Affective reactivity of speech disturbances in schizotypy

Kyle S. Minor *, Alex S. Cohen

Department of Psychology, Louisiana State University, 206 Audubon Hall, Baton Rouge, LA 70803, USA

ARTICLE INFO

ABSTRACT

Speech disturbances (SD) are a pernicious symptom of schizophrenia that increase when negative emotion is elicited. This increase is referred to as affective reactivity (AR). Although considerable research has examined SD in schizophrenia, few studies have investigated this symptom in individuals at risk for the disorder, who demonstrate schizophrenia-like, or schizotypic, traits. In the present study, we examined: (1) SD severity in schizotypy, (2) how SD varies as a function of stress reactivity in schizotypy, and (3) the relationship between SD/AR with Quality of Life (QOL). Individuals with psychometrically-defined schizotypy ($n = 83$) and controls ($n = 22$) completed a laboratory procedure in which they produced speech while viewing pleasant and stressful photographs. This speech was analyzed for subtle speech disorder using a well-validated measure. We found that the schizotypy group demonstrated significant increases in SD across both baseline and stressful conditions compared to the control group. AR was not significantly different between the groups. Within the schizotypy group, severity of disorganized schizotypy symptoms was associated with high levels of SD and AR while interpersonal schizotypy was associated with low levels of SD and AR. AR was also related to increased objective QOL in the schizotypy group. This study highlights the role of stress reactivity across the schizophrenia-spectrum. Moreover, the incongruous relationships between disorganized and interpersonal symptoms with SD underscore the marked heterogeneity in processes across schizotypy.

© 2009 Elsevier Ltd. All rights reserved.

1. Introduction

Speech disturbance (SD) is a stable symptom of schizophrenia believed to be reflective of thought disorder. In patients, speech errors were first described by Bleuler, who introduced the term 'loosening of associations' to reflect a critical aspect of thought disorder that lead to an interruption in the associative threads that guide thinking (Bleuler, 1911). Loss of goal-directed thought and loose associations are often manifested in speech, as patients with schizophrenia frequently construct sentences in which two unrelated ideas are associated or reply in a way that has little to do with the topic (McKenna and Oh, 2005). Often, the speaker uses phrases containing ambiguous or unclear references, making it difficult for the listener to determine meaning (Docherty et al., 1996).

A burgeoning line of research has demonstrated that, in patients with schizophrenia, certain speech errors, detectable only when using a subtle measure of SD, increase when negative emotion is aroused. This condition is often referred to as affective reactivity (AR) (Docherty et al., 1994; Docherty and Hebert, 1997). This line of research is important because it could potentially elucidate differences in how individuals with schizotypy respond to stress, a factor that evidence has shown plays an important role in the progression of schizophrenia (Myin-Germeys et al., 2001; 2002; 2003; 2005; Norman and Malla, 1993; Ventura et al., 1989). According to Meehl (1962), individuals with a genetic vulnerability to developing schizophrenia-spectrum disorders, also known as schizotypy, who encounter sufficient life stressors will develop schizophrenia. Zubin and Spring (1977) expanded on Meehl's work to describe the diathesis-stress model of schizophrenia, which further clarified the relationship between underlying vulnerability and stress in the onset of schizophrenia. As yet, however, there is limited exploration of the extent to which SD or AR occurs in individuals with schizotypy. A recent study by Kerns and Becker (2008) found that individuals with elevated disorganized schizotypy symptoms had a higher incidence of SD compared to controls when discussing negative topics. No significant differences were observed between the two groups when positive topics were discussed, which suggests that increases in SD may only be apparent in individuals with schizotypy when negative emotion or stress is elicited.

A significant hurdle in understanding both schizophrenia and schizotypy is heterogeneity. There is no metabolic, genetic, neuroanatomical, neuropsychological deficit or symptom that is present in all, or even most cases of schizophrenia (Cohen and Docherty, 2005a; Menezes et al., 2006). Within patients, Docherty and colleagues have proposed that AR reflects an individual difference

---

* Corresponding author. Tel.: +1 270 361 9363; fax: +1 225 578 4125.
E-mail address: kminor4@lsu.edu (K.S. Minor).

variable that is reflective of a more general physiological and phenomenological reactivity (Docherty et al., 1996, 2001; Docherty and Hebert, 1997). Thus, AR may reflect a marker of disease process that identifies a subtype of schizophrenia that is pathophysiologically distinct from that seen in other patients (Docherty et al., 2001; Docherty and Grillon, 1995). In the current study, we used the three-factor model of schizotypy to investigate the influence of individual symptoms. This model consists of: (1) cognitive perceptual, (2) interpersonal deficits, and (3) disorganized symptoms (Chen et al., 1997; Fossati et al., 2003; Raine et al., 1994). At present, no studies have examined SD or AR in accordance with the three-factor model of schizotypy. Although Kerns and Becker (2008) observed a significant relationship between disorganized schizotypy and SD in stressful speech conditions, no researchers have investigated SD or AD across cognitive-perceptual or interpersonal symptoms. In patients with schizophrenia, however, positive symptoms are associated with increased SD during stressful conditions (Docherty et al., 1994; Docherty and Hebert, 1997) and negative symptoms are related to lower AR (Cohen and Docherty, 2004).

