



The role of subclinical paranoia on social perception and behavior

Dennis R. Combs^{a,*}, David L. Penn^b

^a*Department of Psychology, University of Tulsa, Room 308, Lorton Hall, Tulsa, OK 74104, USA*

^b*University of North Carolina at Chapel Hill, Chapel Hill, NC, USA*

Received 18 July 2002; received in revised form 9 December 2002; accepted 16 January 2003

Available online 2 April 2003

Abstract

The purpose of this study was to investigate the effects of subclinical paranoia on social perception and behavior. Two groups of participants, those high and low in subclinical paranoia, were identified based on extreme scores on the Paranoia Scale (PS). As expected, persons high in subclinical paranoia had greater depression, social anxiety, self-consciousness, and lower self-esteem compared to persons low in subclinical paranoia. In addition, persons high in subclinical paranoia performed worse than persons low in subclinical paranoia on laboratory measures of emotion perception and on an in vivo social perception task. Finally, behavioral differences between these two groups were revealed: Persons high in subclinical paranoia sat further away from the examiner and took longer to read the consent form than low-paranoia persons. These behavioral differences were not due to the group differences in clinical functioning, indicating that level of paranoia generally accounted for these findings.

© 2003 Elsevier B.V. All rights reserved.

Keywords: Subclinical paranoia; Social perception; Behavior; Emotion recognition

In the study of schizophrenia, there has been growing interest in investigating specific symptoms or subtypes rather than broadly defined syndromes (e.g., Bentall et al., 1988; van Os et al., 2000). One area that has received much attention is paranoia, which can range from clinical symptoms such as delusions of persecution to paranoid thoughts/behaviors that occur in normal persons without psychopathology (American Psychiatric Association, 1994; Fenigstein and Venable, 1992). Research on paranoia and/or persecutory ideation has typically focused on

cognitive biases (Garety and Freeman, 1999; Penn et al., 1997). Specifically, persons with persecutory delusions show biases on both neutral and social probabilistic reasoning tasks. They require less information before making decisions (Garety et al., 1991; Huq et al., 1988), and they are more confident in their decisions, based on limited data, relative to persons without persecutory delusions (Bentall et al., 1991; Dudley et al., 1997; Huq et al., 1988). There is also evidence of an attributional bias in which persons with persecutory delusions tend to make external attributions for negative outcomes and internal attributions for positive outcomes (i.e., a self-serving bias; reviewed in Bentall, 2001; Bentall et al., 1994; Garety and Freeman, 1999). In addition, these cognitive biases appear to be content-specific for threatening

* Corresponding author. Tel.: +1-918-631-2248; fax: +1-918-631-2833.

E-mail address: dennis-combs@utulsa.edu (D.R. Combs).

stimuli (Bentall and Kaney, 1989; Miller and Karoni, 1996). Persons with persecutory delusions have been shown to form illusory correlations to threat-related words (Brennan and Hemsley, 1984), show an interference effect (i.e., slower read times) to threatening words on the Emotional Stroop task (Bentall and Kaney, 1989; Fear et al., 1996), and are able recall more threatening words on memory recall tasks (Bentall et al., 1995; Kaney et al., 1992). This pattern of improved recall for threatening stimuli is also evident in nonclinical college samples high in subclinical paranoia as well (Fenigstein, 1997). Therefore, persons with paranoid ideation show social processing biases that are not evident in other individuals (Fenigstein and Venable, 1992; Kramer, 1998).

Unlike the research cited above on social cognitive biases and paranoid delusions, which clearly show a bias for the processing of social information, there is mixed evidence of a performance deficit on emotion perception tests. Some studies show impaired performance, while others show enhanced performance for persons with paranoid relative to non-paranoid schizophrenia (Davis and Gibson, 2000; Kline et al., 1992; Lewis and Garver, 1995; reviewed in Edwards et al., 2002). These mixed findings may be due to using broad diagnostic criteria, such as “paranoid schizophrenia,” to form groups rather than focusing on specific symptoms. In other words, groups defined according to the paranoid schizophrenia subtype may be comprised of individuals without persecutory delusions or ideation, the symptom most commonly associated with the previously discussed social-cognitive biases. Therefore, the role of paranoid ideation (not the paranoid subtype) on emotion perception needs further examination.

A potential limitation of research in this general area is the almost exclusive emphasis on the social-cognitive consequences of paranoia/persecutory ideation (e.g., attributional style; Theory of Mind), with little attention given to the measurement of actual behavior. There are likely numerous reasons for excluding more direct behavioral indices of paranoid ideation, such as that they are difficult to develop, expensive to implement, require long-term assessment, and may elicit resistance from the participants (see Haynes, 1986 for a discussion). This may be an important omission as cognitive and social-cognitive processes may not only influence paranoid/persecu-

tory behavior, but also may be reinforced and maintained by them (Haynes, 1986). Therefore, a second unexamined area is the role of paranoia or persecutory ideation on actual social behavior.

The purpose of this study was to investigate the role of subclinical paranoia on social perception and behavior. In the study described in this report, we examined subclinical paranoia based on the view that psychopathology lies on a continuum (Clark et al., 1995; Fenigstein, 1997; see Peters et al., 1999 for a similar discussion on delusional beliefs). Therefore, the social-cognitive biases observed in persons with persecutory delusions should be present to some degree in persons with subclinical levels of paranoia as well. Fenigstein and Venable (1992) have defined subclinical paranoia as a mode of thought marked by exaggerated self-referential biases that occurs in normal everyday behavior. Such thinking is characterized by relatively stable tendencies toward suspiciousness, feelings of ill will or resentment, mistrust, and belief in external control or influence (Fenigstein, 1997; Fenigstein and Venable, 1992). This is in contrast to clinical paranoia, which includes persecutory delusions and extreme mistrust. Although a few studies have investigated social information processing in paranoia (Fenigstein, 1997), most have studied only a single cognitive skill (i.e., recall), and none have included multiple measures of social-cognitive processing. Furthermore, we argue that utilizing a subclinical population allows for a better test of the specific role of persecutory ideation on performance, unconfounded by the presence of clinical factors that are associated with clinical populations (e.g., other psychotic symptoms; neuroleptics).

