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Effect of religious context on the content of visual hallucinations in individuals high in religiosity

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ABSTRACT

This study investigated the interaction between the current environment and personality factors associated with religiosity in determining the content of false perceptions (used as a model for hallucinations). A primed word-detection task was used to investigate the effect of a 'religious' context on false perceptions in individuals scoring highly on religiosity. After a subliminal prime, participants viewed letter strings, and stated any words that they saw. The prime and the actual words could have a religious connotation or not. Participants measuring high on religiosity were more likely to report false perceptions of a religious type than participants low on religiosity. It is suggested that context affects the content of false perceptions through the activation of stored beliefs and values, which vary between individuals, offering a mechanism for the effect of context on idiosyncratic content of hallucinations in schizophrenia. The effect of context and individual differences on false-perception content in the current study provides possibilities for future work regarding the underlying nature of hallucinations and their treatment.

1. Introduction

Hallucinatory content is a clinically significant, but relatively little researched area (e.g., Slade and Bentall, 1988). The factors that affect hallucinatory content have been found to vary considerably from individual to individual, making experimental investigation of this area difficult (see Hamilton (1984), Skirrow et al. (2002)). Hallucinations are defined as a perceptual experience in the absence of an external stimulus (APA, 2000), and affect a range of senses, including gustatory, tactile, visual, and auditory (Allen et al., 2008). Although they are considered a hallmark symptom for schizophrenia (Sartorius et al., 1974; Crow, 1980), hallucinations also occur in a wide range of other conditions, including Borderline Personality Disorder (Gunderson et al., 1995), and conditions not linked with psychosis, such as Guillain–Barré Syndrome (Cochen et al., 2005), and Lewy Body Dementia (Harding et al., 2002). In fact, hallucinations have been estimated to occur in 30–40% of the non-clinical population (e.g., Barrett and Etheridge, 1992; Cella et al., 2007), and were reported to be experienced by around 70% of students without a history of psychosis (Posey and Losch, 1983).

Studies that have assessed factors related to the differing content of hallucinations also have focused on the role of individual differences (e.g., Al-Issa, 1977; Kent and Wahass, 1996; Tsakanikos and Reed, 2005; Cella et al., 2007). There are numerous demonstrations that individuals scoring high on psychometrically-measured schizotypy demonstrate higher levels of non-veridical perceptions (in many of these cases, false perceptions in non-clinical populations, rather than full blown clinically-significant hallucinations, have been employed as a model for the latter phenomena) than those scoring low on these scales (Tsakanikos and Reed, 2005; Cella et al., 2007; Reed et al., 2008). However, this personality trait, in itself, does not necessarily relate to specific idiosyncratic content of false perceptions (hallucinations), and may not be helpful in examining hallucination content. In contrast, there are other dimensions of personality which may provide a stronger link to exact nature of the false perception or the hallucination content, such as a person's religiosity (see Gearing et al. (2011), for a review). There is an association between high religiosity and clinical conditions in which hallucinations occur, such as schizophrenia (Huang et al., 2011) and higher levels of schizotypy (Diduca and Joseph, 1997). Moreover, religious themes have a strong representation in reports concerning the content of hallucinations (see Gearings et al. (2011), Huang et al. (2011)). However, there are few studies which have investigated the relationship between high religiosity and levels of false perceptions, and those that have been conducted have produced somewhat inconsistent results. For example, Peters et al. (1999) found that those individuals with higher levels of personal religiosity tended to experience hallucinations at a similar rate to psychotic

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individuals, and at a higher rate than control subjects. In contrast, Davies et al. (2001) found a smaller effect, in that individuals with high religiosity did not display high rates of hallucinations, compared to those with a psychosis, although the former individuals did experience hallucinations at a greater rate than the controls.

One factor that may account for differences in hallucinatory content is the interaction between these individual differences and the environmental context at the time of the hallucination. For example, Skirrow et al. (2002) studied the effect of context on the content of hallucinations using media reports and patients in an Intensive Care Unit. Those individuals who experienced hallucinations, reported more content regarding themes of war, or the military, when media coverage of these topics was high. Similarly, using a non-clinical population, and measuring levels of schizotypy, Randell et al. (2011) assessed the effect of immediate context on the content of falsely perceived auditory stimuli (used as a model for hallucinations). Participants were played auditory tapes of white noise with words embedded in the recording, and had to report any words that they heard. They were also placed in conditions containing either 'high-imagery' or 'low-imagery' words, and the content of any false perceptions was analyzed. Participants scoring high on schizotypy reported more false perceptions, and tended to have context-congruent false perceptions, although this was not a pronounced effect using this procedure. Thus, there is some laboratory-based evidence to suggest personality characteristics may interact with the environment to determine the themes of experienced false perceptions (hallucinations). In the current case, it may be that those individuals with high personal religiosity may be more sensitive to religious contexts, and, in these circumstances, may tend to report more false perceptions with a religious content than those individuals with lower personal religiosity.

To investigate this possibility, the present study employed the word detection task, developed by Tsakanikos and Reed (2005); see also Cella et al. (2007), Reed et al. (2008) for the study of false visual perceptions. In this task, participants are asked to identify words in a fast-moving display containing words and letter-strings, and the call out any words that they see. False perceptions are defined as the participant calling out a word that is not presented on that display. To determine if the content of falsely perceived words was more typically religious in those scoring highly on religiosity, when the context was religious, this procedure was adapted in two ways to generate a 'religious' context. First, the actual words employed had a religious theme. Second, a priming technique, previously used to demonstrate a powerful effect of immediate context on cognition and behavior (see Bargh et al. (1996), Kawakami et al. (2003), Nelson and Norton (2005), Johnson et al. (2010)), was used. Studies by Johnson et al. (2010); see also Pichon et al. (2007) have noted an effect of subliminal priming using Christian religious words by using this paradigm. If the context and the individual religiosity of the participants are jointly responsible for hallucinatory content, it would be expected that those individuals scoring high in religiosity would display more false perceptions of a religious nature in this religious context than those individuals scoring low on this dimension.

