

## Author's Accepted Manuscript

How do differential explanations of voice-hearing influence attributions and behavioural intentions towards voice-hearers?

Deborah Kingston, Nima G. Moghaddam, David L. Dawson



PII: S0165-1781(16)30086-5  
DOI: <http://dx.doi.org/10.1016/j.psychres.2016.01.039>  
Reference: PSY9399

To appear in: *Psychiatry Research*

Received date: 18 June 2015  
Revised date: 16 November 2015  
Accepted date: 15 January 2016

Cite this article as: Deborah Kingston, Nima G. Moghaddam and David L Dawson, How do differential explanations of voice-hearing influence attribution and behavioural intentions towards voice-hearers?, *Psychiatry Research* <http://dx.doi.org/10.1016/j.psychres.2016.01.039>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

How do differential explanations of voice-hearing influence attributions and behavioural intentions towards voice-hearers?

Running Title: ATTRIBUTIONS AND INTENTIONS TOWARDS VOICE-HEARERS

Deborah Kingston<sup>a</sup>, Nima G Moghaddam<sup>b</sup>, and David L Dawson<sup>c</sup>

<sup>a</sup>Nottinghamshire Healthcare NHS Trust, Lincoln, UK.

<sup>b</sup>Corresponding author: Trent Doctorate in Clinical Psychology, College of Social Sciences, University of Lincoln, Brayford Pool, Lincoln, UK. Telephone: 01522837733.

Email: nmoghaddam@lincoln.ac.uk

<sup>c</sup>Trent Doctorate in Clinical Psychology, University of Lincoln, Lincoln, UK.

**Abstract**

Explanations regarding the etiology of mental health difficulties have been found to affect public attitudes towards those who experience such difficulties. Utilizing a large, randomized parallel-groups design (N = 1,004), we examined how standardized differential explanations of voice-hearing influence public attitudes, attributions, and behavioral intentions towards voice-hearers. Additionally, we incorporated a behavioral outcome measure to examine whether reported behavioral intentions towards voice-hearers were related to responses towards an individual with a history of voice-hearing. Consistent with attribution theory, mediated pathways between attributions and intentions were identified: broadly, viewing the voice-hearer's behavior as dangerous, within their personal responsibility, and global was associated with more coercive intentions – and these were mediated by feelings of fear, anger, and pity. Reported behavioral intentions demonstrated small-to-moderate associations with our behavioral outcome measure. The

ACCEPTED MANUSCRIPT

findings suggest that explanations regarding the etiology of mental health difficulties that seek to reduce public attributions of dangerousness, personal responsibility, and globality may facilitate more helpful responses towards voice-hearers.

*Keywords:* Attributions; Attitudes; Mental Health; Voice-hearing; Stigma

Accepted manuscript

Epidemiological studies suggest that voice-hearing is a relatively common experience in the general population, with prevalence rates reported to be around 10% (Beavan et al., 2011; Johns et al., 2002; Tien, 1991). Despite this, within Western societies, voice-hearing is popularly *perceived* (however inaccurately) to be aberrant and extraordinary (Beavan and Read, 2010; Leudar and Thomas, 2000) and associated with mental illness (Moskowitz et al., 2011) – most commonly, schizophrenia (American Psychiatric Association [APA], 2013; Jorm and Griffiths, 2008) – irrespective of whether the experience of voice-hearing causes distress or impairment of functioning.

Contemporary medical explanations broadly emphasize the role of biological and/or genetic factors (e.g., disease of the brain; changes in brain structure; heritability) in the etiology of schizophrenia (ecological factors are increasingly attended to within these explanations, but biological/genetic factors tend to receive greater emphasis). However, biological and genetic factors alone are insufficient to explain the idiographic complexity of voice-hearing phenomena. Individual voice-hearing experiences and voice-content do not appear random, and are often personally and culturally meaningful (e.g., Anthony, 2004): suggesting that consideration of psychological development and social environment is important to understanding and working with voice-hearing experiences (National Institute for Health and Care Excellence [NICE], 2010).