The following study hypotheses were formulated. First, it has been shown that greater clinical paranoia is associated with greater depression (Zigler and Glick, 1988), lower self-esteem (Vinogradov et al., 1992), greater social anxiety (Trower and Chadwick, 1995), and greater self-consciousness (Fenigstein and Venable, 1992). Therefore, we expected persons with high subclinical paranoia to show a similar pattern of performance relative to persons low in subclinical paranoia, a pattern that would lend support for a dimensional, rather than categorical, view of paranoia. Second, we expected the group high in subclinical paranoia to show specific attentional and attributional biases for negative stimuli relative to persons low in

subclinical paranoia (Bentall and Kaney, 1989; Miller and Karoni, 1996). Third, given the mixed evidence for emotion perception deficits in paranoia, particularly for tests of facial affect perception, no hypotheses regarding this domain were made (Davis and Gibson, 2000). However, as discussed below, participants were also asked to form an impression of an experimenter, who was instructed to act in a neutral manner. On this in vivo social perception task, we hypothesized that persons high in subclinical paranoia would perceive the experimenter in a more negative manner relative to persons low in subclinical paranoia, thus reflecting their use of a paranoid schema to interpret social interactions (Turkat et al., 1990). Finally, we hypothesized that persons high in subclinical paranoia will demonstrate greater suspicious-type behaviors (e.g., sit further away from the examiner) than those low in subclinical paranoia. All of the measures included in this study allow for an examination of social information processing biases in persons with paranoid ideation (Fenigstein, 1997; Fenigstein and Venable, 1992; Kramer, 1998; Miller and Karoni, 1996; Turkat et al., 1990).

1. Method

1.1. Participants

Participants comprised 60 undergraduate students from Louisiana State University who received extra credit toward their coursework in exchange for participating in the study. Two groups of participants were formed based on scores on the Paranoia Scale (PS; Fenigstein and Venable, 1992). Twenty-nine persons (22 females, 7 males) who scored at or above the 84th percentile (+1 S.D.; PS scores of 53 or greater) on the PS comprised the high-paranoia group. Thirty-one persons (12 females, 19 males) who scored at or below the 16th percentile (–1 S.D.; PS scores of less than 32) on the PS comprised the low paranoia control group. This method has been used in previous research studies to identify groups high and low in subclinical paranoia (Combs et al., 2003; Fenigstein, 1997) as well as in research on delusional ideation in normal adults (Linney et al., 1998). The extreme groups method is useful in research on paranoid ideation due to subtle differences in cognitive and

social processing for this population (Combs et al., 2003; Fenigstein, 1997). Percentile cutoff scores for the PS were taken from normative data found in Fenigstein and Venable (1992) and has been replicated using similar samples (Combs et al., 2002).

In order to validate the method of group assignment used in this study, we administered a range of clinical measures (including other measures of paranoia), as well as social-cognitive tasks shown to be sensitive to paranoid ideation (i.e., measures of self-consciousness, and attentional and attributional biases).

Comparison *t*-tests and chi-square tests were conducted on the demographic variables to assess group differences. There were no group differences in age $t(58)=1.1$, $p=0.26$, education, $t(58)=0.81$, $p=0.41$, gender, $\chi^2(60)=1.4$, $p=0.22$, or ethnicity, $\chi^2(60)=0.923$, $p=0.63$. A summary of the participant demographics can be found in Table 1.

1.2. Subclinical paranoia measures

1.2.1. Paranoia Scale

The Paranoia Scale is a 20-item scale that measures subclinical levels of paranoid ideation (PS; Fenigstein and Venable, 1992). The PS is scored on a 1–5 Likert scale with scores ranging from 20 to 100. Higher scores reflect higher levels of subclinical paranoia. The PS was developed for use in analogue samples and was not intended for clinical or diagnostic use. The scale has demonstrated good internal consistency ($\alpha=0.84$) and stability ($r=0.70$), and has been shown to be sensitive to experimental manipulations of paranoia, such as two-way mirrors. The PS has also

Table 1
Summary of participant demographics

Variable	High paranoia	Low paranoia
<i>N</i>	29	31
Gender		
Male	7	12
Female	22	19
Ethnicity		
Caucasian	21	19
African American	7	11
Other	1	0
Educational Level (years)	14.9 (1.3)	15.1 (0.85)
Age (years)	20.3 (3.4)	21.2 (2.3)

been shown to be positively correlated with higher scores on measures of anger, self-consciousness, belief in control by others, independent clinical ratings of paranoia, and negatively correlated with lower scores on measures of interpersonal trust (Fenigstein and Venable, 1992; Smari et al., 1994). The PS has also been shown to be highly correlated with other measures of paranoid ideation (Combs et al., 2000; Martin and Penn, 2001), and it was related to differences in the implicit processing of negative social stimuli (Combs et al., 2003). For the current study, the PS showed excellent internal consistency (Cronbach's $\alpha = 0.89$).

1.2.2. Personality Assessment Inventory persecutory ideation subscale

The Personality Assessment Inventory (PAI) paranoia subscale is a 24-item scale that can be used in clinical/diagnostic situations to assess a wide range of paranoid beliefs and behaviors (Morey, 1991). This scale is scored on a Likert scale from 0 to 3 with scores ranging from 0 to 72. Higher scores reflect increased levels of paranoia. Factor analysis revealed that this subscale could be broken down into three factor scales labeled hypervigilance, resentment, and persecutory ideation (Morey, 1991). Validity data showed higher PAI paranoia subscale scores for persons diagnosed with paranoid ideation/delusions (Morey, 1991). The PAI paranoia subscale also correlated highly with the PS and the MMPI paranoia subscale (Combs et al., 2000; Morey, 1991). For the purposes of the present study, we selected the PAI total score ($\alpha = 0.88$) and the persecutory ideation subscale (range 0–24; $\alpha = 0.74$), which seems to best capture the persecutory aspect of paranoia (Garety and Freeman, 1999).

