA

Introduction. Persons with nonclinical paranoia show many of the same biases as those with clinical paranoia, suggesting that paranoia exists on a continuum. However, little is known about the various social cognitive processes found in paranoia and how these relate to social functioning and social behaviours in general. This study will examine performance on emotion perception and attributional style measures and their relationship to social functioning, social problem solving, and social skill. A key element in this study will be the incorporation of ambiguity in the perception of emotional expressions and the assignment of attributional blame, which appears to be an important, yet neglected, construct in paranoia.

Methods. Twenty-six persons with high levels of nonclinical paranoia and 31 persons with low levels of paranoia completed measures of emotion perception, attributional style, social functioning, and social problem solving. Salient and subtle emotional expressions were used to examine how ambiguity impacts emotion perception in paranoia.

Results. The group high in nonclinical paranoia showed reduced accuracy for subtle negative emotional expressions and showed more perceived hostility and blame for ambiguous social situations as compared to the group low in nonclinical paranoia. Also, the high nonclinical paranoia group reported less social engagement, fewer social contacts, and more problems in social perception and social skill than the group low in nonclinical paranoia.

Conclusions. Social cognitive and social functioning biases are found in persons with high levels of nonclinical paranoia. Possible mechanisms of these biases and relevance for treatment approaches are discussed.

Correspondence should be addressed to Dennis Combs, Department of Psychology, University of Texas at Tyler, 3900 University Blvd., Tyler, TX 75799, USA. E-mail: Dcombs@uttyler.edu

Keywords: Emotion perception; Nonclinical paranoia; Social cognition; Social functioning.

INTRODUCTION

In the study of psychosis, there has been increasing interest in investigating specific symptoms (e.g., delusions, hallucinations) rather than broadly defined syndromes, such as schizophrenia (Bentall, Jackson, & Pilgrim, 1988; van Os, Hanssen, Bijl, & Ravelli, 2000; Verdoux & van Os, 2002). One area that has benefited from a symptom-focused approach is paranoia (Combs & Penn, 2004; Gay & Combs, 2005). Paranoid beliefs, similar to delusions and other psychotic symptoms, appear to exist on a continuum ranging from nonclinical to clinical levels (Freeman, Pugh, Voronstova, Antley, & Slater, 2010). At the lower end of the paranoia continuum, nonclinical paranoia is found in normal persons often in response to everyday situations or contexts that evoke suspicion or self-focused attention (i.e., self as the target of others; Fenigstein & Venable, 1992). At the upper, more severe end of the paranoia continuum are clinical forms of paranoia, such as persecutory delusions or paranoid personality disorder, which are more pronounced and based on less evidence. Based on this continuum view of paranoia, we would expect that many of the same characteristics of persons with persecutory delusions would also be present in nonclinical samples as well, albeit at an attenuated level (as reviewed in Combs & Penn, 2008). These may take the form of biases instead of clinical deficits in performance. In fact, a number of studies have shown that persons with nonclinical and clinical levels of paranoia show similarities across a wide range of cognitive, emotion, and reasoning measures, which supports the continuum approach to paranoia (Combs, Michael, & Penn, 2006; Combs, Penn, & Mathews, 2003; Ellett & Chadwick, 2007; Ellett, Lopes, & Chadwick, 2003; Freeman, Dunn, et al., 2005; Freeman, Garety, Bebbington, Slater, et al., 2005; Freeman, Garety, Bebbington, Smith, et al., 2005; Freeman et al., 2010; Martin & Penn, 2001).

One area of particular interest in paranoia research is the construct of social cognition (Combs & Penn, 2008). Social cognition is defined as the way persons perceive, interpret, and process information about their social world (Penn, Addington, & Pinkham, 2006; Penn, Corrigan, Bentall, Racenstein, & Newman, 1997) and is comprised of emotion perception, theory of mind, and attributional style. Given the presence of beliefs that other people or groups have current or future malevolent or harmful intentions towards them, it is likely that persons with paranoia show biases in the way they perceive and think about others, which suggests the importance of social cognition in paranoia (Bentall, Corcoran, Howard,

Blackwood, & Kinderman, 2001; Freeman & Garety, 2000). For example, when a person with persecutory delusions engages in an ambiguous social interaction (e.g., person walks by without speaking), there are a host of social cognitive processes that are actively processing the encounter, which ultimately lead to a biased interpretation of the event as threatening. Furthermore, research in schizophrenia has demonstrated that problems in social cognition are related to poorer social and community functioning (Couture, Penn, & Roberts, 2006; Pinkham & Penn, 2006), and as applied to paranoia, the perception of social situations as threatening may impact social behaviours as well (Combs & Penn, 2008). However, we know very little about social cognition and, on a larger scale, social functioning in paranoia, especially in nonclinical samples (see Combs & Penn, 2008). Due to the difficulty in recruiting samples of persons with clinical paranoia, the use of nonclinical samples is valuable and may help inform clinical research in psychosis. We now review some of the relevant findings in social cognition and social behaviours in persons with paranoia.

Emotion perception (decoding facial displays of affect) research in paranoia is mixed, with some studies showing an increased sensitivity to recognising emotional expressions (Kline, Smith, & Ellis, 1992; Lewis & Garver, 1995) whereas others show problems recognising emotional expressions (for a review, see Combs & Penn, 2008). In fact, two studies by Combs and colleagues found that when paranoia was measured dimensionally, as compared to using traditional DSM-IV diagnostic categories of paranoid schizophrenia, persons with nonclinical and clinical levels of paranoia showed significantly lower scores on emotion perception tasks (Combs & Penn, 2004; Combs et al., 2006). Davis and Gibson (2000) found that persons with paranoid schizophrenia were more accurate in identifying natural emotional expressions as compared to posed expressions due to the higher salience of facial cues in naturally occurring emotions. It is possible that persons with high levels of paranoia show biased processing ambiguous social information, such as less salient emotional expressions (those expressions with less visible facial cues about emotion) (Combs, Penn, Wicher, & Waldheter, 2007; Phillips, Senior, & David, 2000). Again, there is no research that has addressed the role of ambiguity in emotion perception in paranoia. Finally, compared to persons low in nonclinical paranoia, persons with high levels of nonclinical paranoia and clinical levels of paranoia show a greater tendency to blame others for negative events (e.g., personalising attributional bias; Bentall et al., 2001), as well as higher levels of perceived hostility and blame for ambiguous events (Combs et al., 2009; Combs, Penn, Wicher, & Waldheter, 2007). It appears that the ambiguity of information may be an important construct to assess in paranoia research for both emotion perception and attributional style (Green & Phillips, 2004; Pinkham, Bressinger, Kohler, Gur, & Gur, 2011).

