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Linguistic analysis of the valence, arousal and dominance of auditory hallucinations and internal thoughts in schizophrenia: Implications for psychoeducation and CBT

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Abstract: 70% of patients with schizophrenia suffer from auditory verbal hallucinations (AVH) which are frequently described as distressing and disabling. The content of AVH, in relation to internal thought, has never been linguistically tested in a self-monitoring study. The aim of this preliminary study was to establish if there was a significant difference between AVH and inner thoughts on the key linguistic parameters of valence (pleasantness), dominance (control) and arousal (intensity of emotion produced). Six volunteers with a diagnosis of schizophrenia from voice hearing support groups produced real-time, detailed diaries of AVH and inner thoughts using randomised/fixed timers. Analysis of content was completed using an established linguistic database. AVH were significantly more unpleasant and controlling but not more emotionally arousing than inner thoughts. Psychoeducation around the experience of hallucination in schizophrenia should include information that the voices will be significantly more unpleasant and controlling than their own thoughts but not more emotionally arousing. CBT might

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ABOUT THE AUTHOR

Gordon D. Turkington, is a Higher Research Assistant working with CNTW NHS Foundation Trust. The present study was only possible with the input of Lawrence Taylor of Northumbria University, who developed a linguistic database apportioning scores to words on the dimensions of valence, dominance and arousal. Gordon D. Turkington worked on the psychosis and language study project (PaLS) led by Professor Wolfram Heinzen and Dr. Stuart Watson. The PaLS project ran from 2016 to 2018 and, to date, there have been four publications relating to the linguistics of thought disorder in schizophrenia as compared to first degree relatives and non-clinical controls. The concept behind this study was inspired by discussions with the PaLS team.

PUBLIC INTEREST STATEMENT

Hearing voices which nobody else hears is the commonest symptom of schizophrenia. This experience is often described as being stigmatising, bizarre and frightening. This study showed that the voices heard are more similar to the persons internal thoughts than was previously understood. Volunteers from the Hearing Voices Network used diaries when prompted by a timer to write down their voices and thoughts which were then analysed using a language database. The results demonstrated that voices were certainly more unpleasant than thoughts and also more controlling. However, they were not more emotionally upsetting. This is broadly supportive of the theory that voices are externalised and distorted internal thoughts. People struggling with voices will find this information reassuring and helpful in reducing stigma. Voice hearers should be informed of this information by their psychiatrists when the diagnosis is made. This finding will have particular application in psychological treatments for psychosis such as cognitive behavioural therapy.

therefore include the use of compassion focussed techniques to help with the unpleasantness of AVH and schema level techniques to improve coping with the dominance of AVH.

Subjects: Cognitive Behavior Therapy; Language & Linguistics; Schizophrenia;

Keywords: linguistic analysis; auditory hallucinations; internal thoughts; schizophrenia; psychoeducation; cognitive behavioural therapy

1. Introduction

Source monitoring bias has been viewed as a key mechanism of the production of auditory verbal hallucinations (AVH). Ditman and Kuperberg (2005) noted in a comprehensive review of the psychological literature that there was some evidence suggesting that hallucinators showed a primary reality-monitoring abnormality (trait) that was most apparent when patients were required to distinguish self from other in real time. Morrison and Haddock (1997) demonstrated that hallucinators were more prone to attribute an external source for emotional material than a control group. Brookwell, Bentall, and Varese (2013) in a meta-analytic review of the literature reported that externalizing biases were important cognitive underpinnings of hallucinatory experiences and that clinical interventions targeting these biases should be explored as possible treatments. They noted the lack of confirmatory information from self-monitoring studies due to a lack of published evidence. Fernyhoughs' theory of inner speech (2004) was that of dialogue and self-communion. His investigations led him to the view that auditory verbal hallucinations (AVH) were externalised inner speech (2016). Tovar et al. (2019) were able to report a syntactical linguistic analysis of AVH which showed that there was a distinctive linguistic profile to voice speech. They noted that sentence-level content was largely personal rather than impersonal, and in impersonal utterances, it was generally vague. This is an important finding which this paper explores further by comparing AVH to internal thoughts on the three key linguistic parameters of valence, dominance and arousal.

2. Material and methods

2.1. Participants

Six volunteer voice hearers were drawn from voice hearing support groups. 4 volunteers had previously been in mental health services (with previous trials of antipsychotic medication) and had been discharged and 2 volunteers had not. All had the diagnosis of schizophrenia (American Psychiatric Association, 2000) and had experienced voice hearing for at least the last 5 years. All participants provided written consent before taking part in the study. To be included, interested participants were required to indicate that English was their first language and to be over 18 years of age. If any distress was reported by a volunteer as a consequence of study participation, the individual concerned was to be offered an immediate telephone consultation with a psychiatrist (SW) and appropriate support organised.