Explanations that emphasize the role of psychosocial factors in the etiology and maintenance of voice-hearing underpin a number of contemporary evidence-based approaches to working with distress or impairment that may arise in relation to voice-hearing experiences (National Institute for Health and Care Excellence [NICE], 2010)<sup>1</sup>. Contemporary evidence-based approaches commonly invoke the stress-vulnerability

---

<sup>1</sup> We acknowledge that there is a multiplicity of psychological and sociological explanations of voice-hearing, some of which are associated with particular therapeutic approaches and supportive interventions (Hayward et al., 2014). We focus here on two explanatory frameworks underpinning current evidence-based approaches: stress-vulnerability and cognitive models.

ACCEPTED MANUSCRIPT  
model (Zubin and Spring, 1977) as a potential biopsychosocial explanation for the onset of voice-hearing (Garety, 2003): suggesting that voice-hearing experiences emerge from an interaction between stressful circumstances/contexts (including familial) and underlying vulnerability or propensity factors (which may include biological or organismic features).

Cognitive explanations of voice-hearing have highlighted ways in which appraisal biases may lead people to 'hear' thoughts as independent voices (Bentall, 1990) or misattribute their inner-speech (Morrison and Haddock, 1997). These explanations also implicate potential source-monitoring difficulties (e.g., Morrison et al., 2003; Waters et al., 2012) wherein the individual attributes internal experiences to external phenomena. Broadly, these cognitive accounts emphasize that voice-hearing has continuities with wider cognitive experience: they offer a normalizing explanation of etiology and place greater emphasis on *adaptation* to the experience of voice-hearing. In terms of cognitive approaches to adaptation, the model of Chadwick and Birchwood (1994) has been prominent (Thomas et al., 2014). This model suggests that the emotional and behavioral consequences of voice-hearing are influenced by the voice-hearer's beliefs about the voices (their identity, intention, and power) and perceived self-efficacy – which may relate to broader beliefs about the self and others (Birchwood et al., 2004).

Further to the (biological and psychosocial) explanations that underpin contemporary evidence-based approaches to understanding and working with voice-hearing, such experiences are conceptualized as a spiritual or religious phenomenon in some cultures and communities. For example, in South Africa, Xhosa people who hear voices are supported to become indigenous healers (Sodi, 1995, cited in Thomas and Leudar, 1996). Although spiritual/religious accounts of voice-hearing are diverse, from this perspective, the origin and maintenance of voice-hearing can be broadly understood as selective direction and communication from a higher being or spiritual entity – or as an individual having special receptivity to such messages (McCarthy-Jones et al., 2013).

ACCEPTED MANUSCRIPT

Spiritual understandings represent just one ‘alternative’ to the biological and psychosocial models that dominate professional discourse and practice in Western cultures: Voice-hearers draw on a diverse range of explanations for their voice-hearing experiences, and this diversity is explicitly respected and validated by the international Hearing Voices Movement, which explicitly encourages individuals to develop their own explanatory framework as ‘experts by experience’ (Corstens et al., 2014).

The explanations used to make sense of voice-hearing experiences may have important implications for how: (a) the general public understands and responds to voice-hearers, (b) mental health professionals work with voice-hearers, and (c) voice-hearers make sense of their voice-hearing experiences (Lebowitz and Ahn, 2014). In particular, the way we explain voice-hearing may impact on the social stigma experienced by those who hear voices – i.e., how the broader community relates and responds to voice-hearers. Individuals perceived to have mental health difficulties are often marginalized, socially excluded, and considered dangerous by others, particularly when their voice-hearing is interpreted as a symptom of schizophrenia (Angermeyer and Dietrich, 2006). It would seem that mental health professionals are also susceptible to holding stigmatizing attitudes towards those with mental health difficulties (e.g., Magliano et al., 2004; Schulze and Angermeyer, 2003) with research indicating that these attitudes can influence the use of coercive treatments and segregation (Rao et al., 2009).