Social cognition biases and deficits have been linked to poorer social functioning in persons with schizophrenia, and it is possible that persons with paranoia may show problems in social situations as well. However, research on social functioning in paranoia is limited at present to only a few studies. In two separate studies, as paranoia increased from nonclinical to clinical levels, so did the distance the participants sat from the examiner, which reflects a generalised social avoidance of others (Freeman, Garety, & Kuipers, 2001; Freeman et al., 2007; Gay & Combs, 2005). Also, the experimenters in these studies acted in a neutral manner, but were perceived by the participants to be more negative and threatening, a finding that has been found in virtual reality environments as well (Freeman, Garety, Bebbington, Slater, et al., 2005; Freeman et al., 2008). Haynes (1986) argued that these persons may show problems with social problem-solving and social skills as well, but these areas have not been directly examined in paranoia research.

As evident in the previous discussion, there is much to learn about the social cognitive and social functioning abilities of persons with paranoia. The present study builds on previous research to examine social cognition and social functioning in a sample of persons with high and low levels of nonclinical paranoia based on the continuum view of paranoia. This study will examine performance on emotion perception and attributional style measures, as well as social functioning (quality and frequency of social interactions), social problem solving (perception, processing, and understanding of social situations), and social skill (verbal and nonverbal skills used in conversation). A key element in this study will be the incorporation of ambiguity in the perception of emotional expressions and the assignment of attributional blame, which appears to be an important, yet neglected, construct in paranoia.

Based on previous research, we hypothesise persons with high levels of nonclinical paranoia will show worse scores on tasks of emotion perception and, specifically, will show lower scores for emotional expressions that are ambiguous compared to persons low in nonclinical paranoia. Also, we predict that participants high in nonclinical paranoia will show higher levels of perceived hostility and attributed blame for ambiguous social situations than persons low in nonclinical paranoia (Combs et al., 2009; Combs, Penn, Wicher, & Waldheter, 2007). Given that previous research showed problems in social interactions, we predict that persons with high levels of nonclinical paranoia compared to those low in nonclinical paranoia will show reduced performance in other areas such as social problem solving, social skills, and social functioning (Combs & Penn, 2004; Gay & Combs, 2005).

METHOD

Participants

From a total sample of 146 undergraduates, we identified a group of high nonclinical participants ($n = 26$) and a group of low nonclinical participants ($n = 31$) based on scores from the Paranoia Scale (Fenigstein & Vanable, 1992), a measure of nonclinical paranoia. The high nonclinical paranoia group showed PS scores greater than or equal to 1 *SD* above the normative mean score (PS scores ≥ 53 ; 84% or greater) and the low paranoia group showed PS scores less than or equal to 1 *SD* below the normative mean score (PS scores ≤ 32 ; 16% or less). These cutoff scores have been used in our previous research, and participants with high PS scores show similarities to persons with clinical levels of paranoia (Combs & Penn, 2004; Combs, Penn, Chadwick, et al., 2007; Combs et al., 2009; Combs, Penn, Wicher, & Waldheter, 2007). Participants also completed a second measure of paranoia, the Paranoia/Suspiciousness Questionnaire (Rawlings & Freeman, 1996), to cross-validate our group classification method.

There were no significant differences between the high and low nonclinical paranoia groups in terms of gender, $\chi^2(df = 1, 57) = 1.8, p = .130$, or ethnicity, $\chi^2(df = 4, 54) = 1.2, p = .170$. Also, the groups did not differ in terms of age or educational level, all *t*-values $< 2.0, p > .100$. There were no differences based on gender or ethnicity for any of the dependent variables of interest in the study, all *t*-values $< 2.0, p > .100$. A summary of the demographic variables for the sample can be found in Table 1.

Measures

Paranoia

Paranoia Scale. The Paranoia Scale (PS) is a 20-item scale that measures nonclinical paranoid ideation found in normal individuals in response to

TABLE 1
Summary of participant demographics

<i>Variable</i>	<i>High paranoia group Mean (SD)</i>	<i>Low paranoia group Mean (SD)</i>
N	26	31
Age (years)	22.1 (4.6)	22.5 (5.8)
Educational level (years)	13.7 (2.0)	14.2 (0.7)
% Male	20	10
% White	60	70

everyday events and situations (Fenigstein & Venable, 1992). Each item is scored on a Likert scale, ranging from 1 (“not at all”) to 5 (“extremely applicable”) with total scores ranging from 20 to 100. Higher scores reflect higher levels of nonclinical paranoia. The PS was developed for use in analogue samples, has good psychometric properties, and has been widely used in paranoia research (Combs, Penn, & Fenigstein, 2002; Martin & Penn, 2001). In the current sample, the PS showed good levels of internal consistency (Cronbach’s $\alpha = .88$).

Paranoia/Suspiciousness Questionnaire. The Paranoia/Suspiciousness Questionnaire (PSQ; Rawlings & Freeman, 1996) is a 47-item scale designed to measure paranoid ideation in nonclinical samples. Each of the items is rated using a true or false format, and scores range from 0 to 47. Higher scores reflect greater nonclinical paranoia. The PSQ was developed using both item analysis and factor analytic methods in a large sample of undergraduate students ($N = 561$). In previous research, the PSQ demonstrated excellent internal consistency (Cronbach’s $\alpha = .89$) and test–retest reliability over a 12-week period was good ($r = .82$; Rawlings & Freeman, 1996). For the current sample, the PSQ showed excellent levels of internal consistency (Cronbach’s $\alpha = .90$).

