

Recognition of Nonverbal Affect and Schizotypy

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ABSTRACT. The authors assessed the degree to which schizotypal characteristics in a nonclinical population were associated with impairments in the ability to correctly identify emotions as expressed in facial, paralinguistic, and postural cues. Participants completed the Schizotypal Personality Questionnaire (SPQ; A. Raine, 2005), and the 3 receptive subtests of the Diagnostic Analysis of Nonverbal Accuracy-2 (DANVA2; S. Nowicki Jr., 2005). The SPQ subscales No close friends and Suspiciousness were correlated with impaired ability to correctly identify postural affective cues on the DANVA2. Unusual perceptual experiences were correlated with deficits in the ability to identify emotions on the DANVA2 paralinguistic measure. Impairments in the ability to correctly perceive and respond to expressions of affect may be part of a deficit in social cognition that contributes to development of schizotypal traits.

Keywords: affect, emotions, schizotypal characteristics, social cognition

ERRORS IN SOCIAL PERCEPTION can have disastrous, unintended consequences (Ekman, 2003). A famous example is in Shakespeare's *Othello*: Othello mistakes the facial expression of Desdemona as guilt, rather than fear, and the results are tragic. Mistakes in the reading of emotional and social cues can aggregate and accentuate preexisting difficulties, skewing the proper evaluation of the beliefs, intentions, and desires of others. Differences in patterns of impairment in social cognition are associated with difficulties in adjustment during both adolescence and adulthood (Penn, Corrigan, & Bentall, 1997; Wickline, Bollini, Nowicki, & Walker, 2005).

Schizotypal personality characteristics are associated with deficits in the ability to correctly perceive and interpret social cues (Chapman & Kwapil, 1995; Kendler, McGuire, Gruenberg, & Walsh, 1995; Meehl, 1990). These characteristics include deficits in social cognition and interpersonal functioning marked by

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discomfort with and reduced capacity for close relationships as well as tendencies to develop unusual beliefs and eccentricities of behavior (Millon & Davis, 1995; Siever, Bernstein, & Silverman, 1995). Schizotypal characteristics are also associated with signs of impairment in self-awareness (Barnacz, Johnson, Constantino, & Keenan, 2004; Platek & Gallup, 2002) and poor performance on false belief tasks (Langdon & Coltheart, 1999).

Adaptive social cognition has three components: (a) the ability to correctly perceive the dispositions and intentions of others, (b) construction and maintenance of a viable concept of self, and (c) production and regulation of behavior appropriate to social contexts (Broks, 1997). Schizotypal characteristics can both accentuate and result from dysfunctions in social cognition because failure to accurately perceive the emotions of others will cause inappropriate nonverbal responses, which, in turn, may confuse not only the interaction partners, but also the initial senders who receive unexpected responses from their peers (Wickline et al., 2005).

Accurate interpretation of affective cues is an essential ability that helps people develop and maintain existing relationships (Ekman, 1994; Russell & Fernandez-Dols, 1997). Emotions inform people by signaling the emotional state, intentions, and condition of the sender and the status of the relationship between sender and receiver (Keltner & Kring, 1998). Affect-decoding deficits are linked to overall social competence (Mueser et al., 1996). Wickline et al. (2005) used the Diagnostic Assessment of Nonverbal Accuracy (DANVA2) facial recognition task (Nowicki & Carton, 1992) to investigate the relationship between schizotypal characteristics and affect-decoding deficits. Adolescents with schizotypal personality characteristics had deficits in recognizing happy and angry expressions. By asking participants to complete measures of motor response, basic facial-processing ability, and intelligence, Wickline et al. were able to argue that their evidence indicates this deficit was specifically affective, not the result of general cognitive impairment. In the second part of the study, Wickline et al. longitudinally tested the same adolescents on measures of social competence and thought problems. Poor facial emotion recognition was generally predictive of later thought problems and social maladjustment. Participants who made more facial identification errors for anger and low-intensity emotions had more thought problems at a later age, and participants who made more errors for fear performed poorly on social reasoning. The researchers speculated that nonverbal communication deficits may lead to cognitive and interpersonal deficiencies associated with schizotypal traits.

