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Schizophrenia Research 69 (2004) 277–287
SCHIZOPHRENIA RESEARCH
www.elsevier.com/locate/schres

Misattribution of external speech in patients with hallucinations and delusions

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Received 1 August 2003; accepted 24 September 2003

Available online 26 November 2003

Abstract

Background: One of the main cognitive models of positive symptoms in schizophrenia proposes that they arise through impaired self-monitoring. This is supported by evidence of behavioural deficits on tasks designed to engage self-monitoring, but these deficits could also result from an externalising response bias. We examined whether patients with hallucinations and delusions would demonstrate an externalising bias on a task that did not involve cognitive self-monitoring. *Method*: Participants passively listened (without speaking) to recordings of single adjectives spoken in their own and another person's voice, and made self/nonself judgements about their source. The acoustic quality of recorded speech was experimentally manipulated by altering the pitch. Fifteen patients with schizophrenia who were currently experiencing hallucinations and delusions, 13 patients with schizophrenia not experiencing current hallucinations and delusions and 15 healthy controls were compared. *Results*: When listening to distorted words, patients with hallucinations and delusions were more likely than both the group with no hallucinations and delusions and the control group to misidentify their own speech as alien (i.e. spoken by someone else). Across the combined patient groups, the tendency to misidentify self-generated speech as alien was positively correlated with current severity of hallucinations but not with ratings of delusions or positive symptoms in general. *Conclusions*: These findings indicate that patients with hallucinations and delusions are prone to misidentifying their own verbal material as alien in a task which does not involve cognitive self-monitoring. This suggests that these symptoms are related to an externalising bias in the processing of sensory material, and not solely a function of defective self-monitoring.

Keywords: Speech; Hallucination; Delusion

1. Introduction

Auditory verbal hallucinations (AVHs) are a key feature of schizophrenia (Slade and Bentall, 1988) and are usually associated with delusions (Liddle, 1987). Most cognitive models of AVHs suggest that internally generated thoughts or images are mistaken for externally generated events as a consequence of a malfunction in either a central monitor (Hoffmann, 1986; Frith and Done, 1988) or in a reality discrimination process (Bentall, 1990). Reality or source monitoring tasks require participants to distinguish between memories of their self-generated material and externally generat-

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doi:10.1016/j.schres.2003.09.008

ed events. Patients who experience hallucinations are more likely than controls and nonhallucinating patients to misattribute self-generated items to an external source (Bental et al., 1991; Morrison and Haddock, 1997). Furthermore, these source-monitoring errors occur more often when the material is emotional as opposed to neutral.

However, these tasks require participants to identify the source of verbal material some time after presentation or generation. 'Immediate' source-monitoring models propose that AVHs result from impaired monitoring of intended speech. Frith and Done's model proposes that AVHs and delusions of control result from a breakdown in the awareness of self-generated action. The theory is specific to current or the immediate perception of all motor actions including the generation of speech. To distinguish between self-generated and externally generated actions, we rely on a 'feed forward' signal of our intentions to an internal monitor (Blakemore et al., 2002). According to this model, hallucinations and other positive symptoms can be conceptualised as resulting from a breakdown in the systems monitoring the current intention to make actions (including the generation of inner speech). Consequently, self-generated inner speech is misidentified as 'alien' and perceived as externally generated 'voices'.

According to Frith's model, self-monitoring applies to all thoughts and motor actions (including verbal actions) and impairments should effect the monitoring of overt speech as well as inner speech. This model is supported by data from studies that have engaged verbal self-monitoring by experimentally manipulating auditory verbal feedback while patients spoke aloud (Cahill et al., 1996; Johns et al., 2001). Altering the acoustic characteristics of participants' speech (by distorting it) introduced a disparity between the expected and perceived sound of the speech. Participants were required to make self/nonself judgements about the source of speech that was fed back to them. In both studies, patients with schizophrenia who were experiencing hallucinations and delusions were more likely than controls to make errors of misattribution (misidentify their own speech as alien) when it was distorted. Moreover, they made more identification errors when the words they read were derogatory as opposed to neutral or positive (Johns et al., 2001).

While all these findings are consistent with Frith's model, they could equally be explained by an externalising response bias (Bentall, 1990; Brebion et al., 2000) independent of impairments in verbal self-monitoring. A response bias is apparent when participants fail to recognise the source of a word or a thought and misattribute it to an external speaker.

The aim of the present study was to measure response bias independent of self-monitoring. Specifically, we examined whether the misidentification of speech described by Cahill et al. (1996) and Johns et al. (2001) would still be evident if their paradigm was modified such that participants did not generate speech, but made auditory judgements about the source of recorded speech. Thus, participants passively listened to recordings of their own and another person's previously recorded speech, with the speech distorted on a proportion of the trials to increase uncertainty as to its source. The rationale for the use of alien speech in the design of this study was to test whether or not the hypothesised response bias was specific to the subjects own speech, as opposed to a general perceptual or voice discrimination failure that would affect both self-generated and external speech.

We tested the hypothesis that, even in the absence of a self-monitoring component, patients with hallucinations and delusions would still demonstrate a significant externalising response bias.

2. Method

2.1. Participants

2.1.1. Patient groups

All patients were recruited through the South London and Maudsley NHS Trust, met DSM-IV criteria for schizophrenia and were on regular stable doses of antipsychotic medication (as assessed from the patient's medication charts). Medication comprised of both typical and atypical antipsychotics.

Patients' symptoms were assessed on the day of testing using the Scale for the Assessment of Positive Symptoms (SAPS; Andreason, 1984), the Scale for Assessment of Negative Symptoms (SANS; Andreason, 1984) and the Calgary Depression Scale (CDSS). Reports of symptoms were corroborated with medical notes. IQ was estimated using the NART 2nd edition (Nelson and O'Connell, 1978).