Emotion perception

Face Emotion Identification Test. The Face Emotion Identification Test (FEIT; Kerr & Neale, 1993) was developed based on the still photograph stimuli of Ekman and Izard. The FEIT consists of 19 videotaped pictures of six different emotional states, which include happiness, sadness, anger, surprise, fear, and shame. Persons were asked to look at each expression and decide which emotion was being presented; a list of emotion choices was provided to choose from. Scores range from 0 to 19, and higher scores reflect better emotion perception abilities. The FEIT has been widely used in emotion perception research and has shown good psychometric properties (Kerr & Neale, 1993). For the present sample, the FEIT showed acceptable levels of internal consistency (Cronbach’s $\alpha = .72$).

Facial Expressions of Emotion-Stimuli and Tests. From the Facial Expressions of Emotion-Stimuli and Tests (FEEST; Young, Perrett, Calder, Sprengelmeyer, & Ekman, 2002), two sets of facial expressions were identified based on the intensity/salience of the facial expressions to examine the hypothesis that persons with paranoia may differentially respond to highly salient versus ambiguous expressions of emotion. Twelve images were salient expressions of emotion (e.g., more intense or exaggerated facial cues of an emotion) and 12 images were ambiguous or subtle. Differences in

salience were digitally created by the publishers of the FEEST by modifying the facial action units involved in each emotional expression (e.g., shape, distance, texture, and pigmentation to make the features more or less visible) compared to the average or prototype emotional expression. According to the FEEST manual, salient expressions were 50% more intense than the average emotion, and the subtle group was 50% less salient than the average. For this study, an equal number of male and female images were used and reflected expressions of happiness, sadness, anger, fear, surprise, and disgust, which were presented via a computer. Persons were asked to look at each expression and decide which emotion was being presented; a list of emotion choices was provided to choose from. Scores for each set of images range from 0 to 12, and higher scores reflect better emotion recognition. For this study, we also computed a score for positive emotions (mean score for happy and surprise: 0–4) and negative emotions (mean score for anger, fear, sadness, disgust: 0–8). To ensure that the images differed in terms of perceived salience, we administered the 12 salient and 12 subtle emotions to a group of 15 undergraduate students and had them rate each emotion on a Likert scale ranging from 1 (“very subtle”) to 7 (“very intense”). The images that comprised the salient group showed a mean rating of 6.8 ($SD = 0.7$) and the subtle group showed a mean score of 1.5 ($SD = 0.4$), which suggested that the expressions differed in perceived salience according to the raters. For the present sample, the salient and ambiguous sets of images showed good levels of internal consistency (Cronbach’s alpha = .81 and .83, respectively).

Attributional style

Ambiguous Intentions Hostility Questionnaire. The Ambiguous Intentions Hostility Questionnaire (AIHQ; Combs, Penn, Wicher, & Waldheter, 2007) was used to measure level of perceived hostility, blame, and aggression for situations that vary in intentionality. The AIHQ is comprised of 15 short vignettes that reflect negative interpersonal events for intentional, accidental, and ambiguous situations. Participants are asked to read each vignette, to imagine the scenario happening to her or him (e.g., “You walk past a bunch of teenagers at a mall and you hear them start to laugh”), and to write down the reason why the other person (or persons) acted that way towards them. Two blinded raters subsequently code this written response (participants’ reason for the situation) for the purpose of computing a “Hostility bias” (described later). The participant then rates, on a Likert scale, whether the other person (or persons) performed the action on purpose (anchored by 1 = “definitely no” and 6 = “definitely yes”), how angry it would make them feel (anchored by 1 = “not at all angry” and 5 = “very angry”), and how much they would blame the other person (or persons) (anchored by 1 = “not at all” and 5 = “very much”). These three self-rated scores are then

collapsed to form a composite Blame score, which is more psychometrically sound than using the three individual items (Combs, Penn, Wicher, & Waldheter, 2007). Finally, the participant is asked to write down how she or he would respond to the situation, which is later coded by two independent raters to compute an "Aggression bias".

In our previous research, the Hostility, composite Blame, and Aggression bias scores for five ambiguous situations (AIHQ items 3, 5, 8, 10, 13) were found to be highly correlated with measures of paranoia (Combs, Penn, Wicher, & Waldheter, 2007; Waldheter, Jones, Johnson, & Penn, 2005). For this study, we administered the entire AIHQ, but only used the five ambiguous items in the analyses. The AIHQ has demonstrated good reliability and validity with other measures of paranoia in several studies (Combs, Adams, et al., 2007; Combs, Penn, Chadwick, et al., 2007; Combs, Penn, Wicher, & Waldheter, 2007).

Based on the participant's written responses to the vignettes, the Hostility and Aggression bias scores were independently rated by two research assistants who were blinded to the study using a 5-point Likert scale ranging from 1 ("not at all hostile") to 5 ("very hostile") and 1 ("not aggressive") to 5 ("physically aggressive"), respectively. The raters underwent extensive training on the AIHQ prior to scoring participant responses, which included didactic training on the measure, ratings of sample responses, and training and feedback on the scale (all raters were trained to an ICC of .80+ with a criterion-trained rater). Twenty-five per cent of the AIHQ protocols were rated by an independent researcher with good levels of agreement (ICCs ranged .81–.87). The internal consistency of the composite Blame score was very good (Cronbach's alpha = .80).