In this study, we assessed the degree to which schizotypal characteristics as measured by the Magical Ideation Scale (MIS; Eckblad & Chapman, 1983) and the Schizotypal Personality Questionnaire (SPQ; Raine, 2005) were associated with deficits in the ability to correctly identify emotions expressed in facial, paralinguistic, and postural cues. We hypothesized that the SPQ subscales No close friends and Suspiciousness would be associated with deficits in the processing of

emotional expressions because these subscales are most likely to indicate the presence of difficulties with social interactions.

Method

Participants

Undergraduate students ($N = 99$) participated in the study. Their average age was 18.76 years, and 65% were women. We recruited participants from introductory psychology classes at a mid-Atlantic U.S. university and obtained informed consent from all participants before collecting data.

Questionnaires

Participants completed the MIS (Eckblad & Chapman, 1983) and the SPQ (Raine, 2005). The MIS is a 30-item, true–false, self-report questionnaire measuring endorsement of cause–effect interactions that are inconsistent with normative cultural understandings. The SPQ is a 74-item, yes-or-no, self-report measure of schizotypal personality disorder traits that was developed to measure all nine traits of subsyndromal patterns of the disorder described in *The Diagnostic and Statistical Manual of Mental Disorders*, fourth edition, revised (*DSM-IV-R*; American Psychiatric Association, 1994). The SPQ subscales assess (a) Ideas of reference, (b) Social anxiety, (c) Odd beliefs and magical thinking, (d) Unusual perceptual experiences, (e) Odd or eccentric behavior, (f) No close friends, (g) Odd speech, (h) Constricted affect, and (i) Suspiciousness. The SPQ has excellent internal and test–retest reliability (Raine, 1991).

Measures of Affect Recognition

To assess levels of affect recognition, we administered three receptive subtests of the DANVA2: (a) the Adult Faces test (DANVA2-AF; Nowicki & Carton, 1992), (b) the Postures test (DANVA2-POS; Pitterman & Nowicki, 2004), and (c) the Adult Paralanguage (voices) test (DANVA2-AP; Baum & Nowicki, 1998). The DANVA2 subtests allow researchers to assess the ability of participants to identify four basic nonverbal emotions (happy, sad, angry, and fearful) differing in intensity (high and low) in three nonverbal contexts. The subtests each include 24 items with an equal number of stimuli representing each emotion, of male and female models or actors, and of high- and low-valence items and, for the postures, an equal number of standing and sitting postures.

The DANVA2-AF consists of color headshots of the models each portraying one of the four target emotions with their facial expressions. The DANVA2-POS consists of color full-body shots of models each portraying one of the target emotions through posture. Each model is dressed entirely in black,

and the face of each model is obscured with a black oval so that judgments must be made on the basis of posture alone. The DANVA2-AP is an audiocassette recording of actors reading the sentence, "I am going out of the room now, and I'll be back later," each expressing one of the four target emotions through vocal tone and inflection. All DANVA2 stimuli were selected on the basis of high rater agreement on the emotions portrayed and are reported to have good test-retest reliability (Nowicki, 2005).