1.3. Clinical measures

1.3.1. Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (RSES) is a 10-item scale used to assess self-esteem level (Rosenberg, 1965). This scale is scored on a Likert scale of 1–4 with scores ranging from 10 to 40; higher scores reflect increased levels of self-esteem. Internal consistency reliability has been shown to be excellent ($\alpha = 0.92$). This scale has excellent validity data and correlates highly with other measures of self-

esteem (Robinson and Shaver, 1973). The RSES has been shown to be negatively correlated with the PS scale across several studies (Combs et al., 2000; Martin and Penn, 2001). For this study, the internal consistency was found to be 0.89.

1.3.2. Beck Depression Inventory-2

The Beck Depression Inventory-2 (BDI-2) is a 21-item scale that measures the severity of depressive symptoms (Beck et al., 1996). The scale is rated on a Likert scale from 0 to 3 and scores range from 0 to 63. Higher scores reflect an increased severity of depressive symptoms. The BDI-2 has demonstrated good reliability and substantial convergent (with other measures of depression) and discriminant validity, and has been widely used in research on depression. The BDI scales have been shown to be related to level of paranoid ideation in several studies (Kendlerman and Bental, 1996; Martin and Penn, 2001). For this study, the internal consistency was found to be 0.88.

1.3.3. Brief Fear of Negative Evaluation Scale

The Fear of Negative Evaluation Scale (FNE; Leary, 1983) is a 12-item scale that measures social anxiety and fear of criticism and negative evaluation. It is scored on a 1–5 Likert scale with a range of 12–60. Higher scores reflect more social anxiety and fear of evaluation and criticism. Internal consistency data was found to be excellent for this brief scale ($\alpha = 0.90$; Leary, 1983). Validity data showed that the brief FNE positively correlated with other clinical and structured interview measures of social anxiety and behavioral avoidance (Leary, 1983) and subclinical paranoid ideation (Martin and Penn, 2001). For this study, the internal consistency was found to be 0.82.

1.4. Social-cognitive measures

1.4.1. Self-Consciousness Scale

The Self-Consciousness Scale (SCS; Fenigstein et al., 1975) is a 23-item scale designed to measure one's level of self-awareness or self-focused attention. The scale is rated on a Likert scale ranging from 0 (Extremely Uncharacteristic) to 4 (Extremely Characteristic). Scores range from 0 to 92, with higher scores indicating a higher level of perceived self-consciousness. For this study, the internal consistency was

found to be 0.84. The SCS has three factor-analyzed subscales, public self-consciousness ($\alpha=0.78$), private self-consciousness ($\alpha=0.62$), and social anxiety ($\alpha=0.85$). The SCS has been used in previous experimental research on paranoid ideation and the results showed paranoia was more related to public self-consciousness (scrutiny by others) than private self-consciousness (Fenigstein and Vanable, 1992).

1.4.2. Emotional Stroop Test

The Emotional Stroop Test was used to assess for cognitive interference effects for paranoia and depression (Bentall and Kaney, 1989). For this task, the participant was required to read a list of nonthreatening words, paranoid-content words (e.g., spy, threat), and depression-content words (e.g., sad, cry). Due to its sensitivity to paranoid ideation, we predicted that participants in the high-paranoia group, relative to the low-paranoia group, should show a selective interference for color-naming only paranoid words. An interference index can be calculated for both the paranoia and depression lists in which the time to read the control list is subtracted from the time to read the paranoia and depression lists, respectively (thus controlling for the effects of nonthreatening words). Prior research showed that persons with persecutory delusions and high levels of subclinical paranoia showed slowed color naming to threat words as compared to depressed and neutral words (Bentall and Kaney, 1989; Combs et al., 2003; Fear et al., 1996).

1.4.3. Internal, Personal, and Situational Attributions Questionnaire

The Internal, Personal, and Situational Attributions Questionnaire (IPSAQ) is a 32-item questionnaire that contains 16 positive social situations and 16 negative social situations (Kinderman and Bentall, 1996). The person has to select if the outcome (i.e., someone pays them a complement) is due to them, other people, or situational factors. The IPSAQ contains two bias scores that can be computed. The Externalizing Bias (EB) score reflects a tendency for the person to take credit for positive outcomes and blame others for negative events. A positive EB score indicates more of a self-serving bias (takes credit for positive events, but blames others for negative ones; Kinderman and

Bentall, 1996). The Personalizing Bias (PB) score reflects the tendency for the person to blame others for negative events as opposed to attributing the event to situational causes. The PB score is a proportion, and according to Kinderman and Bentall (1996), PB scores of +0.50 or above indicates more personal attributions for negative social outcomes. Prior validity data using persons with persecutory delusions showed a higher tendency to make external attributions for negative events as compared to both depressed and control persons (Kinderman and Bentall, 1996, 1997). For this study, the IPSAQ had an internal consistency of 0.70.

1.5. Emotion/social perception measures

1.5.1. Bell–Lysaker Emotion Recognition Test

The Bell–Lysaker Emotion Recognition Test (BLERT) is a 21 item videotaped presentation of seven different emotional states (Bell et al., 1997; Bryson et al., 1997). The emotional states include happiness, sadness, anger, fear, disgust, surprise, and no emotion. Each emotional state is presented for 10 s, and the person must decide which affective state is presented. A male actor who recites a series of three standard monologues concerning situations about his job displays each emotion. The BLERT has good categorical stability data ($\kappa=0.76$), and 5-month test–retest reliability was 0.76. The BLERT has demonstrated good discriminant and convergent validity with measures of attention and executive function as well (Bell et al., 1997; Bryson et al., 1997). The BLERT has been shown to correlate highly with another reliable measure of emotion recognition, the Facial Emotion Identification Test (FEIT; Combs and Gouvier, 2002). In this study, the internal consistency of the BLERT was 0.52, and 6 items, which demonstrated poor reliability, were deleted for a total of 15 items. Thus, scores on the BLERT range from 0 to 15. In general, it is not uncommon for tests of facial affect perception to have moderate internal consistencies (see Penn et al., 2000; Davis and Gibson, 2000 for examples).