Social functioning

Social Functioning Scale. The Social Functioning Scale (SFS; Birchwood, Smith, Cochrane, & Wetton, 1990) was used to measure level of social support and social engagement. The SFS is a 79-item self-report questionnaire that has been widely used in psychosis research and has excellent psychometric properties (Birchwood et al., 1990; Dickerson, Ringel, & Parente, 1999). The SFS is considered a valid measure of interpersonal and adaptive functioning in the community (Liefker, Patterson, Heaton, & Harvey, 2011). The SFS is comprised of six subscales: (1) social engagement (scores range 0–15; frequency of social engagement), (2) interpersonal communication (scores range 0–9; number of social contacts and support), (3) independence-performance (scores range 0–39; number of activities of daily living engaged in over the past month), (4) independence-competence (scores range 0–39; does the individual need help in performing activities of daily living), (5) recreation (scores range 0–45; number of activities/hobbies

engaged in over past month), and (6) prosocial behaviours (scores range 0–66; engagement in activities with others or in public places). There is a subscale on educational/occupational status, but we will not report data on this subscale given that all participants were students. Although we will analyse all six of the previously mentioned SFS subscales, we are most interested in the social engagement, interpersonal communication, and prosocial behaviours subscales based on the expectation that paranoia would affect interpersonal functioning (see Combs, Adams, et al., 2007). Across the subscales, in the current sample, the SFS showed acceptable to very good levels of internal consistency (alpha values ranged from .72 to .85).

Assessment of Interpersonal Problem-Solving Skills. The Assessment of Interpersonal Problem-Solving Skills (AIPSS; Donahoe, Carter, Bloem, & Leff, 1987) is a videotaped measure of social problem solving and social competence based on the conceptualisation that problem solving consists of receiving, processing, and sending skills (Wallace et al., 1980). The AIPSS contains 13 vignettes (10 of which contain actual problems; three contain no problem) that present various social problems that the participant must identify, process, and then solve. After viewing each vignette, the participant is asked whether there is a problem evident in the case (identification), what the problem may be (description), and what the participant could say or do to solve the problem (processing). Finally, the participant is asked to demonstrate via a role play what they would actually do or say (sending skills). For this study, we examined the problem identification (scores range from 0 to 13; higher scores reflect better problem identification), problem description (scores range from 0 to 10; higher scores reflect a better verbal description of the problem), processing (scores range from 0 to 10; higher scores reflect a better verbal plan to address problem), and an overall rating of social competence/skills (scores range from 0 to 20; higher scores reflect better social skills). The rating for overall social skills was based on the quality of both verbal and nonverbal behaviours exhibited during the role play, and each response was rated on a scale of 0–2 with increments of 0.5 using anchors from the AIPSS manual (Donahoe et al., 1987).

The AIPSS has a long history of use in clinical research and has demonstrated good psychometric properties in several studies (Donahoe et al., 1987; Nienow, Docherty, Cohen, & Dinzeo, 2006). Performance on the AIPSS was audiotaped so that the quality of participant responses could be rated later by two undergraduate research assistants who were blind to the study hypotheses. The raters underwent extensive training on the AIPSS prior to scoring participant responses, which included didactic training on the measure, ratings of sample responses, and training and feedback on the scale (all raters were trained to an ICC of .80+ with a criterion-trained

rater). Interrater reliability for this study was calculated for 25% of the sample and was good (all ICCs = .80+ across the four component scores).

Procedures

All participants were tested individually and completed all of the measures in a single 2-hour session. Participants were offered extra credit towards their undergraduate classes for participation in this study.

Data analytic plan

First, we computed mean and summary scores for the measures according to group membership (high vs. low nonclinical paranoia groups). Second, we conducted a series of independent *t*-tests to examine for group differences on the social cognition and social functioning variables.

RESULTS

Descriptive and summary scores

Mean and standard deviation scores for the study measures according to group membership (high vs. low PS groups) are presented in [Table 2](#). All of the measures showed acceptable levels of kurtosis and skewness (i.e., values between $+/- 1$) prior to statistical analysis.

Group differences

Given that the presence of nonclinical paranoia was primarily defined by scores on the PS, we examined for differences on a second measure of paranoia, the PSQ (see [Table 2](#)). As expected the groups differed on both the PS, $t(55) = 28.7$, $p < .001$, $d = 7.60$, and the PSQ, $t(55) = 9.5$, $p < .001$, $d = 2.50$. The PS and the PSQ were significantly correlated, $r = .73$, $p < .001$. These results provide converging evidence that the groups actually differed in level of paranoid ideation.

Given the number of comparisons across the social cognition and social functioning variables, we utilised an adjusted probability value of .005 to determine statistical significance. As evident in [Table 2](#), the results showed a number of significant group differences on the measures of social cognition and social functioning with the general pattern that persons in high nonclinical paranoia group showed more impairment as compared to the low nonclinical group. There were significant differences on the FEIT,

TABLE 2
Paranoia, social cognition, social functioning scores by group membership

Variable	High paranoia group Mean (SD)	Low paranoia group Mean (SD)
Paranoia scale	55.4 (3.1)*	27.0 (3.3)
Paranoia/suspiciousness questionnaire	23.6 (7.5)*	8.3 (4.0)
FEIT	12.5 (1.5)*	14.2 (2.0)
FEEST salient	10.0 (1.0)	10.5 (1.3)
FEEST ambiguous	9.0 (1.5)*	10.3 (1.1)
AIHQ hostility ambiguous	2.1 (0.58)*	1.2 (0.31)
AIHQ blame ambiguous	3.1 (0.85)*	2.3 (0.75)
AIHQ aggression ambiguous	1.8 (0.51) ^a	1.5 (0.55)
AIPPS identification	9.8 (1.7)*	11.0 (1.2)
AIPPS description	12.8 (2.8)	12.9 (3.0)
AIPPS processing	11.1 (2.7)	10.4 (3.4)
AIPSS overall skill	10.5 (2.6)*	12.7 (3.6)
SFS social engagement	10.2 (2.0)*	11.8 (1.4)
SFS interpersonal contact	7.7 (1.1)*	8.7 (0.42)
SFS independence-performance	27.9 (3.9)	28.5 (4.3)
SFS independence-competence	36.6 (2.6)	37.6 (1.8)
SFS recreation	19.3 (6.6)	18.6 (5.2)
SFS prosocial behaviours	24.5 (7.2) ^a	28.5 (5.9)

AIHQ = Ambiguous Intentions Hostility Questionnaire; AIPPS = Assessment of Interpersonal Problem Solving; FEIT = Face Emotion Identification Test; FEEST = Facial Expressions of Emotion-Stimuli and Tests; SFS = Social Functioning Scale. * $p < .005$ (adjusted p -value); ^anonsignificant trend, $p < .100$.