2. Method

2.1. Participants

One hundred participants (31 male, 69 female), with a mean age of 29 (range = 18–55) years were recruited. Participants were volunteers, and did not receive payment in return for participation in the study. None of the participants reported any history of mental illness.

2.2. Materials

2.2.1. Francis scale of attitude towards Christianity—Adult (Francis and Stubbs, 1987)

Assesses attitude towards Christianity (chosen as the dominant religion of the area in which the study was conducted). The questionnaire consists of 24 statements concerning: God, Jesus, the Bible, prayer, and Church, to which the participant responds on a 1 to 4 Likert scale, for example: "Prayer helps me a lot": '1'—not at all, '2'—somewhat, '3'—moderately so, '4'—very much so. The questionnaire is scored by adding each number the participant has circled on the scale, with higher overall scores representing higher religiosity. Some items are reverse scored. The adult version has good internal reliability (Cronbach α) of 0.97, and empirical results regarding theoretical predictions about variations in attitude supporting the construct validity of the scale.

2.2.2. The Oxford-Liverpool Inventory of Feelings and Experiences—Brief (OLIFE-B; Mason and Claridge, 2006)

Is designed to assess schizotypy in non-clinical samples, and consists of four sub-scales: unusual experiences (UE)—containing items assessing abnormal perceptions, hallucinations, and magical thinking; cognitive disorganisation (CD)—assesses attention, concentration, decision-making, and social anxiety, reflecting the disorganised thought aspects of schizotypy; introvertive anhedonia (IA)—contains items assessing the avoidance of intimacy, and a lack of enjoyment from social or physical pleasure; and impulsive nonconformity (IN)—contains items assessing anti-social and impulsive behaviour. The Brief Version consists of 43 items, with the participant responding 'yes' or 'no' to questions such as: 'Does a passing thought ever seem so real it frightens you?'. Each affirmative answer is attributed one point, with each negative answer scoring zero points, and some items reverse scored. Mason and Claridge (2006) advise against combining scales to make one composite score, instead using each for separate analyses. It has internal reliability (Cronbach α) of between 0.62 and 0.80, and a concurrent validity of between 0.9 and 0.94 (UE α=0.8, validity=0.94; CD, α=0.77, validity=0.93; IA, α=0.62, validity=0.91; IN, α=0.63, validity=0.9).

2.2.3. Beck Depression Inventory (BDI; Beck et al, 1961)

Consists of 21 items designed to assess the presence and intensity of depression. Each item refers to a particular symptom of depression, with a four point rating scale and corresponding statement, increasing in severity. For example '0'—I do not feel sad, '1'—I feel sad, '2'—I am sad all the time and can't snap out of it, '3'—I am so sad or unhappy that I can't stand it. The BDI has an internal reliability (Cronbach α) of between 0.73 and 0.92, and concurrent validity of between 0.55 and 0.73, for non-clinical samples (Beck et al., 1988).

2.2.4. The State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970)

Is designed to measure anxiety, and consists of two sub-scales measuring state and trait anxiety. The trait anxiety scale assesses long term personality trait or disposition to feeling anxious. The questionnaire consists of 40 overall questions rated using a Likert scale (Spielberger et al., 1970). Twenty items on the state sub-scale assess symptoms of anxiety that the individual may feel in the present moment, for example: "I feel nervous": '1'—Not at all, '2'—Somewhat. '3'—Moderately so, '4'—Very much so. The 20 items on the trait sub-scale assess symptoms of anxiety that the individual may feel generally during their life, with a corresponding appropriate scale, for example: "I feel nervous and restless"—'1'—Almost never, '2'—Sometimes, '3'—Often, '4'—Almost always. Participants score between 20 and 80 on each sub-scale, with some items relating to the absence of anxiety reverse scored; higher scores indicate greater anxiety. The STAI has concurrent validity of 0.52 to 0.80, and internal reliability (Cronbach α) of 0.93. The trait anxiety sub-scale has also been found to have high test–retest reliability, with scores remaining at similar levels across testing periods (Rule and Traver, 1983).

2.3. False perception task

The word detection task was created using E-Prime E-Studio, and was presented on a Samsung R55 laptop. After instructions, the sequence of the task appeared as follows: blank screen, prime pre-mask, prime, prime post-mask, word detection slide, and then an inter-slide interval. This 'trial' sequence was then repeated 96 times. All slides were presented at a rate of 59.95 Hz, with a screen resolution of 800 × 600.

2.3.1. Priming

The priming sequence was based on a study of religious priming by Johnson et al. (2010). Priming words were presented in upper case, white font, on a black background, and were presented on the screen for 35 ms. Prior to each prime word, there was a pre-mask, consisting of 10 crosses, presented for 70 ms. An identical post-mask was presented for 70 ms following presentation of the prime. The priming words used for the religious context were: gospel, heaven, Jesus, messiah, prayer, sermon, bible, faith, Christ, and church. None of the priming words appeared in the word detection slides as real words. The priming stimulus used