1.5.2. Facial Emotion Identification Test (FEIT)

Kerr and Neale (1993) developed the FEIT based on the still photograph stimuli of Ekman (1976) and Izard (1971). The FEIT consists of 19 videotaped

pictures of six different emotional states. Emotions are happiness, sadness, anger, surprised, afraid, and ashamed. The person must look at the picture and decide which emotion is being presented. The FEIT was developed in order to have an affect perception test with acceptable reliability and validity. Previous reliability results showed an internal consistency value ranging from 0.56 to 0.71 (Kerr and Neale, 1993). In this study, the internal consistency of the FEIT was 0.53, and 3 items, which demonstrated poor reliability, were deleted for a total of 16 items. Scores range from 0 to 16.

1.5.3. *In vivo social perception task*

The final social perception task required each participant to rate the research assistant on her/his behavior during the study. We considered this task an “in vivo” social perception measure since the participant must rate the experimenter on a variety of social and behavioral items. In order to minimize bias, all research assistants were instructed and trained to remain emotionally neutral during the sessions, thus eliminating performance cues to the participant. All research assistants completed training sessions on how to act in the experimental setting (i.e., greeting the participant, responding to questions, observing performance) and completed two practice administrations before actual enrollment began. The principal investigator (DC) observed each research assistant on several random occasions to ensure they were complying with the instructions. Following the experiment, the participant was asked to rate the experimenter on a Likert scale of 1 (Strongly Disagree) to 6 (Strongly Agree) for five items: (1) the experimenter was friendly, (2) the experimenter was hostile, (3) the experimenter was analyzing my actions, (4) the experimenter was influencing my performance, and (5) the experimenter was trustworthy. Participants were asked to complete the rating form after the research assistant left the room and to place his/her ratings in a sealed envelope, with their signature across the envelope seal. In order to increase the believability of the task, the participants were informed that the ratings would only be seen by the principal investigator (DC) for quality-control purposes. These items were analyzed separately since they measured different participant observations and the internal consistency of the full scale was not

acceptable ($\alpha=0.34$). No participant reported an awareness of the purpose of this activity or the expected outcome of the study after debriefing.

1.5.4. *Behavioral measures of paranoia*

There were two behavioral measures of paranoia used in this study based on Haynes' (1986) behavioral formulation of paranoia. The first behavioral measure was a measurement of the distance that each participant sat from the examiner; persons high in subclinical paranoia should sit farther away from the examiner (indicating more social discomfort) than persons low in subclinical paranoia. At the beginning of the study, each participant was told that they could sit anywhere along an 8-ft table that they chose. The participants were told (and shown) that the examiner was sitting at the head of the table as marked by the experimenter's books and other materials. A single chair was placed at the midpoint (4-ft point) of the table in which each person could place themselves along the length of the table. An unobtrusive marker noted the place where the chair was placed, and the distance (in inches) was recorded at the conclusion of the study after the participant had left the room. In order to standardize the task, the initial placement of the participant's chair and the experimenter's materials remained unchanged throughout the study. The second behavioral measure was the time it took the participant to read the informed consent form. We reasoned that persons high in subclinical paranoia would spend more time scrutinizing the consent form than persons low in subclinical paranoia. The person was told to read the consent form, and afterwards, the study would be discussed with the participant. Out of the view of each participant, the examiner timed (in seconds) how long it took for each person to finish reading the consent form. A review of the experimenter comments after each session showed that no participant was aware of the timing or use of a marker to assess seating distance. All research assistants underwent training on how to conduct the behavioral measurements in an unobtrusive manner.

1.6. *Procedure*

Participants were recruited via a sign-up board located in the LSU Department of Psychology, which described the study as examining “beliefs about

others.” Five research assistants (4 female and 1 male) who were blind to the expected outcomes of the study conducted the study. The principal investigators were not involved in the data collection process. Participants were given extra credit for their completion of the study. The measures administered were randomized in the order of presentation.

2. Results

2.1. Data analysis overview

First, we conducted analyses to examine the validity of our group classification strategy. Then, we conducted a series of one-way MANOVAs (for correlated variables) or ANOVAs (for uncorrelated variables) on the study’s dependent variables to examine the study hypotheses. A Bonferroni adjustment method was employed across all analyses to control for Type I error.

2.2. Group validity check

To check the validity of the group assignment based on PS scores, we conducted a series of analyses on the two other measures of paranoia (i.e., the PAI and Stroop Task). We then conducted a series of analyses on the clinical and social cognitive variables that have theoretical (and empirical) relationships with paranoid ideation, (i.e., attributional style, depression, social anxiety, and self-consciousness) (Table 2).

A between-groups *t*-test revealed that the two groups significantly differed on the PAI paranoia subscale, $t(58)=7.7$, $p=0.0001$, as well as on the PAI persecutory ideation subscale, $t(58)=5.76$, $p=0.0001$. Based on the published PAI norms (Morey, 1991), the high-paranoia group had a PAI total *T* score of 59.4 and a persecutory ideation subscale *T* score of 59.2, which is in the borderline range for a subclinical interpretation and approximately 1 S.D. above the mean. The low-paranoia group showed PAI total and persecutory ideation *T* scores of 44.2 and 45.0, respectively. Previous research showed that the PS and PAI have a moderate correlation ($r=0.68$), and an exact concordance of scores should not be expected (Combs et al., 2000).

Table 2
Grouping validity variables

Variable	Level of subclinical paranoia	
	High mean (S.D.)	Low mean (S.D.)
PAI Paranoia Scale (total score)	28.5 (9.1)**	13.0 (6.2)**
PAI Persecutory Ideation Subscale	6.4 (3.7)**	1.9 (2.1)**
Emotional Stroop Test		
Paranoia Interference	4.2 (5.7)*	1.4 (3.6)*
Depression Interference	1.5 (3.3)	1.7 (4.3)
Clinical variables		
Beck Depression Inventory-2	14.2 (7.9)**	6.1 (5.6)**
Rosenberg Self-Esteem Scale	31.6 (5.6)**	36.6 (2.9)**
Fear of Negative Evaluation Scale	34.9 (6.6)*	31.9 (5.7)*
Attributional Style (IPSAQ)		
Externalizing Bias Index	4.1 (3.5)	5.4 (3.6)
Personalizing Bias Index	0.65 (0.23)	0.56 (0.28)
Self-Consciousness Scale (total)	58.0 (13.0)**	43.5 (11.1)**
Public self-consciousness	18.5 (5.2)**	14.2 (5.1)**
Private self-consciousness	26.1 (5.4)*	22.7 (5.2)*
Social anxiety	13.9 (5.0)**	8.4 (4.3)**

* $p < 0.05$.