$t(55) = 3.3$, $p < .001$, $d = 0.96$, and FEEST ambiguous expressions, $t(55) = 3.5$, $p < .001$, $d = 0.98$, but not on the FEEST salient expressions, $t(55) = 1.4$, $p = .140$, $d = 0.43$. In general, persons with high levels of nonclinical paranoia showed more problems recognising subtle emotional expressions than more salient ones. More specifically, on the FEEST, we examined for differences in recognising positive emotions as compared to negative emotions. There were no group differences for positive emotions regardless of whether they were salient, $t(55) = .25$, $p = .790$, $d = 0.01$, or subtle, $t(55) = 0.80$, $p = .420$, $d = 0.16$. However, persons high in subclinical paranoia were significantly worse at recognising ambiguous negative expressions, $t(55) = 3.0$, $p < .001$, $d = 0.83$; there was no difference for salient negative emotions, $t(55) = 1.3$, $p = .180$, $d = 0.37$.

As expected, persons with higher nonclinical paranoia also reported higher levels of perceived hostility, $t(55) = 4.3$, $p < .001$, $d = 1.00$, and greater blame towards others for the ambiguous negative social situations on the AIHQ, $t(55) = 3.6$, $p < .001$, $d = 1.10$; there was a nonsignificant trend for differences on the aggression index, $t(55) = 1.8$, $p = .070$, $d = 0.55$. On the

AIPPS, there were significant differences on problem identification, $t(55) = 2.9$, $p < .005$, $d = 0.79$, and ratings of overall social competence/skill, $t(55) = 3.1$, $p < .005$, $d = 0.85$, suggesting specific problems with social perception and quality of social skills in the high paranoia group.

Finally, persons with high nonclinical paranoia showed significantly fewer social contacts on the SFS interpersonal communication subscale, $t(55) = 4.4$, $p < .001$, $d = 1.10$, and reduced social engagements of others on the SFS social engagement subscale, $t(55) = 3.3$, $p < .005$, $d = 0.85$. There was a nonsignificant trend on the SFS prosocial behaviours subscale, $t(55) = 2.3$, $p = .040$, $d = 0.61$. There were no differences on SFS subscales reflecting independence-performance, $t(55) = 0.45$, $p = .650$, $d = 0.12$, independence-competence, $t(55) = 1.6$, $p = .13$, $d = 0.42$, or recreation, $t(55) = 0.40$, $p = .680$, $d = 0.10$.

DISCUSSION

Paranoia is becoming an important area of research due to its effect on interpersonal relationships, cognitive processing, and treatment response (Combs & Penn, 2008; Freeman et al., 2008; Peer, Rothmann, Penrod, Penn, & Spaulding, 2004; Salinas, Paul, & Newbill, 2002). Research that attempts to describe the underlying biases and deficits found in paranoia would be especially valuable to research in terms of understanding the condition and in treatment development. Over the last 5 years, research has benefited from studies showing that paranoia exists on a continuum with similarities between persons with clinical and nonclinical paranoia. In this study, we examined social cognition and social functioning in a sample of persons with high and low levels of nonclinical paranoia. We directly incorporated ambiguity, which may impact the way persons with paranoia process social information. Previous research has shown that persons with paranoia have more problems processing ambiguous stimuli, which may in turn actually increase their paranoia. This is the first study to examine social cognition and social functioning in a group of participants with differing levels of nonclinical paranoia. We know very little about how persons with high levels of nonclinical paranoia behave, process, and interpret social situations as compared to those low in nonclinical paranoia. This present study provides crucial data on these issues.

The results demonstrate that persons with high levels of nonclinical paranoia may have more problems recognising subtle emotional expressions than salient ones. More specifically, follow-up analyses showed that subtle negative emotions were more problematic than positive ones, which is consistent with our previous research (Combs et al., 2006). Both groups were able to recognise highly salient emotions. A possible reason for this finding

may lie in the visual scanning and processing of faces. Previous eyetracking studies have found that persons with paranoia overexamine/-process ambiguous stimuli and tend to repeatedly reexamine areas of ambiguity looking for possible threat (Phillips et al., 2000). The reexamination of ambiguous facial expressions may result in slowed decision making along with the intrusion of paranoid ideations about the emotions that reduce overall accuracy (Green, Williams, & Davidson, 2001). Persons with paranoia may actually engage in hypervigilant scanning of faces looking for cues about the emotion and possibly why the emotion is present (Davis & Gibson, 2000). Highly salient emotions are easier to recognise because they do not invoke the level of controlled processing that ambiguous expressions do.

In terms of attributional style, social functioning, and social problem solving, we see a convergent pattern of findings. Persons with high levels of nonclinical paranoia showed increased perceived hostility and blame towards others for negative ambiguous social situations, consistent with our findings on ambiguous emotions discussed above. A possible reason for this finding is that persons with paranoia tend to show a strong need for closure in which they may not examine other reasons for another person's behaviour (i.e., search for other possible causes is terminated prematurely), which in paranoia, leads to a primary focus on blaming others for ambiguous negative events (Colbert & Peters, 2002; Colbert, Peters, & Garety, 2006; Freeman et al., 2004). In terms of social functioning, the group high in nonclinical paranoia reported fewer social contacts and a reduced tendency to engage others in social conversation, which was not found in the low paranoia group. They were also less likely to report being in public places or attending events involving others, but this was only a trend. Consistent with other studies, this reflects the possible social avoidance and isolation found in people with persecutory delusions, but also seen in our nonclinical sample to some degree (Freeman et al., 2001; Freeman et al., 2007). This avoidance of others may actually reinforce the paranoid ideation and prevents a disconfirmation of those paranoid beliefs (Haynes, 1986; Turkat, Keane, & Thompson-Pope, 1990). It should be noted that these persons tend not to be physically aggressive (see AIHQ aggression index), but tend to report more internal anger/rumination. Finally, when analysing social situations, we found weaknesses in two key areas: social perception and social competence/skills. Persons with high levels of nonclinical paranoia were poorer at determining whether a problem existed which may seem strange given their hypervigilance, but may be consistent with their tendency to overprocess social stimuli similar to subtle emotional expressions (Nienow et al., 2006). Also, their level of social competence and ability to interact in a roleplay was rated by independent judges as lower, suggesting a weakness in conversational skills. Haynes (1986) argued that the poor social skills found in paranoid persons may lead to negative interactions with