Claims have been made that medical conceptualizations should reduce stigma towards ‘mental illness’ by highlighting that ‘illnesses’ are outside the control and responsibility of the individual (Angermeyer et al., 2011). However, research examining the influence of differential explanations regarding the etiology and maintenance of ‘mental illness’ on public attitudes towards those deemed to be ‘mentally ill’ has produced mixed results. For example, some authors (e.g., Angermeyer et al., 2004; Lincoln et al., 2008; Read, 2007) report that biological/medical explanations of mental illness increase

ACCEPTED MANUSCRIPT

stigma by eliciting attributions of dangerousness, in turn leading to fearful emotional responses and social-exclusionary intentions (Corrigan, 2000; Corrigan and Shapiro, 2010). Similarly, Dietrich et al. (2004) found that people report a greater desire for social distance when understanding schizophrenia to be caused by biological factors. However, in a recent meta-analysis, Kvaale, Haslam, and Gottidiener (2013) found that biological explanations of ‘mental illness’ did not affect reported social distancing, but did induce pessimistic attitudes and elevate perceptions of dangerousness.

Given the negative consequences of stigmatization, it is important to consider how public attitudes towards voice-hearers might operate and be influenced. Attribution theory provides a useful framework for understanding this process (e.g., Weiner, 1979, 1980, 1985, 1995; Weiner et al., 1976). Within attribution theory, attitudes are understood to incorporate three linearly-related components: cognitions (attributions), emotions, and behavioral intentions (e.g., Reber and Reber, 1995). An attribution is a cognitive process through which individuals make sense of events, behaviors, and the world around them. These attributions are posited to influence emotional responses, which in turn mediate behavioral intentions (e.g., Corrigan, 2000). For example, if we observe a person falling over, the way that we attribute the behavior will impact upon our feelings and intentions towards that person: if the behavior is attributed to be uncontrollable (e.g., physical disability), related to an internal locus of causality (e.g., biological condition), outside of the individual’s personal responsibility (e.g., hereditary), and stable over time (e.g., long-term condition), we may feel sympathy and wish to help that person (e.g., Corrigan, 2000; Weiner, 1995). In contrast, if we view that person’s behavior as controllable, within their personal responsibility, and unstable (e.g., they are acutely intoxicated) we may experience wariness and keep our distance (e.g., Corrigan, 2000; Weiner, 1995). In addition to the attributions outlined above (controllability, personal responsibility, locus of causality, and stability) attributions of globality (versus specificity) – i.e., whether behaviors or events

are seen to be situationally-specific or constant across all situations (Abramson et al., 1978) – are also considered to be influential determinants of attitudes.

Further to these commonly-recognized attributions, a recent systematic literature review concluded that people frequently make attributions that individuals with a ‘mental illness’ are dangerous (Jorm et al., 2012), leading to reported avoidance of such individuals, and a preference for coercive treatments and segregation (Corrigan et al., 2003; Link et al., 1999). Figure 1 provides an overview of the attribution model, incorporating core attributions and components discussed above.

---

Figure 1 here

---

The way people respond to individuals who have experiences that are commonly associated with mental illness – such as voice-hearing – thus appears to be influenced by the particular attributions that they hold. Given this, it is important to understand these attributions and whether they are sensitive to differing explanatory frameworks. By examining public attitudes towards voice-hearers, and how these might be modified, we can further our understanding of how best to reduce discrimination, increase social inclusion, and promote more positive consideration and support towards those who have these experiences.

In this study, our primary aim was to examine public attitudes and attributions in relation to voice-hearing, and how differential explanations of voice-hearing (biological, psychosocial [cognitive-behavioral], biopsychosocial, spiritual/religious) influence attributions and intentions towards voice-hearers. Further to being the first study to examine public attitudes towards voice-hearing, the current study was designed to address a number of limitations recognized in previous vignette-based applications of attribution theory in this area. For example, we include a control (no explanation) vignette,



ACCEPTED MANUSCRIPT

overcoming acknowledged weaknesses of recent investigations in this area (Bannatyne and Abel, 2015; Lebowitz and Ahn, 2014); active vignettes are matched for length and readability; we use multiple ‘psychosocial’ explanations, predicated on models underpinning current evidence-based interventions (National Institute for Health and Care Excellence [NICE], 2010), and include a non-mental health (religious/spiritual) explanation; and finally, we incorporate a novel behavioral outcome measure (see method section below) to triangulate self-reported behavioral intentions towards a voice-hearer. Although various features of the study were novel, we based our hypotheses on findings of a recent meta-analysis examining effects of biogenetic explanations on public responses towards individuals with a diagnosis of schizophrenia (Kvaale et al., 2013). We specifically predicted that, relative to other explanations, biogenetic explanations would be associated with (1) lower attributions of personal responsibility, (2) higher attributions of dangerousness, and (3) less helpful (more avoidant) intentions.