Procedure

We scheduled participants on a first-come, first-served basis regulated through the Sona Systems online research participation system. Sample size was determined by participant pool allocations. Once the sign-up and scheduling process was complete, we assigned participants to groups of approximately 10 people (range = 8–12 people). The testing room was equipped with a large conference-style table, a computer, a projector, and a projection screen. Before the students arrived, we placed a packet containing the consent form, answer sheets, and questionnaires at each seat of the table. As each participant arrived, he or she read and signed the consent form and waited for the study to begin. Then we asked participants to flip to the appropriate section of their answer sheets and follow along as we read instructions for the DANVA2-AF. Then we began the DANVA2-AF Powerpoint presentation. We presented each stimulus slide for 2 s, followed by a blank white screen presented for 10 s, during which participants could respond on the answer sheets. After we presented the 24 DANVA2-AF stimuli, we read the instructions before beginning the DANVA2-POS Powerpoint presentation. The DANVA2-POS presentation was similar in format to the DANVA2-AF; we presented each stimulus in the center of the numbered slide for 2 s and then presented a blank slide for 10 s. The DANVA2-AP stimuli were on an audiocassette, and we presented them using a cassette player located at the back of the room. We read aloud the instructions, asked if there were any questions, and played the tape recording. Before each audio stimulus, a male voice said the number of the item. The answer sheet was similar to that used for the DANVA2-AF and DANVA2-POS.

After we presented the DANVA2 receptive tests, we asked participants to fill out the schizotypy questionnaires (e.g., MIS and SPQ) in their packets. We presented the MIS first and the SPQ second. The questionnaires were not labeled, and instructions for each questionnaire were printed on the facing page.

Results

The mean MIS score was 9.54 ($SD = 6.63$), which is comparable to published college student norms ($M = 9.73$, $SD = 5.83$ for men; $M = 9.33$, $SD = 5.47$ for women; T. R. Kwapil, personal communication, 2002). The sample mean

SPQ question endorsement was 26.36 ($SD = 12.56$); these scores compare well to data from two normative samples ($M = 26.9$ and 26.3 , $SD = 11.0$ and 11.4 , respectively; Raine, 2005). Table 1 shows correlations of the MIS with the cognitive–perceptual SPQ subscales (i.e., Ideas of reference, Odd beliefs, and Unusual experiences).

The DANVA2 manual (Nowicki, 2005) reported mean number of errors for normal college-aged students (aged 19–21 years), and these data were comparable to the data we obtained in this study, except that participants in this study had slightly better ability to recognize postural expressions of affect and scored somewhat lower than the normative group on recognition of facial affect. Table 2 shows the number of errors on each measure. DANVA2 postures and voices subtest scores were correlated ($r = .23$, $p < .02$).

We conducted separate multiple regression analyses using the MIS and SPQ subscales that correlated significantly with performance on any one of the three DANVA2 measures (facial affect, postures, paralanguage). We did not find significant Bonferroni-corrected correlations between the MIS or any of the SPQ subscales. We found significant Bonferroni-corrected correlations between SPQ

TABLE 1. Correlations of Magical Ideation Scale (MIS; M. Eckblad & L. J. Chapman, 1983) and Schizotypal Personality Questionnaire (SPQ; A. Raine, 2005) Factors and Subscales

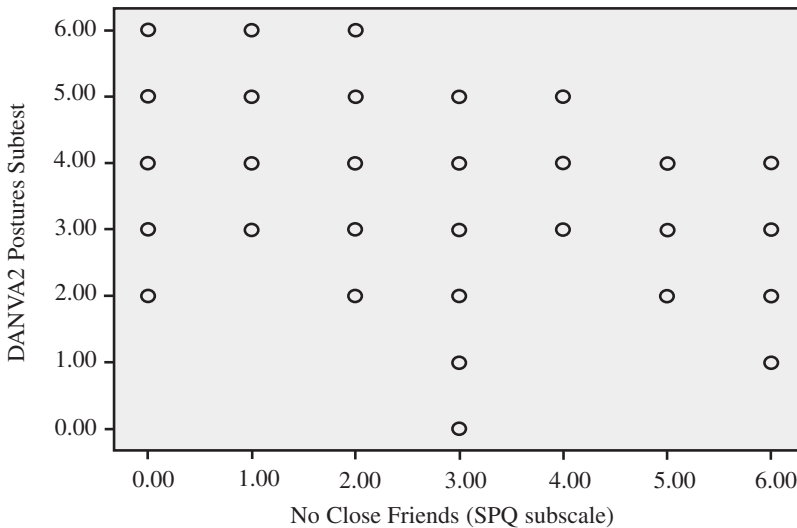
Scale or factor	MIS	SPQ total	Factor 1	Factor 2	Factor 3
MIS	—	.75**	.85**	.39*	.49**
SPQ Total	.75**	—	.84**	.80**	.78**
Factor 1			—		
SPQ cognitive–perceptual subscales	.39**	.80*	—	.47**	.50**
Ideas of reference	.70**	.70**	.89**	.33**	.39**
Odd beliefs	.72**	.52**	.73**	.16	.21*
Unusual experiences	.78**	.72**	.79**	.35**	.51**
Factor 2				—	
SPQ interpersonal	.39**	.80**	.47**	—	.50**
Social anxiety	.23*	.59**	.28*	.83**	.31**
No close friends	.25*	.61**	.21*	.83**	.41**
Constricted affect	.25*	.62**	.23*	.84**	.43**
Suspiciousness	.48**	.69**	.72**	.64**	.45**
Factor 3					—
SPQ disorganized	.49**	.78**	.50**	.50**	—
Eccentric behavior	.40**	.61**	.23*	.37**	.21*
Odd speech	.47**	.74**	.47**	.50**	.89**