others, which in turn confirms the paranoid beliefs. In contrast, the ability to verbally describe and cognitively process social problems was not different between the groups, suggesting that these persons can think about problems, but when asked to “do something” or interact, the social interaction goes poorly. Overall, the data support a pattern of perceived hostility, blame, reduced social interactions, poor social perception, and reduced competence, and it should be emphasised that the findings reflect only differences between high and low participants; we do not know how persons in the average range would compare to either group. Since the sample is comprised entirely of college students, the presence of these weaknesses in this group may be surprising, but in our previous studies, we found that even college students with high levels of nonclinical paranoia showed greater social distance and viewed the experimenters in a more negative hostile manner (Combs & Penn, 2004).

Limitations of the study are as follows. First, we used an extreme groups design consisting of persons with high and low levels of nonclinical paranoia instead of examining the entire sample, which is more consistent with a continuum approach. We have found that including participants in the middle range of scores (or using a more conservative median split for PS scores) attenuates meaningful differences between high and low nonclinical groups. We do not know if our findings would remain the same if the middle group was included in the analyses. Second, we used a nonclinical sample in order to make inferences about a clinical phenomenon, and it is possible that these participants are different from clinical participants in terms of biological and psychological factors. We would like to point out that scores on the emotion perception and attributional style are about 1 standard deviation above persons with schizophrenia (Combs, Adams, et al., 2007). Finally, the social functioning data (e.g., social functioning scale) comes from a self-report scale, and we did not include measures completed by informants in this study to corroborate our findings.

In closing, this study provides data about the social cognitive and social functioning of persons with high and low levels of nonclinical paranoia. It is hoped that our findings will be applicable to clinical samples and provide convergent data about the social cognitive biases found across the paranoia continuum. Paranoia clearly affects interpersonal relationships, perceptions, and behaviours, and we hope that by understanding and then addressing these biases, we can reduce one of the most common, yet refractory symptoms found in psychosis—that of paranoia.

REFERENCES

- Bentall, R. P., Corcoran, R., Howard, R., Blackwood, N., & Kinderman, P. (2001). Persecutory delusions: A review and theoretical integration. *Clinical Psychology Review, 21*, 1143–1192. doi:[10.1016/S0272-7358\(01\)00106-4](https://doi.org/10.1016/S0272-7358(01)00106-4)
- Bentall, R. P., Jackson, H. F., & Pilgrim, D. (1988). Abandoning the concept of “schizophrenia”: Some implications of validity arguments for psychological research into psychotic phenomena. *British Journal of Clinical Psychology, 27*, 303–324. doi:[10.1111/j.2044-8260.1988.tb00795.x](https://doi.org/10.1111/j.2044-8260.1988.tb00795.x)
- Birchwood, M., Smith, J., Cochrane, R., & Wetton, S. (1990). The Social Functioning Scale: The development and validation of a new scale of social adjustment for use in family intervention programmes with schizophrenic patients. *British Journal of Psychiatry, 157*, 853–859. doi:[10.1192/bjp.157.6.853](https://doi.org/10.1192/bjp.157.6.853)
- Colbert, S. M., & Peters, E. R. (2002). Need for closure and jumping-to-conclusions in delusion-prone individuals. *Journal of Nervous and Mental Disease, 190*, 27–31. doi:[10.1097/00005053-200201000-00007](https://doi.org/10.1097/00005053-200201000-00007)
- Colbert, S. M., Peters, E. R., & Garety, P. A. (2006). Need for closure and anxiety in delusions: A longitudinal investigation in early psychosis. *Behaviour Research and Therapy, 44*, 1385–1396. doi:[10.1016/j.brat.2005.06.007](https://doi.org/10.1016/j.brat.2005.06.007)
- Combs, D. R., Adams, S. D., Penn, D. L., Roberts, D., Tiegreen, J., & Stem, P. (2007). Social Cognition and Interaction Training (SCIT) for inpatients with schizophrenia spectrum disorders: Preliminary findings. *Schizophrenia Research, 91*, 112–116. doi:[10.1016/j.schres.2006.12.010](https://doi.org/10.1016/j.schres.2006.12.010)
- Combs, D. R., Michael, C. O., & Penn, D. L. (2006). Paranoia and emotion perception across the continuum. *British Journal of Clinical Psychology, 45*, 19–31. doi:[10.1348/014466505X29099](https://doi.org/10.1348/014466505X29099)
- Combs, D. R., & Penn, D. L. (2004). The role of subclinical paranoia on social perception and behavior. *Schizophrenia Research, 69*, 93–104. doi:[10.1016/S0920-9964\(03\)00051-3](https://doi.org/10.1016/S0920-9964(03)00051-3)
- Combs, D. R., & Penn, D. L. (2008). Social cognition in paranoia. In D. Freeman, R. Bentall, & P. Garety (Eds.), *Persecutory delusions: Assessment, theory and treatment* (pp. 175–204). Oxford: Oxford University Press.
- Combs, D. R., Penn, D. L., Chadwick, P., Trower, P., Michael, C. O., & Basso, M. R. (2007). Subtypes of paranoia in a nonclinical sample. *Cognitive Neuropsychiatry, 12*, 537–553. doi:[10.1080/13546800701707306](https://doi.org/10.1080/13546800701707306)
- Combs, D. R., Penn, D. L., & Fenigstein, A. (2002). Ethnic differences in subclinical paranoia: An expansion of norms of the Paranoia Scale. *Cultural Diversity and Ethnic Minority Psychology, 8*, 248–256. doi:[10.1037/1099-9809.8.3.248](https://doi.org/10.1037/1099-9809.8.3.248)
- Combs, D. R., Penn, D. L., & Mathews, R. C. (2003). Implicit learning and non-clinical paranoia: Does content matter? *Personality and Individual Differences, 34*, 143–157. doi:[10.1016/S0191-8869\(02\)00038-7](https://doi.org/10.1016/S0191-8869(02)00038-7)
- Combs, D. R., Penn, D. L., Michael, C. O., Basso, M. R., Wiedeman, R., Siebenmorgan, M., . . . Chapman, D. (2009). Perceptions of hostility by persons with and without persecutory delusions. *Cognitive Neuropsychiatry, 14*, 30–52. doi:[10.1080/13546800902732970](https://doi.org/10.1080/13546800902732970)
- Combs, D. R., Penn, D. L., Wicher, M., & Waldheter, E. (2007). The Ambiguous Intentions Hostility Questionnaire (AIHQ): A new measure for evaluating hostile social-cognitive biases in paranoia. *Cognitive Neuropsychiatry, 12*, 128–143. doi:[10.1080/13546800600787854](https://doi.org/10.1080/13546800600787854)
- Couture, S. M., Penn, D. L., & Roberts, D. L. (2006). The functional significance of social cognition in schizophrenia: A review. *Schizophrenia Bulletin, 32* (Suppl. 1), S44–S63. doi:[10.1093/schbul/sbl029](https://doi.org/10.1093/schbul/sbl029)
- Davis, P. J., & Gibson, M. G. (2000). Recognition of posed and genuine facial expressions of emotion in paranoid and nonparanoid schizophrenia. *Journal of Abnormal Psychology, 109*, 445–450. doi:[10.1037/0021-843X.109.3.445](https://doi.org/10.1037/0021-843X.109.3.445)