2.2. AVH and inner thoughts recording protocol

Written diary samples were produced by six volunteers. A minimum of six pages of the participant's AVH were compared to a minimum of six pages of the participant's inner thoughts as written in their diaries. Diaries and a downloadable smartphone application (iPromptU) Hurlburt (2014) that presented individuals with randomised or fixed prompts at varying time intervals was made available to each participant. After this prompt had been triggered the volunteer was then asked to report any and all AVH or inner thoughts being experienced at that time. All volunteers were given a unique identifying number and no other identifiers were retained on any database. Encrypted memory sticks and locked pencil and paper records were used. All participants were reimbursed for travel and postage costs.

2.3. Linguistic database

Language content can be scored on three domains (valence, arousal and dominance) using a linguistic database (Warriner, Kuperman, & Brysbaert, 2013). The authors extended their database from the original ANEW norms database collected by Bradley and Lang (1999) which consisted of 1,034 words. The larger database created by Warriner et al. (2013) and the database used within the current project consisted of 14,000 English words. Valence was defined as the pleasantness of the word being used. The more pleasant the word the higher the numerical value assigned by the database to that particular word. For example, "believe" scored 7.05 (a pleasant word), while "kill" scored 1.81 (unpleasant). Arousal was defined as the intensity of emotion produced by a particular word. "Attack" scored 7.05 (highly arousing), but "asleep" scored 2.00 (low arousal). Dominance was defined as the level of control exhibited by a particular word. A lower score indicated a more controlling word. For example, "kind" scored 7.39 (low control) but "scumbag" scored 2.73 (high control). This approach was applied to the content of AVH and internal thoughts. The samples were quantitatively compared by taking summary measures of linguistic salience (valence, dominance and arousal). A numerical value was allocated to each word across each dimension.

3. Results

Statistical analysis was performed on the difference between linguistic scores on valence, dominance and arousal in the AVH and inner speech samples using appropriate non-parametric statistical tests (Wilcoxon Signed-Ranks Test). Non-parametric tests were used due to the small (n = 6) sample size. All data are presented as mean ± standard deviation. The mean number of words per diary (voices and thoughts) was 500 words (SD = 317; 8 diaries were completed by the 6 participants with 2 volunteers completing 2 diaries each) with 308 words (SD = 220) of auditory hallucination per diary (SD = 220) and 204 words (SD = 135) of inner thought per diary. There was a statistically significant difference between valence scores for AVH, 4.94 (±0.60), and inner thoughts, 5.83 (±0.10), $z = -2.201$, $p < .05$. There was not a statistically significant difference between arousal scores for AVH, 4.57 (±0.53), and inner thoughts, 4.13 (±0.13), $z = -1.472$, $p = 0.14$. There was a statistically significant difference between dominance scores for AVH, 5.11 (±0.41), and inner thoughts, 5.61 (±0.12), $z = -2.201$, $p < .05$.

4. Discussion

AVH are a neglected, complex and multi-faceted area of human experience. Voices are categorically different linguistically from inner thoughts in 2 out of 3 domains. A significant difference was found between AVH and inner thoughts on valence (pleasantness). AVH was significantly more unpleasant in content compared to inner thoughts. This is an important finding as qualitative studies have often reported this, but it has never been quantitatively demonstrated. AVH therefore may seem alien and distressing partly due to the unpleasantness of their content. However, there was no significant difference in the level of emotional arousal between participants AVH and inner thoughts. This is a surprising finding as it might have been expected that AVH would be inducing strong emotions in voice hearers, but this does not appear to be the case. It may be the case that any emotional reactions to voice hearing are more related to stigma than the voice content itself. The dominance result showed that voices were significantly more controlling when compared to the participant's inner thoughts. AVH therefore are similar to thoughts in terms of the emotional intensity of the words used but are very different in terms of their unpleasantness and controlling nature. It would seem that this disparity may be the key to understanding more about the nature of AVH.

The first limitation in the current project was that of power. Another potential constraint involved in the current study was that of censorship of voice or thought content. The completeness of the data set was reliant on the participants providing uncensored data.

Antipsychotic medication remains the cornerstone of the treatment of auditory hallucinations. However, not all voices respond to medication and stigma and poor adherence remain major problems. This results of this study should be made available by prescribing psychiatrists, mental health staff delivering psychoeducation about voice hearing and via Hearing voices support networks. Such

knowledge might lead to patients feeling less stigmatised by the voice-hearing experience and lead to improved coping. The results may also influence CBT practice by helping therapist and client to target the unpleasantness of the voices using compassion focussed techniques and by working with their controlling nature using schema focussed therapy or imagery.

There are a number of potential implications arising from the current study to be addressed in future research. A key recommendation is that the current study be repeated with a larger sample including ethnic and cultural diversity. Dissociation should be measured in a larger study as should trauma using the Impact of Events Scale-Revised (IES-R) (Weiss & Marmar, 1997) as such measures may help to clarify the mechanisms involved.

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