** $p < 0.004$ (Bonferroni corrected).

On the Emotional Stroop Task, a 2 (Group: High Paranoia vs. Low paranoia) \times 2 (Stroop Task: Interference Index Paranoid words vs. Depressed words) mixed model MANOVA, with repeated measures, revealed a significant Group \times Stroop Task interaction, $F(1,58)=7.2$, $p=0.009$. Significant group differences were observed on the Stroop Paranoia Interference Index, $t(1,58)=2.2$, $p=0.02$, but not on the Stroop Depression Interference Index, $t(1,58)=0.86$, ns (see Table 2); participants high in subclinical paranoia showed greater interference only to the paranoia words relative to the group low in paranoia. Overall, the differences in PAI and Stroop scores lend support to our group classification methods for identifying persons with high and low subclinical paranoid ideation.

A series of between-group *t*-tests conducted on the clinical measures showed that persons high in subclinical paranoia had greater depression (BDI-2; $t(58)=4.5$, $p=0.001$), social anxiety (FNES; $t(58)=2.2$, $p=0.03$), and lower self-esteem (RSES; $t(58)=4.3$, $p=0.001$) relative to persons low in subclinical paranoia. Comparison *t*-tests conducted on IPSAQ

revealed no significant group differences on either the Externalizing Bias Index [EB; tendency for the person to take credit for positive outcomes and blame others for negative events; $t(55)=1.3$, $p=0.18$] or the Personalizing Bias [PB; tendency for the person to blame others for negative events as opposed to attributing the event to situational causes; $t(55)=1.3$, $p=0.18$]. Finally, comparison t -tests conducted on the Self-Consciousness scores revealed that persons with subclinical paranoia had higher scores on the SCS total score [$t(58)=4.6$, $p=0.0001$], greater public self-consciousness [$t(58)=3.1$, $p=0.002$], and higher social anxiety scores [$t(58)=4.5$, $p=0.0001$] relative to persons low in subclinical paranoia.

2.3. Primary analyses

2.3.1. Social perception measures

A one-way MANOVA (Group: High versus Low Subclinical Paranoia) conducted on the two laboratory-based emotion perception measures (BLERT, FEIT) was significant, Wilk's Lambda (2,57)=0.74, $p=0.0001$; persons high in subclinical paranoia scored lower on the BLERT, [$F(1,58)=12.5$, $p=0.001$] and the FEIT, [$F(1,58)=9.41$, $p=0.003$] compared to the group low in subclinical paranoid ideation (Table 3).

A series of t -tests conducted on the items comprising the in vivo social perception task showed that

relative to persons low in subclinical paranoia, persons high in subclinical paranoia had a stronger belief that the research assistant was influencing their performance during the study, $t(58)=3.0$, $p=0.003$, that the research assistant was analyzing their actions, $t(58)=4.3$, $p=0.0001$, and viewed the research assistant as less trustworthy, $t(58)=2.1$, $p=0.03$. There were no significant differences on ratings of friendliness or overt hostility, which is consistent with the research assistant's goal of acting in a neutral manner (all $p>0.05$). It should be noted that an analysis of experimenter ratings for the different research assistants was not significant, indicating that the research assistants acted in a similar manner across participants.

2.4. Behavioral measures

A one-way MANOVA (Group: High versus Low Subclinical Paranoia) was conducted to examine group differences on distance sat from examiner and time to read consent form. Overall, the multivariate group effect was significant, Wilk's Lambda (2,57)=0.62, $p=0.0001$. One-way analyses of variance (ANOVAs) showed significant group effects for seating distance from the examiner, $F(1,58)=14.8$, $p=0.0001$, and time to read consent form, $F(1,58)=28.4$, $p=0.0001$. Persons high in subclinical paranoia sat further away from the examiner ($M=44.7$ in., S.D.=2.1) than did persons who were low in subclinical paranoia ($M=32.4$ in., S.D.=2.1). In addition, persons high in subclinical paranoia also took longer to read the consent form ($M=128.7$ sec, S.D.=8.5) as compared to persons low in subclinical paranoia ($M=65.1$ sec, S.D.=8.2).

2.5. Supplementary analyses

One could argue that the group differences in the behavioral and social perception measures might not have been due to subclinical paranoia, but rather to group differences in depression, self-esteem, self-consciousness, and social anxiety. To address this issue, we conducted several stepwise multiple regression analyses predicting seating distance, time to read the consent, and performance on the two emotion perception tests (BLERT and FEIT). The predictor variables were the PS, BDI-2, FNE, Rosen-

Table 3
The effects of subclinical paranoia on social perception

Variable	Level of subclinical paranoia	
	High mean (S.D.)	Low mean (S.D.)
<i>Emotion perception tests</i>		
BLERT	12.0 (1.8)	13.5 (1.4)**
FEIT	10.9 (2.4)	12.6 (1.7)**
<i>Experimenter ratings (scale 1–6)</i>		
Friendly	5.4 (0.91)	5.7 (0.17)
Trustworthy	5.5 (0.95)*	5.9 (0.30)*
Analyzing my actions	4.2 (0.34)**	2.2 (0.31)**
Influencing performance	2.0 (1.4)**	1.2 (0.50)**
Hostility	1.4 (0.99)	1.1 (0.91)

Bonferroni adjusted $p=0.006$.

* $p<0.05$.