- Dickerson, F. B., Ringel, N., & Parente, F. (1999). Predictors of residential independence among outpatients with schizophrenia. *Psychiatric Services, 50*, 515–519.
- Donahoe, C. P., Carter, M. J., Bloem, W. D., & Leff, G. L. (1987). *Assessment of interpersonal problem-solving skills administration manual*. Unpublished manuscript.
- Ellett, L., & Chadwick, P. (2007). Paranoid cognitions, failure, and focus of attention in college students. *Cognition and Emotion, 21*, 558–576. doi:10.1080/02699930600758155
- Ellett, L., Lopes, B., & Chadwick, P. (2003). Paranoia in a non-clinical population of college students. *Journal of Nervous and Mental Disease, 191*, 425–430. doi:10.1097/01.NMD.0000081646.33030.EF
- Fenigstein, A., & Vanable, P. A. (1992). Paranoia and self-consciousness. *Journal of Personality and Social Psychology, 62*, 129–138. doi:10.1037/0022-3514.62.1.129
- Freeman, D., Dunn, G., Garety, P. A., Bebbington, P., Slater, M., Kuipers, E., . . . Ray, K. (2005). The psychology of persecutory ideation I: A questionnaire survey. *Journal of Nervous and Mental Disease, 193*, 302–308. doi:10.1097/01.nmd.0000161687.12931.67
- Freeman, D., & Garety, P. A. (2000). Comments on the content of persecutory delusions: Does the definition need clarification? *British Journal of Clinical Psychology, 39*, 407–414. doi:10.1348/014466500163400
- Freeman, D., Garety, P. A., Bebbington, P., Slater, M., Kuipers, E., Fowler, D., . . . Dunn, G. (2005). The psychology of persecutory ideation II: A virtual reality experimental study. *Journal of Nervous and Mental Disease, 193*, 309–315. doi:10.1097/01.nmd.0000161686.53245.70
- Freeman, D., Garety, P. A., Bebbington, P. E., Smith, B., Rollinson, R., Fowler, D., . . . Dunn, G. (2005). Psychological investigation of the structure of paranoia in a non-clinical population. *British Journal of Psychiatry, 186*, 427–435. doi:10.1192/bjp.186.5.427
- Freeman, D., Garety, P. A., Fowler, D., Kuipers, E., Bebbington, P. E., & Dunn, G. (2004). Why do people with delusions fail to choose more realistic explanations for their experiences? An empirical investigation. *Journal of Consulting and Clinical Psychology, 72*, 671–680. doi:10.1037/0022-006X.72.4.671
- Freeman, D., Garety, P. A., & Kuipers, E. (2001). Persecutory delusions: Developing the understanding of belief maintenance and emotional distress. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 31*, 1293–1306. doi:10.1017/S003329170100455X
- Freeman, D., Garety, P. A., Kuipers, E., Fowler, D., Bebbington, P. E., & Dunn, G. (2007). Acting on persecutory delusions: The importance of safety seeking. *Behaviour Research and Therapy, 45*, 89–99. doi:10.1016/j.brat.2006.01.014
- Freeman, D., Pugh, K., Antley, A., Slater, M., Bebbington, P., Gittins, M., . . . Garety, P. (2008). Virtual reality study of paranoid thinking in the general population. *British Journal of Psychiatry, 192*, 258–263. doi:10.1192/bjp.bp.107.044677
- Freeman, D., Pugh, K., Vorontsova, N., Antley, A., & Slater, M. (2010). Testing the continuum of delusional beliefs: An experimental study using virtual reality. *Journal of Abnormal Psychology, 119*, 83–92. doi:10.1037/a0017514
- Gay, N. W., & Combs, D. R. (2005). Social behaviors in persons with and without persecutory delusions. *Schizophrenia Research, 80*, 361–362. doi:10.1016/j.schres.2005.04.015
- Green, M. J., & Phillips, M. L. (2004). Social threat perception and the evolution of paranoia. *Neuroscience and Biobehavioral Reviews, 28*, 333–342. doi:10.1016/j.neubiorev.2004.03.006
- Green, M. J., Williams, L. M., & Davidson, D. J. (2001). Processing of threat-related affect is delayed in delusion-prone individuals. *British Journal of Clinical Psychology, 40*, 157–165. doi:10.1348/014466501163607
- Haynes, S. N. (1986). A behavioral model of paranoid behaviors. *Behavior Therapy, 17*, 266–287. doi:10.1016/S0005-7894(86)80056-9