The secondary aim of this research was to provide a large-scale test of the attribution theory model, as applied to public attitudes towards voice-hearers: Specifically, we wanted to examine whether (and how) participant attributions influence emotional responses, and whether these emotional responses in turn mediate their behavioral intentions towards voice-hearers. This is the first study to specifically examine the attribution theory model in relation to voice-hearing. However, previous work has examined attribution theory in relation to vignettes depicting an individual with ‘schizophrenia’ (Corrigan et al., 2015; Corrigan et al., 2003) and found support for a posited pathway by which attributions of personal responsibility lead to increased anger and decreased pity, which in turn lead to reduced willingness to help. There is also some evidence implicating attributions of dangerousness in avoidant and coercive tendencies towards individuals with schizophrenia, with fear as a mediating emotional response (Corrigan et al., 2015; Corrigan et al., 2003). Based on these previous findings, we

ACCEPTED MANUSCRIPT

hypothesized that there would be significant indirect pathways such that (1) personal responsibility is negatively associated with helping intentions, via increased anger and decreased pity and (2) dangerousness is negatively associated with helping intentions, via increased fear; we expected parallel (but inverse) relationships with coercive intentions.

## **2. Methods**

We used a randomized, parallel-groups design, facilitated through a large-scale online survey incorporating snowball sampling via social media. Estimated effect-size for this study was based on findings from a meta-analysis by Kvaale et al. (2013). The authors examined differential effects of biological versus psychosocial explanations of psychiatric symptoms on attributions of personal responsibility. Analyzing across 11 studies (total sample size of 1,454) they found an overall difference of small-to-medium magnitude (equivalent to Cohen's  $f = 0.198$ ). An a priori power calculation indicated that, given the number of conditions in the current study (five), with an alpha-level of 0.05, a sample size of at least 310 (62 per condition) was required to provide sufficient power (80%) to detect an effect of similar magnitude. Factoring in Bonferroni corrections for multiple testing (i.e., an adjusted alpha-level of 0.004), the required sample size was 505 (101 per condition).

### **2.1 Participants**

The study was open to all members of the general public aged 18 or over who were able to understand written English and access the internet (to complete the survey). We used snowball sampling techniques to recruit research participants. The researchers advertised the study online (via social media and research recruitment platforms) and via institutional and personal mailing lists; we encouraged participants to disseminate the invitation to others (by sharing the study link) who were in turn encouraged to disseminate further. In this way, recruitment expanded beyond the immediate networks of the researchers. Participants did not receive compensation for participation in the study,

Ethical approval was obtained from an institutional review board at the authors' host institution.

## 2.3 Materials

**2.3.1 Vignettes.** Vignettes have been the most commonly used approach in studying stigma towards those with perceived mental health difficulties (Link et al., 2004). The vignettes in this study described a male voice-hearer ('John'). The description of the voice-hearer and characteristics of his voices remained consistent across the five vignettes, and did not include any diagnostic labels (all vignettes used in this study are provided verbatim in the Supplementary material).<sup>2</sup> Crucially, each condition offered a different etiological explanation of John's voice-hearing experience, with corresponding implications for managing the experience: (1) a biological explanation, indicating that his voice-hearing is caused by biogenetic factors, and can be managed with medication; (2) a cognitive-behavioral explanation, indicating that his voice-hearing is caused by a misattribution of inner speech, and that, if John is troubled by his voice-hearing experiences, he can learn to manage them by changing the way he thinks about and responds to them (through Cognitive Behavioral Therapy); (3) a biopsychosocial explanation, indicating that his voice-hearing is caused by genetic and biological susceptibility to stress, and can be managed through interventions that reduce exposure to stress; (4) a non-mental-health-related explanation, which frames his voice-hearing experience within a spiritual and/or religious context, and can be managed through spiritual guidance and support; and (5) a non-explanatory control condition.