** $p<0.005$.

berg Self-Esteem Scale, and the SCS total score. For both seating distance and time to read the consent form, the only variable to enter into the model was the Paranoia Scale score, $R=0.452$, $R^2=0.204$, $F=14.69$, $p=0.0001$, and $R=0.576$, $R^2=0.320$, $F=28.3$, $p=0.0001$, respectively. On the emotion perception measures, the PS score was found to be the only significant predictor of the BLERT ($R=0.417$, $R^2=0.174$, $F=11.9$, $p=0.001$) and FEIT ($R=0.327$, $R^2=0.107$, $F=6.8$, $p=0.01$) as well. These follow-up analyses suggest that the findings for the behavior and emotion perception measures used in this study are primarily due to differences in subclinical paranoid ideation and cannot be better accounted for by depression, anxiety, self-esteem, or self-consciousness.

3. Discussion

The purpose of this study was to examine whether persons high in subclinical paranoia differed from persons low in subclinical paranoia in social perception and social behavior. This paper extends previous research that has primarily focused on clinical manifestations of paranoia such as persecutory delusions to a sample of normal persons who differed in subclinical paranoid ideation. The two groups were formed initially on scores from the PS and were found to be different on two other independent measures of paranoid ideation. Thus, we feel confident that our group classification methods reflects differences in subclinical paranoia (i.e., convergent validity) and not measurement error associated with a single measure of paranoid ideation. Overall, the results showed that the group high in subclinical paranoia had worse emotion perception, rated the research assistants more negatively, and demonstrated more behaviors indicative of suspiciousness relative to persons low in subclinical paranoia. These findings are discussed below.

On the emotion perception measures, persons high in subclinical paranoia performed worse than persons low in subclinical paranoia. This is the first study, to our knowledge, that examined emotion perception in a sample of persons with differing levels of paranoid ideation without the contamination of psychotic symptoms. These findings are not in accord with previous research showing that persons with paranoid

schizophrenia are relatively better at identifying emotions than persons with non-paranoid schizophrenia (Kline et al., 1992; Lewis and Garver, 1995). Our findings are more consistent with a recent study by Davis and Gibson (2000) who showed that persons with paranoid schizophrenia have impaired affect perception deficits for posed faces, which is similar to one of the emotion perception tests used in this study (i.e., the FEIT). Davis and Gibson (2000) argued that problems in the identification of posed emotional states may be due to rejection of stereotyped displays of emotions (i.e., people can fake emotional reactions) in others, which is consistent with the skepticism associated with paranoia. Perhaps, the group high in subclinical paranoia was focused on discerning the true underlying emotion instead of the posed one, which may have led to their observed deficits. Of course, the discrepancy in our findings with previous work may be due to comparing samples with a clinically defined disorder with those who are elevated in a specific symptom associated with the disorder. Furthermore, as mentioned earlier, persons comprising a “paranoid schizophrenia” group may have more than just persecutory symptoms, further muddying cross-sample comparisons. Finally, samples with paranoid and non-paranoid schizophrenia tend to differ in cognitive functioning (Magaro, 1980; Zalewski et al., 1998), which could clearly contribute to group differences in emotion perception (Chapman and Chapman, 1978). Since we sampled from an in-house college student population who did not differ from one another in years of education, it is unlikely that such differences in cognitive functioning affected the results. Therefore, increased persecutory ideation in nonclinical samples may be associated with impairments in emotion perception.

Social perceptual biases were also observed in the present study. Persons high in subclinical paranoia rated the examiner as more likely influencing their performance in the study, analyzing their actions, and being less trustworthy than did the group low in subclinical paranoia. Of course, most of these group differences, while statistically significant, were not large in scale (with the exception of “analyzing my actions,” which showed a clear difference). Furthermore, the ratings of all participants were on the positive end of the scales, indicating that the social perceptual biases were relativistic in nature and not

reflective of uniformly negative perceptions of the social environment by persons high in subclinical paranoia (see Combs et al., 2003; Fenigstein, 1997 for similar effects). These perceptual differences were found despite the fact the examiners acted in a neutral manner throughout the study, and none of the participants reported awareness of the study hypotheses. This finding is in accord with those showing that persons high in persecutory ideation tend to interpret benign, neutral, or ambiguous situations in a threatening manner (Turkat et al., 1990) and may reflect the presence of some type of hostile attribution bias (Crick and Dodge, 1995). Thus, persons high in sub-paranoia take a more suspicious and critical stance of others, which was clearly evident even in this experimental situation.

We hypothesized that persons high in subclinical paranoia would demonstrate more behaviors indicative of suspiciousness relative to persons low in subclinical paranoia. This hypothesis was supported. Persons high in subclinical paranoia consistently sat further away from the examiner, indicating a preference for more personal space or lack of comfort in social situations. This difference in social distance was not trivial, but averaged over 1 ft further than the control group. In addition, persons higher in subclinical paranoia took twice as long to read the consent form than did persons low in paranoia. The findings of this study extend our knowledge beyond merely the social-cognitive aspects of subclinical paranoia, to the behavioral consequences as well.

The inability to find attributional bias differences between groups high and low in subclinical paranoia was unexpected. However, such attributional biases are not always shown (e.g., Combs et al., 2003; Martin and Penn, 2002; discussed in Garety and Freeman, 1999) and are more likely to be manifest when a group with depression is included in the design. It is also possible that attributional differences can only be detected when paranoia reaches clinical levels.

A primary limitation of this study is the use of a nonclinical sample to measure a clinical construct. The main argument against using a nonclinical sample is that the findings reported in this study might not be consistent with those obtained with a clinical sample. It is possible that the assessment measures used in this study may produce different results due to co-variations in response patterns and differences in reliability

and validity of these measures when applied to a different sample. A possible way to address this limitation is to conduct studies with multiple groups of participants across all levels of the symptom under study. However, very few studies have taken this approach, although it does appear to have great merit. While we acknowledge that this limits the generalizability of the findings to persons with clinical disorders (e.g., paranoid schizophrenia), it does provide an opportunity to study a specific symptom without the confounding presence of other clinical variables, such as medication and additional symptoms. Furthermore, if one espouses a dimensional view of psychopathology, then studying a clinical phenomenon such as persecutory ideation in a non-clinical sample is an important first step in understanding the characteristics of this construct in clinical populations. In fact, there have been several studies that have found that psychotic phenomena are present in the normal population, and these symptoms are similar to those present in clinical samples (Johns and van Os, 2001; Linney et al., 1998; Martin and Penn, 2001; Peters et al., 1999; van Os et al., 2000).