- Kerr, S. L., & Neale, J. M. (1993). Emotion perception in schizophrenia: Specific deficit or further evidence of generalized poor performance? *Journal of Abnormal Psychology, 102*, 312–318. doi:10.1037/0021-843X.102.2.312
- Kline, J. S., Smith, J. E., & Ellis, H. C. (1992). Paranoid and nonparanoid schizophrenic processing of facially displayed affect. *Journal of Psychiatric Research, 26*, 169–182. doi:10.1016/0022-3956(92)90021-F
- Leifker, F. R., Patterson, T. L., Heaton, R. K., & Harvey, P. D. (2011). Validating measures of real-world outcome: The results of the VALERO expert survey and RAND Panel. *Schizophrenia Bulletin, 37*(Suppl. 2), 334–343. doi:10.1093/schbul/sbp044
- Lewis, S. F., & Garver, D. L. (1995). Treatment and diagnostic subtype in facial affect recognition in schizophrenia. *Journal of Psychiatric Research, 29*, 5–11. doi:10.1016/0022-3956(94)00033-N
- Martin, J. A., & Penn, D. L. (2001). Social cognition and subclinical paranoid ideation. *British Journal of Clinical Psychology, 40*, 261–265. doi:10.1348/014466501163670
- Nienow, T. M., Docherty, N. M., Cohen, A. S., & Dinzeo, T. J. (2006). Attentional dysfunction, social perception, and social competence: What is the nature of the relationship? *Journal of Abnormal Psychology, 115*, 408–417. doi:10.1037/0021-843X.115.3.408
- Peer, J. E., Rothmann, T. L., Penrod, R. D., Penn, D. L., & Spaulding, W. D. (2004). Social cognitive bias and neurocognitive deficit in paranoid symptoms: Evidence for an interaction effect and changes during treatment. *Schizophrenia Research, 71*, 463–471. doi:10.1016/j.schres.2004.03.016
- Penn, D. L., Addington, J., & Pinkham, A. (2006). Social cognitive impairments. In J. A. Lieberman, T. S. Stroup, & D. O. Perkins (Eds.), *The American Psychiatric Association textbook of schizophrenia* (pp. 261–274). Arlington, VA: American Psychiatric Publishing, Inc.
- Penn, D. L., Corrigan, P. W., Bentall, R. P., Racenstein, J. M., & Newman, L. (1997). Social cognition in schizophrenia. *Psychological Bulletin, 121*, 114–132. doi:10.1037/0033-2909.121.1.114
- Phillips, M. L., Senior, C., & David, A. S. (2000). Perception of threat in schizophrenics with persecutory delusions: An investigation using visual scan paths. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences, 30*, 157–167. doi:10.1017/S0033291799001397
- Pinkham, A. E., Bressinger, C., Kohler, C., Gur, R. E., & Gur, R. C. (2011). Actively paranoid patients with schizophrenia over attribute anger to neutral faces. *Schizophrenia Research, 125*(2–3), 174–178. doi:10.1016/j.schres.2010.11.006
- Pinkham, A. E., & Penn, D. L. (2006). Neurocognitive and social cognitive predictors of interpersonal skill in schizophrenia. *Psychiatry Research, 143*, 167–178. doi:10.1016/j.psychres.2005.09.005
- Rawlings, D., & Freeman, J. L. (1996). A questionnaire for the measurement of paranoia/suspiciousness. *British Journal of Clinical Psychology, 35*, 451–461. doi:10.1111/j.2044-8260.1996.tb01199.x
- Salinas, J. A., Paul, G. L., & Newbill, W. A. (2002). Is paranoid status prognostic of good outcomes? It depends. *Journal of Consulting and Clinical Psychology, 70*, 1029–1039. doi:10.1037/0022-006X.70.4.1029
- Turkat, I. D., Keane, S. P., & Thompson-Pope, S. K. (1990). Social processing errors among paranoid personalities. *Journal of Psychopathology and Behavioral Assessment, 12*, 263–269. doi:10.1007/BF00960623
- van Os, J., Hanssen, M., Bijl, R. V., & Ravelli, A. (2000). Straus (1969) revisited: A psychosis continuum in the general population? *Schizophrenia Research, 45*, 11–20. doi:10.1016/S0920-9964(99)00224-8
- Verdoux, H., & van Os, J. (2002). Psychotic symptoms in non-clinical populations and the continuum of psychosis. *Schizophrenia Research, 54*, 59–65. doi:10.1016/S0920-9964(01)00352-8

- Waldheter, E. J., Jones, N. T., Johnson, E. R., & Penn, D. L. (2005). Utility of social cognition and insight in the prediction of inpatient violence among individuals with a severe mental illness. *Journal of Nervous and Mental Disease, 193*, 609–618. doi:[10.1097/01.nmd.0000177788.25357.de](https://doi.org/10.1097/01.nmd.0000177788.25357.de)
- Wallace, C. J., Nelson, C. J., Liberman, R. P., Aitchison, R. A., Lukoff, D., Elder, J. P., & Ferris, C. (1980). A review and critique of social skills training with schizophrenic patients. *Schizophrenia Bulletin, 6*, 42–63. doi:[10.1093/schbul/6.1.42](https://doi.org/10.1093/schbul/6.1.42)
- Young, A., Perrett, D., Calder, A., Sprengelmeyer, R., & Ekman, P. (2002). *Facial expressions of emotions: Stimuli and tests*. Oxford: Thames Valley Test Company.

Copyright of Cognitive Neuropsychiatry is the property of Psychology Press (UK) and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.