The vignettes were developed by the three authors (clinical psychologists) in conjunction with an external clinical psychologist who specializes in working with voice-

---

<sup>2</sup> Labelling was excluded to minimise extra-conceptualisation influences on responding to the vignettes: Previous research has shown that use of diagnostic labels can elicit more negative responses (Lincoln et al., 2008).

ACCEPTED MANUSCRIPT  
hearers. Vignettes were designed to ensure that all explanatory conditions were matched for word length and readability (e.g., Flesch scores; Klare, 1974). Additionally, vignettes were checked for face validity by a voice-hearing service-user from a local service-user involvement panel.

Stigma can be seen to comprise tendencies to (1) blame individuals for their situation, (2) perceive them as dangerous, and (3) be pessimistic about the potential to change or improve their situation (Haslam and Kvaale, 2015). Thus, stigmatizing responses (prejudice and discrimination) may be sensitive to information about both the etiology and manageability (likely course and consequences) of voice-hearing. In view of this, we designed vignettes to reflect different approaches to understanding and helping people who hear voices, and to incorporate implications for management of their experiences (malleability) in addition to an explanation of etiology. We primarily draw on (biological, psychological, and biopsychosocial) models underpinning evidence-based approaches to understanding and helping, but also include a non-mental-health (spiritual) approach to represent (just one of the) alternative conceptualizations of voice-hearing that individuals may endorse (Corstens et al., 2014).

**2.3.2 Attribution Questionnaire.** We adapted Corrigan et al.'s (2003) attribution questionnaire for use in the present study. The original questionnaire is widely used and assesses six different constructs: one cognitive attribution (personal responsibility), three emotional responses (anger, fear, and pity), and two behavioral intentions (helping/avoidant and coercion/segregation). Given that we aimed to assess a broader range of empirically and theoretically implicated attributions, emotional responses, and behavioral intentions, we made a number of modifications: (1) including items to capture additional attributions (locus of causality, controllability, dangerousness, stability over time, and globality across situations); (2) grouping 'pity' items into two separate emotional responses ('sympathy/concern' [empathic] versus 'pity' [belittling]) following analysis of

ACCEPTED MANUSCRIPT

pilot data, which suggested that these items formed two distinct constructs; (3) adding further items to gauge helping behavioral intentions (derived from Link et al., 1987). For measurement of the ‘locus of causality’ attribution, questions were adapted from a number of sources (Jorm and Griffiths, 2008; Martin et al., 2000) in order to assess whether participants attributed the cause of voice-hearing to internal or external factors. We added six items to capture locus of causality in terms of internal factors (‘own character’; ‘chemical imbalance in his brain’; ‘genetic factors’) and external factors (‘upbringing’; ‘stressful circumstances’; ‘God’s will’). Within the current study, all items were scored along scales ranging from 0 to 8, with higher scores indicating greater endorsement. The adapted questionnaire demonstrated good internal consistency, with alpha coefficients ranging from 0.70 to 0.96.

**2.3.3 Behavioral Outcome Measure.** To augment measurement of attitudes towards a (hypothetical) voice-hearer, we additionally embedded a relevant behavioral outcome measure – enabling us to examine correspondence between conjectural intentions and actual behavior (within constraints of the survey-based design). In this study, the behavioral outcome of interest was whether the participant would consent to being contacted directly by a voice-hearer – ostensibly regarding an opportunity to take part in further research (an interview-based study, conducted by a researcher who “has lifelong experience of voice-hearing himself and is interested in how people learn about voice-hearing”). The invitation was made at the end of the survey, with answers restricted to a binary (yes/no) response.

## **2.4 Procedure**

The survey was hosted online; the participant information sheet was provided on the introduction page and prospective participants were required to provide consent before continuing. Participants were directed to a page to create a personal identification code, which allowed them to withdraw their data from the study up to two weeks after

After providing demographic information, participants were: (1) randomly assigned to one of the five vignettes; (2) invited to complete the adapted attribution questionnaire; (3) asked to respond to the behavioral outcome measure; and (4) fully debriefed.