The results of this study can be linked to clinical populations in several ways. First, the results (with the exception of the attributional measures) are consistent with research on persons with clinical levels of persecutory ideation. As expected, persons high in subclinical paranoia had lower self-esteem, greater depression and social anxiety, and showed more attentional biases for threatening information relative to persons low in subclinical paranoia, a pattern also found in clinical populations (Bentall, 2001; Freeman and Garety, 2000; Garety and Freeman, 1999). In addition, the behavioral differences (e.g., increased social distance and scrutiny of research materials) and the social perception deficits (e.g., emotion perception and perception of the experimenter's actions) are consistent with social processing formulations of clinical paranoia (Haynes, 1986; Kramer, 1998; Fenigstein and Vanable, 1992). Finally, non-specific symptoms such as paranoia and social withdrawal tend to precede the development of initial psychosis (Heinssen et al., 2001; Yung and McGorry, 1996). Therefore, understanding the social-cognitive processes underlying subclinical paranoia may contribute to our understanding of the development of schizophrenia.

One could argue that the group selection method may have compared a group of highly suspicious people with a group of very trusting people. Thus, any differences on the emotion perception tests, behavioral measures, and in vivo perception measures may reflect differences in the low-paranoia group than any real differences in the high group. However, we found no indication that the low-paranoia group was extreme on the validation measures of paranoid ideation (PAI and Emotional Stroop Test) or any of the other clinical measures (SCS, FNES, BDI-2) compared to available norms for these measures. Furthermore, the PAI scores of the low-paranoia group were not suggestive of extreme trust (T score = 45). Therefore, the group low in subclinical paranoia did not appear to be extreme on this clinical construct.

The results of this study suggest a number of avenues for future study. First, comparisons between analogue and clinical samples should be pursued and would help elucidate the subtle differences in cognition and behavioral functioning of these two groups. Second, it has been mentioned that paranoid ideation may be associated with problems in social interaction and functioning. The link between performance on experimental-based measures of persecutory ideation and problems in real life social situations (e.g., lack of friends, problems at work and with significant others) would further expand our knowledge of the consequences of this construct.

References

- American Psychiatric Association, 1994. *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. Author, Washington, DC.
- Beck, A.T., Steer, R.A., Brown, G.K., 1996. *Beck Depression Inventory-2 Manual*. The Psychological Corporation, San Antonio, TX.
- Bell, M., Bryson, G., Lysaker, P., 1997. Positive and negative affect recognition in schizophrenia: a comparison with substance abuse and normal control subjects. *Psychiatry Research* 73, 73–82.
- Bentall, R.P., 2001. Social cognition and delusional beliefs. In: Corrigan, P.W., Penn, D.L. (Eds.), *Social Cognition in Schizophrenia*. American Psychological Association, Washington, DC, pp. 123–148.
- Bentall, R., Kaney, S., 1989. Content specific information processing and persecutory delusions: an investigation using the emotional stroop test. *British Journal of Medical Psychology* 62, 355–364.
- Bentall, R., 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, 156–169.
- Bentall, R., Kaney, S., Dewey, M.E., 1991. Paranoia and social reasoning: an attribution theory analysis. *British Journal of Clinical Psychology* 30, 13–30.
- Bentall, R., Kinderman, P., Kaney, S., 1994. The self, attributional processes and abnormal beliefs: towards a model of persecutory delusions. *Behavior Research and Therapy* 32, 331–341.
- Bentall, R., Kaney, S., Bowen-Jones, K., 1995. Persecutory delusions and recall of threat related, depression related, and neutral words. *Cognitive Therapy and Research* 19, 445–457.
- Brennan, J.H., Hemsley, D.R., 1984. Illusory correlations in paranoid and non-paranoid schizophrenia. *British Journal of Clinical Psychology* 23, 225–226.
- Bryson, G., Bell, M., Lysaker, P., 1997. Affect recognition in schizophrenia: a function of global impairment or a specific cognitive deficit. *Psychiatry Research* 71, 105–113.
- Chapman, L.J., Chapman, J.P., 1978. The measurement of differential deficits. *Journal of Psychiatric Research* 14, 303–311.
- Clark, L.A., Watson, D., Reynolds, S., 1995. Diagnosis and classification in psychopathology: challenges to the current system and future directions. *Annual Review of Psychology* 46, 121–153.
- Combs, D.R., Gouvier, W.D., 2002. The role of attention in affect perception (under review).
- Combs, D.R., Fresina, B., Elmore, S., Penn, D.L., Fenigstein, A., 2000. Ethnic differences in subclinical paranoia: an expansion of norms and validity of paranoia scale scores. Poster Session presented at The Annual Meeting of the Association for Advancement of Behavior Therapy, New Orleans, LA. November.
- Combs, D.R., Penn, D.L., Fenigstein, A., 2002. Ethnic differences in subclinical paranoia: an expansion of norms for the paranoia scale. *Cultural Diversity and Ethnic Minority Psychology* 8, 248–256.
- Combs, D.R., Penn, D.L., Mathews, R., 2003. Implicit learning and paranoia. *Personality and Individual Differences* 34, 143–157.
- Crick, N.R., Dodge, K.A., 1995. A review and reformulation of social information processing mechanisms in children's social adjustment. *Psychological Bulletin* 115, 74–101.
- 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.
- Dudley, R.E.J., John, C.H., Young, A.W., Over, D.E., 1997. The effect of self-referent material on the reasoning of people with delusions. *British Journal of Clinical Psychology* 36, 575–584.
- Edwards, J., Jackson, H.J., Pattison, P.E., 2002. Emotion recognition via facial expression and affective prosody in schizophrenia: a methodological review. *Clinical Psychology Review* 22, 789–832.
- Ekman, P., 1976. *Pictures of Facial Affect*. Consulting Psychologists Press, Palo Alto, CA.
- Fear, C., Sharp, H., Healy, D., 1996. Cognitive processes in delusional disorders. *British Journal of Psychiatry* 168, 61–67.
- Fenigstein, A., 1997. Paranoid thought and schematic processing. *Journal of Social and Clinical Psychology* 16, 77–94.