It is also important to understand the degree to which SD and AR affect "real-world" functioning. In both patients with schizophrenia (Bengtsson-Tops and Hansson, 1999; Ho et al., 1998) and individuals with schizotypy (Cohen and Davis, in press; Henry et al., 2008), Quality of Life (QOL) has been shown to be impoverished. This is especially true when examining functioning in social domains, with both friends (Aguirre et al., 2008; Ballon et al., 2007) and family members (Aguirre et al., 2008). It serves to reason that since communication is such an important component in relating to others, that relationships with friends and family members would be adversely impacted in individuals who have increased SD, or who demonstrate more SD when they feel stressed (reflected by higher AR). Other aspects of QOL may also be affected. Although it is known that both SD and AR are increased in patients and that some QOL domains are negatively impacted in both patients and individuals with schizotypy, it is unclear if SD/AR and QOL are related.

In the current study, we investigated three hypotheses. First, we hypothesized that individuals with schizotypy would have an increase in both SD and AR compared to controls. Second, our expectation was that, within the schizotypy group, cognitive-perceptual and disorganized symptoms would be associated with increases in SD and AR, while interpersonal symptoms would not be associated with SD or AR. Finally, we investigated whether subjects exhibiting increased rates of SD and AR have a significantly lower QOL rating compared to participants with few SD and AR.

2. Method

2.1. Participants

Participants were recruited from the freshman and sophomore population at Louisiana State University. Students (n = 1775) completed a series of questionnaires in exchange for a chance to win one of 10 $25 prizes. Individuals who scored at the 95th percentile (separately computed by gender and ethnicity) on at least one of three symptom subscales (perceptual-cognitive, interpersonal, or disorganized [Raine et al., 1994]) were recruited for the schizotypy group. Control participants, who scored <1 standard deviation from the mean on all schizotypy subscales, were also recruited. Participants were compensated $20 for their participation in the laboratory phase. In the final analyses, participants were only included if they had four completed transcripts (detailed below). Thirteen subjects had missing data in at least one transcript due to software complications and were excluded. The final sample consisted of 22 control subjects and 83 individuals with schizotypy.

2.2. Measures

The Schizotypal Personality Questionnaire (Raine, 1991), which has been used in over 100 peer-reviewed studies (Stefanis et al., 2004), was employed here. It consists of 74 items and measures nine schizotypy symptoms based on DSM-III criteria. The SPQ has a 3-factor structure consisting of Cognitive-Perceptual (or positive schizotypy), Interpersonal (or negative schizotypy), and Disorganization symptoms (Chen et al., 1997; Fossati et al., 2003; Raine et al., 1994). The full SPQ and information about how the Cognitive-Perceptual (ex. 'Do you sometimes feel that things you see on the TV or read in the newspaper have a special meaning for you?'; 'Have you often mistaken objects or shadows for people, or noises for voices?'), Interpersonal (ex. 'I am poor at returning social courtesies and gestures'; 'I attach little importance to having close friends'), and Disorganized (ex. 'Some people think that I am a very bizarre person'; 'People occasionally comment that my conversation is confusing') scales were derived is available online (see Raine, 2009). Total SPQ score and scores for each of the three factors were obtained by summing the raw scores of corresponding scales. The SPQ has demonstrated high internal reliability (α = 0.91) and high subscale validity across all nine subscales (with coefficient alphas ranging from 0.71 to 0.78). In addition, test–retest reliability (α = 0.82) and both convergent and discriminant validity have been demonstrated (Raine, 1991). In the present study, we used a modified version of the SPQ that employed a five-point Likert-style response format (see Wuthrich and Bates (2005) for validity data).

All participants completed a narrative task developed within our laboratory, which utilized the Computerized Assessment of affect from Natural Speech (CANS) (documented in Cohen et al., 2009). During this task, participants were fitted with a head-mounted microphone and their speech was recorded in two separate three minute intervals across two conditions. In each condition, subjects sat directly in front of a computer monitor and viewed either pleasantly or stressfully valenced photographs. Participants were asked to talk about what each picture meant to them, what it reminded them of, and how it made them feel.

During the narrative task, photographs presented to participants were selected from the International Affective Picture Systems (IAPS). The IAPS is a library of approximately 1000 pictures designed to elicit a wide range of reactions. Affect intensity of photographs is associated with stronger emotional reactions to both pleasant and stressful stimuli (Larsen et al., 1986) and to stress (Gilboa and Revelle, 1994). Photographs used in the current study were selected based on extreme positive and negative ratings using norms from Lang et al. (2008). In several studies utilizing a schizophrenia cohort, reliability for invoking emotion has been demonstrated using the IAPS (Herbener et al., 2007; Taylor et al., 2002; Volz et al., 2003). Each condition consisted of 10 photographs displayed for 40 s each at a total time of 6 min. All narratives were later transcribed by trained research assistants.

The Communication Disturbances Index (CDI), a measure developed to capture subtle instances of SD (Docherty, 1996), was employed here. Whereas most measures of SD identify gross disturbances that are often observed in the speech of patients with schizophrenia, the CDI is designed to detect mild disturbances. The CDI has demonstrated the ability to differentiate between the speech of nonpsychiatric controls and relatives of patients with schizophrenia (Docherty, 1995; Docherty et al., 1998), and the sensitivity to detect low levels of SD in nonpsychiatric controls (Docherty et al., 2003). SD was calculated as number of errors per 100 words in order to control for differences in the amount of speech generated per participant. The CDI includes six subscales (Vague references, Confused references, Missing information references, Ambiguous word meanings, Wrong word references, and