## **2.5 Analysis**

The primary aim was analyzed using a series of one-way between-groups ANOVAs. To account for multiple testing, Bonferroni corrections were applied to the alpha criterion; given that there were 12 separate ANOVAs, the alpha criterion was adjusted to 0.004 (i.e.,  $0.05/12$ ). When assumptions for homogeneity were violated, the Brown-Forsyth F ratios were reported (Field, 2013). When assumptions for normality were violated, equivalent non-parametric tests were applied (e.g., Kruskal-Wallis). To test the model of attribution theory, a series of boot-strapped mediation analyses were performed (as outlined in Field, 2013).

## **3. Results**

### **3.1 Sample characteristics**

1,004 participants completed the online measures. Age data were available for 854 participants and ranged from 18-80 years old (Mean = 41.5 years; SD = 12.1). Seventy-two percent of participants were female. Participants identified as White British (55%), British other (37%), European (2.1%), American/Canadian (1.7%), Australian/New Zealander (0.8%), Asian (0.3%), and 'other' (3.1%). Preliminary analysis revealed no significant differences between groups (vignette conditions) in terms of socio-demographic characteristics, indicating that randomization achieved parity between groups on measured sample characteristics.

### **3.2 Differential effects of voice-hearing explanations**

A series of one-way ANOVAs was conducted on the 'locus of causality' questions as a preliminary check to assess whether the provided explanations functioned to influence

ACCEPTED MANUSCRIPT

participants' understanding of the etiology of voice-hearing in the expected manner (e.g., whether those participants who received the biological conceptualization were more likely to attribute the cause of voice-hearing to an internal biological state – e.g., a 'chemical imbalance'). Significant between-explanation differences were identified for five out of the six 'locus of causality' questions: 'Own character',  $F(4, 999) = 5.39, p < 0.001$ ; chemical imbalance,  $F(4, 999) = 13.89, p < 0.001$ ; upbringing,  $F(4, 995) = 4.99, p = 0.001$ ; stressful circumstances,  $F(4, 999) = 13.08, p < 0.001$ ; and genetic,  $F(4, 999) = 15.07, p < 0.001$ . The variable 'God's will' violated the assumption of normality and was consequently analyzed using the Kruskal-Wallis Test; after adjustment for multiple testing, no significant between-explanation differences were found for this variable,  $\chi^2 = 14.15, p = 0.007$ . Pairwise comparison analyses are presented in Table 1 and indicate that the explanations largely influenced participants as expected (i.e., the endorsed causality was congruent with the explanations that the participants received).

---

Table 1 (a & b) here

---

Having established that the explanations functioned as intended, a series of one-way between-group ANOVAs was conducted to examine whether reported attributions (personal responsibility, dangerousness, controllability, stability, and globality), emotions (pity, sympathy/concern, anger, and fear), behavioral intentions (helping and coercive), and behavioral outcome were sensitive to the differential explanations (Table 2).

When analyzing the influence of explanations on attributions, no significant differences were identified between explanations in terms of: (a) 'dangerousness',  $F(4, 999) = 1.65, p = 0.160$ ; (b) 'controllability',  $F(4, 999) = 3.18, p = 0.013$ ; (c) 'stability',  $F(4, 999) = 3.14, p = 0.014$ ; or (d) 'globality',  $F(4, 999) = 2.48, p = 0.043$ . However, a statistically significant difference was identified between explanations in terms of

‘personal responsibility’,  $F(4, 999) = 4.27, p = 0.002$ . Despite reaching statistical significance, however, the magnitude of effect was small ( $\eta_p^2 = 0.13$ ). Bonferroni-adjusted post hoc comparisons indicated a significant difference between those receiving cognitive versus biological explanations: Relative to participants receiving the biological explanation ( $M = 0.78, SD = 1.17$ ), participants receiving the cognitive explanation rated the voice-hearer as having greater personal responsibility for their voice-hearing experiences ( $M = 1.40, SD = 1.69; p = 0.001$ ). No other post hoc comparisons for personal responsibility reached statistical significance.