* $p < .05$. ** $p < .01$.

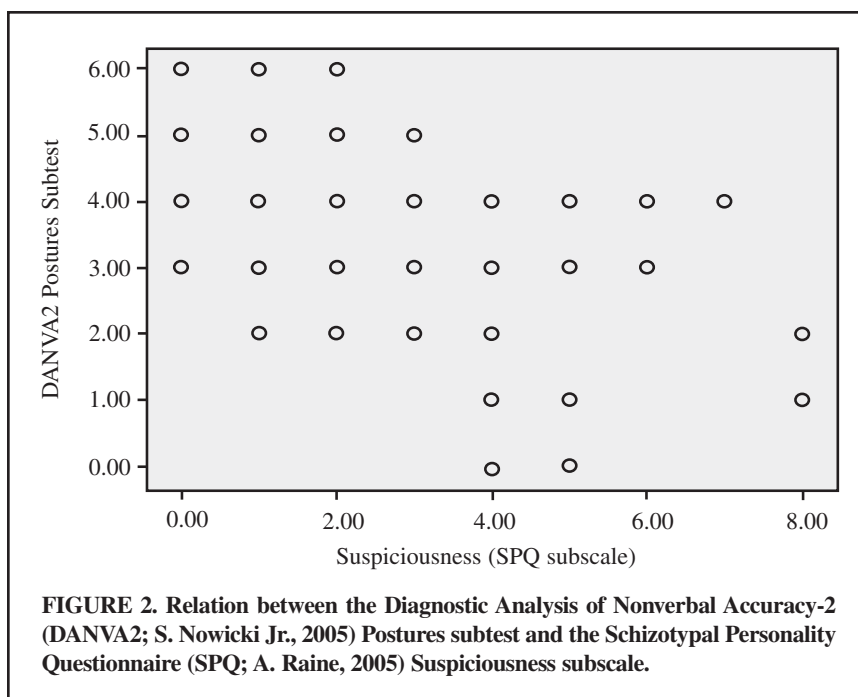
TABLE 2. Means and Standard Deviations of Diagnostic Analysis of Nonverbal Accuracy 2 (DANVA2; S. Nowicki Jr., 2005) Norms and Study Participants on DANVA2 Subtests

Subtest	DANVA2 Manual		Study sample	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Adult Faces	4.2	2.4	5.1	2.2
Postures	7.9	2.4	5.3	2.1
Adult Paralanguage	5.5	2.2	5.6	2.2

Note. Scores represent the number of incorrect responses and range from 0–24.