- Fenigstein, A., Vanable, P.A., 1992. Paranoia and self-consciousness. *Journal of Personality and Social Psychology* 62, 129–138.
- Fenigstein, A., Scheier, M.F., Buss, A.H., 1975. Public and private self-consciousness: assessment and theory. *Journal of Consulting and Clinical Psychology* 43, 522–527.
- Freeman, D., Garety, P., 2000. Comments on the content of persecutory delusions: does the definition need clarification? *British Journal of Clinical Psychology* 39, 407–414.
- Garety, P.A., Freeman, D., 1999. Cognitive approaches to delusions: a critical review of theories and evidence. *British Journal of Clinical Psychology* 38, 113–154.
- Garety, P.A., Hemsley, D.R., Wessely, S., 1991. Reasoning in deluded schizophrenic and paranoid patients. *Journal of Nervous and Mental Disease* 179, 194–201.
- Haynes, S.N., 1986. A behavioral model of paranoid behaviors. *Behavior Therapy* 17, 266–287.
- Heinssen, R.K., Perkins, D.O., Appelbaum, P.S., Fenton, W.S., 2001. Informed consent in early psychosis research. *Schizophrenia Bulletin* 27, 571–584.
- Huq, S.F., Garety, P.A., Hemsley, D.R., 1988. Probabilistic judgments in deluded and nondeluded subjects. *Quarterly Journal of Experimental Psychology* 40, 801–812.
- Izard, C.E., 1971. *The Face of Emotion*. Appelton-Century-Crofts, New York.
- Johns, L.C., van Os, J., 2001. The continuity of psychotic experiences in the general population. *Clinical Psychology Review* 21, 1125–1141.
- Kaney, S., Wolfenden, M., Dewey, M.E., Bentall, R.P., 1992. Persecutory delusions and recall of threatening propositions. *British Journal of Clinical Psychology* 31, 85–87.
- 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.
- Kinderman, P., Bentall, R.P., 1996. Self-discrepancies and persecutory delusions: evidence for a model of paranoid ideation. *Journal of Abnormal Psychology* 105, 106–113.
- Kinderman, P., Bentall, R., 1997. Causal attributions in paranoia and depression: internal, personal and situational attributions for negative events. *Journal of Abnormal Psychology* 106, 341–345.
- 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.
- Kramer, R.M., 1998. Paranoid cognition in social systems: thinking and acting in the shadow of doubt. *Personality and Social Psychology Review* 2, 251–275.
- Leary, M.R., 1983. A brief version of the fear of negative evaluation scale. *Personality and Social Psychology Bulletin* 9, 371–375.
- Lewis, S.F., Garver, D.L., 1995. Treatment and diagnostic subtype in facial affect recognition in schizophrenia. *Journal of Psychiatry Research* 29, 5–11.
- Linney, Y., Peters, E., Ayton, P., 1998. Reasoning biases in delusion-prone individuals. *British Journal of Clinical Psychology* 37, 347–370.
- Magaro, P.A., 1980. *Cognition in Schizophrenia and Paranoia*. Erlbaum, Hillsdale, NJ.
- Martin, J.A., Penn, D.L., 2001. Social cognition and subclinical paranoid ideation. *The British Journal of Clinical Psychology* 40, 261–265.
- Martin, J.A., Penn, D.L., 2002. Attributional style in outpatients with schizophrenia with and without persecutory delusions. *Schizophrenia Bulletin* 28, 131–141.
- Miller, E., Karoni, X., 1996. The cognitive psychology of delusions: a review. *Applied Cognitive Psychology* 10, 487–502.
- Morey, L.C., 1991. *The Personality Assessment Inventory Manual*. PAR, Odessa, CA.
- Penn, D.L., Corrigan, P.W., Bentall, R.P., Racenstein, J.M., Newman, L., 1997. Social cognition in schizophrenia. *Psychological Bulletin* 121, 114–132.
- Penn, D.L., Combs, D., Ritchie, M., Francis, J., Cassisi, J., Morris, S., Townsend, M., 2000. Emotion recognition in schizophrenia: further investigation of specific versus generalized performance deficit models. *Journal of Abnormal Psychology* 109, 512–516.
- Peters, E.R., Joseph, S.A., Garety, P.A., 1999. Measurement of delusional ideation in the normal population: introducing the PDI. *Schizophrenia Bulletin* 25, 553–576.
- Robinson, J.P., Shaver, P.R., 1973. *Measures of Social Psychological Attitudes*. Institute for Social Research, Ann Arbor, MI.
- Rosenberg, M., 1965. *Society and the Adolescent Self-Image*. Princeton Univ. Press, Princeton, NJ.
- Smari, J., Stefansson, S., Thorgilsson, H., 1994. Paranoia, self-consciousness, and social-cognition in schizophrenia. *Cognitive Therapy and Research* 18, 387–399.
- Trower, P., Chadwick, P., 1995. Pathways to a defense of the self: a theory of two types of paranoia. *Clinical Psychology: Science and Practice* 2, 263–278.
- 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.
- van Os, J., Hanssen, M., Bijl, R.V., Ravelli, A., 2000. Strauss (1969) revisited: a psychosis continuum in the general population. *Schizophrenia Research* 45, 11–20.
- Vinogradov, S., King, R.J., Huberman, B.A., 1992. An associationist model of paranoid process: application of phase transition in spreading activation networks. *Psychiatry* 55, 79–94.
- Yung, A.R., McGorry, P.D., 1996. The prodromal phase of first-episode psychosis: past and current conceptualizations. *Schizophrenia Bulletin* 22, 353–370.
- Zalewski, C., Johnson-Selfridge, M.T., Ohriner, S., Zarrella, K., Seltzer, J.C., 1998. A review of neuropsychological differences between paranoid and nonparanoid schizophrenia patients. *Schizophrenia Bulletin* 24, 127–145.
- Zigler, E., Glick, M., 1988. Is paranoid schizophrenia really camouflaged depression? *American Psychologist* 43, 284–290.