Emotional responses towards voice-hearers were not directly sensitive to differential explanations of voice-hearing: fear,  $F(4, 999) = 2.03, p = 0.088$ ; anger,  $F(4, 998) = 0.09, p = 0.986$ ; pity,  $F(4, 999) = 3.84, p = 0.613$ ; and concern/sympathy,  $F(4, 999) = 3.05, p = 0.461$ . Similarly, no statistically-significant differences were observed between the explanations for: (a) helping behavioral intentions,  $F(4, 995) = 1.69, p = 0.150$ ; (b) coercive behavioral intentions,  $F(4, 998) = 0.42, p = 0.795$ ; or (c) the behavioral outcome measure,  $F(4, 999) = 0.63, p = 0.640$ .

---

Table 2 here

---

### 3.3 Test of the attribution model

In order to test the pathways considered to underpin attribution theory (Figure 1), mediation analyses were undertaken using SPSS macros written by Preacher and Hayes (2008) outlined in Grist and Field (2012). Mediation describes the relationship between predictor variables (presently, cognitive attributions) and outcome variables (behavioral intentions), in terms of their relationship to the mediating variables (emotional responses). For each parameter, robust standard errors and bias-corrected confidence intervals were computed, based on 1,000 bootstrap samples; standardized estimates of direct and indirect effects were produced. Effects can be identified as statistically significant (at  $p \leq 0.05$ )



when bootstrapped confidence intervals do not include zero (i.e., the null value). The *indirect* effect estimates the influence of mediation. For the purpose of these analyses, all groups (explanatory conditions) were collapsed (i.e., analyses were conducted across the whole sample).

Ten mediation analyses were conducted: five modelled helpful behavioral intentions as the outcome variable, again with separate models for each of the five attribution (explanatory) variables (dangerousness, controllability, personal responsibility, stability, and globality); a further five modelled coercive behavioral intentions as the outcome variable, again with separate models for each of the five attribution (explanatory) variables. In all models, four mediating variables (pity, concern/sympathy, anger, and fear) were entered together.

Eight of the ten mediation analyses supported the attribution model, demonstrating that the relationship between attributions and behavioral intentions was emotionally mediated. In addition to mediated (indirect) pathways, seven of these analyses also revealed significant *direct* effects of attributions on intentions (see Figure 2). The two mediation analyses examining the relationship between attributions of stability and behavioral intentions did not find any significant indirect effects (i.e., no emotional mediation was observed). Figure 2 shows a schematic representation of the mediation models under investigation, and depicts the strength and direction of pathways (standardized beta coefficients) between attributions, emotions, and behavioral intentions.

As an extension of the models considered above, an analysis was undertaken to examine whether the behavioral intentions identified were related to the behavioral outcome measure – presently, whether participants would agree to be contacted by a voice-hearer to discuss future research. Spearman correlations indicated a small-to-medium sized positive correlation between helping behavioral intentions and the behavioral outcome measure ( $\rho = 0.247$ ,  $n = 1,004$ ,  $p < 0.001$ ) and a small-to-medium negative correlation

ACCEPTED MANUSCRIPT  
between coercive behavioral intentions and the same outcome measure ( $\rho = -0.216$   $n = 1,004$ ,  $p < 0.001$ ).

---

Figure 2 here

---

#### 4. Discussion

Our primary aim in this study was to examine whether attributions, emotional responses, and behavioral intentions towards voice-hearers are sensitive to differential explanations of voice-hearing.

Attributions of ‘locus of causality’ were largely congruent with the particular explanations that participants received, affirming that these explanations influenced causal attributions in expected ways. For example, participants receiving the biological explanation showed a differential tendency to assign causality to internal (and specifically, *biogenetic*) factors: i.e., to a ‘chemical imbalance in the brain’ and ‘genetics’ (but not to the voice-hearer’s ‘own character’). Those receiving cognitive and stress-vulnerability explanations (i.e., those emphasizing psychosocial contributions) were more likely than others to assign causality to external factors: i.e., to the voice-hearer’s ‘upbringing’ and ‘stressful circumstances’.