**FIGURE 1. Relation between the Diagnostic Analysis of Nonverbal Accuracy-2 (DANVA2; S. Nowicki Jr., 2005) Postures subtest and the Schizotypal Personality Questionnaire (SPQ; A. Raine, 2005) No close friends subscale.**

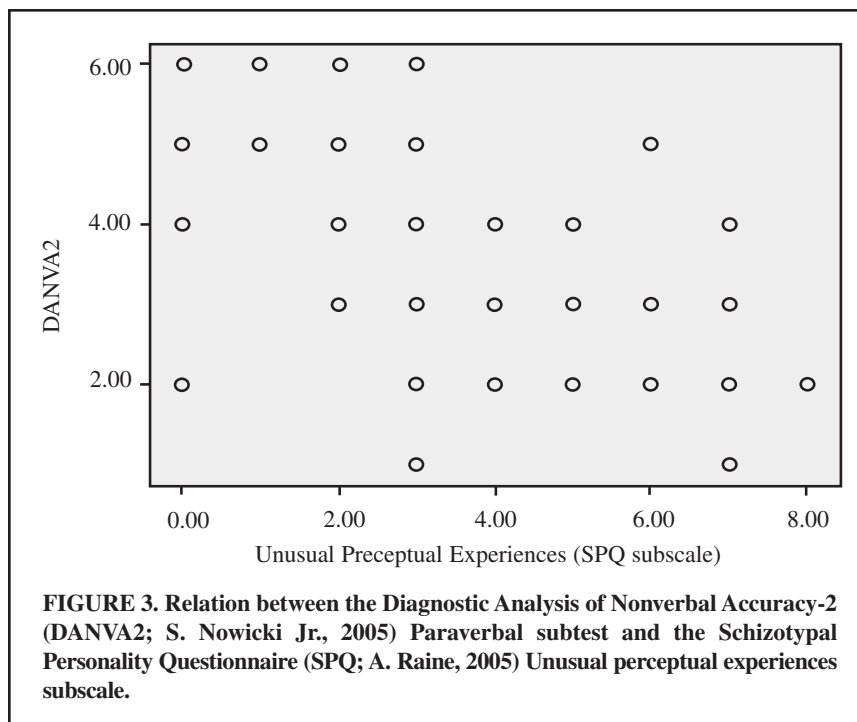
subscales and DANVA2 postures and paraverbal subscales, and we included these measures in multiple regression equations. Regression analysis of the DANVA2 postures subtest with SPQ subscales, $F(4, 94) = 8.50, p < .01$, indicated that No close friends ($\beta = -0.29, p < .01$) and Suspiciousness ($\beta = -0.38, p < .01$) predicted performance on this DANVA2 subtest (see Figures 1 and 2). A second regression analysis that included the subscales Odd speech and Unusual



perceptual experiences indicated the DANVA2 paralinguistic subtest, $F(2, 96) = 18.18, p < .01$, was negatively related to scores on the Unusual perceptual experiences subscale ($\beta = -0.45, p < .01$; see Figure 3).

Discussion

Multivariate studies of the SPQ indicate that schizotypy is a multifaceted construct (Raine, 2005). Our results are consistent with this view and suggest that differences in the ability to correctly perceive postural expressions of affect are correlated with specific interpersonal subscale scores having to do with lack of close friends and suspiciousness. Suspiciousness and lack of close relationships may function as both cause and effect in the development and exacerbation of difficulties in processing affective postural cues that, in turn, make it more difficult for people to form close friendships. The SPQ cognitive-perceptual subscale of Unusual perceptual experiences was related to the ability to correctly perceive paraverbal expressions of emotion. People who have more atypical perceptual experiences (e.g., item content, "Have you ever seen things invisible to other people?") have more difficulty recognizing emotions as expressed in tone of voice. A feedback model of cause and effect is also applicable to understanding this relationship: Individuals who have difficulty processing affect in tone of voice are more likely to



cope with stressful interactions by withdrawing into a world of fantasy.

It is unclear whether deficit in decoding affective cues is a specific deficit or part of a broader cognitive-perceptual processing deficit that includes a broad range of functions, including attention, categorization, discrimination, and working memory (Johnston, Katsikitis, & Carr, 2001). Although we did not measure overall cognitive functioning, that the results of this study indicate that the SPQ subscales were associated with impairments in processing postural affective cues in college students suggests that deficits in social cognition may be relatively independent of basic functions, such as attention, discrimination, and working memory. Social cognition allows for the interpretation of the behavior of others in terms of agency, emotions, intentions, desires, and beliefs and fosters social interactions and the coordination of goal-directed behavior. As domain-specific modules, these concepts appear to be distinct from nonsocial-cognitive functions in a college population.

It is important to note that, in measuring schizotypy, social desirability concerns are relevant. During the procedure, some participants audibly scoffed at some of the items on the questionnaires, suggesting that the content of one or both the MIS items and, to a lesser degree, the SPQ items referred to experiences too bizarre to be taken seriously by a normal college student population.

Although the MIS and SPQ correlated with each other, and in particular the MIS correlated with the cognitive–perceptual subscales of the SPQ (i.e., Odd beliefs and Magical thinking), the developers of the SPQ attempted to be more subtle than did the developers of the MIS in the approach to question content. The developers of the SPQ (Raine, 1991) drew upon the Chapman scales (Chapman & Kwapil, 1995) for source material, but the relevant SPQ items differ and are presented in a yes-or-no, question-based format with more generalized traits of behavior (e.g., “Have you had ever had experiences with the supernatural?”) rather than the strict true–false endorsement style of the MIS, which is more relevant to specific actions (e.g., “I have sometimes sensed an evil presence around me, although I could not feel it.”). Nevertheless, social desirability may affect the candor of participants and could skew questionnaire data away from accurate estimates of schizotypal features. Future researchers should address this concern by including social desirability measures as covariates in analyses.

The relationship between the ability to recognize facial affect and schizotypal characteristics may have also been affected by the method used to present stimuli. In this study, photos of facial expression did not differentiate between levels of schizotypal characteristics, even though paired comparisons indicated that scores on the three DANVA2 subscale scores did not differ. We did not find much variation in scores on the facial affect recognition subscale in particular, indicating that participants were very accurate in identifying the DANVA2 facial expressions of emotion. Researchers should consider methodological concerns associated with how facial affect recognition is measured (Russell, 1995). The ecological validity of the manner of presentation of affective stimuli used in this study is questionable (particularly regarding facial affect) because the static (i.e., not dynamic) photos of faces may not map well onto how facial emotion is encountered in natural situations (Archer, Hay, & Young, 1994). Future researchers should incorporate stimuli that enhance ecological validity. Though maintaining stimuli consistency across studies is important, it may be time to experiment with alternative methods that match natural settings better. To supplement the idea that affect recognition represents one facet of a larger framework uniting schizotypy with social cognition, future researchers may consider administering not only a decoding task, but also measures of social cognition, such as social roleplay and sequencing tasks, and measures such as false belief and deception tasks (Waldeck & Miller, 2000; Wickline et al., 2005). Assessment of these parameters could also translate more readily into interventions, such as training individuals in the skilled perception and production of expressions of emotion, both artificial and in vivo, and both true and deceitful.

AUTHOR NOTE

Glenn Shean, PhD, is a professor of clinical psychology at the College of William & Mary with clinical and research interests in the interpersonal aspects of schizotypy and

schizophrenia spectrum disorders. **Emily Bell** and **Christopher Daryl Cameron** are graduate students at William & Mary who plan to pursue doctorates in clinical psychology.

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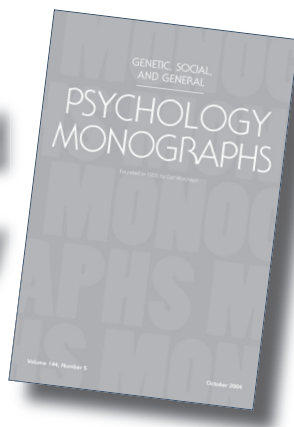
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