Analysis revealed that attributions of ‘personal responsibility’ were also sensitive to the explanations offered: Specifically, relative to those receiving a cognitive explanation, those receiving the biological explanation considered the voice-hearer presented in the vignette to have less personal responsibility for their voice-hearing. This finding is partly consistent with previous research suggesting that biological explanations reduce attributions of personal responsibility, whereas psychosocial conceptualizations can increase them (Kvaale et al., 2013; Lincoln et al., 2008; Read, 2007). Importantly, however, neither conceptualization differed significantly from a control (non-explanatory)

ACCEPTED MANUSCRIPT  
condition: Previous studies have identified that interpretation of differences between biological and psychosocial explanations are typically limited by a lack of a control comparator; in addressing this limitation, we found evidence to support *relative* rather than *absolute* effects of explanatory emphases.

No other attributions showed sensitivity to the explanations offered. The finding that attributions of dangerousness were not sensitive to differential explanations was notably at odds with a recent meta-analysis (Kvaale et al., 2013), which concluded that attributions of dangerousness were sensitive to biological explanations. One hypothesis as to why the current study did not find any significant results for attributions of dangerousness may be due to the absence of psychiatric labels within the biological vignette and the fact that we provided a standardized ‘symptom-level’ (i.e., ‘voice-hearing’) description across all vignettes. The results therefore appear to support findings from previous research (Lincoln et al., 2008) that suggests attributions of dangerousness may be accounted for by diagnostic labelling. This suggestion requires further exploration, but points to the potential usefulness of focusing on symptom-specific experiences in future anti-stigma research and messaging (rather than diagnoses). A recent large-scale experimental study (N = 2,265) by Imhoff (2015) demonstrated that, holding all other information constant, the addition of the diagnostic label ‘schizophrenia’ was sufficient to elevate perceptions of dangerousness and untrustworthiness, feelings of anxiety, and prognostic pessimism (with respect to a hypothetical case vignette). Evidence of the effect of labelling on public attitudes adds to an established literature demonstrating potential negative effects of diagnostic labelling on the diagnosed individual (in terms of perceived stigma, experienced stigma, and self-stigma)(Brohan et al., 2010). Although we highlight the potential usefulness of focusing on presenting concerns versus diagnoses, we acknowledge that the dominance of diagnostic language (in clinical and public discourse) would make this difficult to achieve in practice.

ACCEPTED MANUSCRIPT

The limited sensitivity of attributions to explanations may partly reflect the design of the study (e.g., the use of brief hypothetical vignettes). It is hypothesized that effects on attributions would be more apparent when information is (1) presented in formats that encourage greater personal engagement and depth of processing and/or (2) delivered in a more ecologically valid format (i.e., rather than in the context of a hypothetical case description). The lack of effect in the current study may partly reflect issues with vignette selection and construction. We chose to draw primarily on models that are compatible with current evidence-based approaches to helping people manage their voice-hearing experiences – this seemed appropriate to our focus on measuring intentions towards helping (versus coercing) responses, and we reasoned that explanations given to the public should ideally be consistent with explanations used in practice with voice-hearers. However, although we consider that attributions are likely to be shaped by information on both etiology and management (as discussed in the methods section) provision of information conflating cause and treatment may have masked differential effects. Furthermore, our selection of explanatory models is necessarily circumscribed and fails to reflect the range of potential explanations used by voice-hearers and practitioners working with voice-hearers. In particular, although our stress-vulnerability (biopsychosocial) vignette referred to the potential influence of “previous traumatic experiences”, trauma-based understandings are gaining prominence as explanatory frameworks, and such models may warrant independent consideration in future research. Notwithstanding the caveats outlined above, evident effects on locus of causality suggest that the explanations presented in this study were not inert (they influenced attributed causes in meaningful and predictable ways).

The study found no *direct* effects of explanations on emotional responses, behavioral intentions, or behavioral outcome. Notwithstanding this, the study found support for *indirect* pathways through which emotional and behavioral responses may be

ACCEPTED MANUSCRIPT

influenced, via effects on attributions (consistent with the attribution theory model of attitudes) as discussed below. Thus, although effects on emotional and behavioral responses were not detected in the current study, observed relationships suggest that these responses could be altered through interventions that influence attributions (assuming, as the model does, that change in attributions would produce changes in emotional and behavioral sequelae).

Our secondary aim was to test the attribution theory model and identify attributions and emotional mediators that influence behavioral intentions. Consistent with the model, analyses found a number of mediated pathways between attributions and intentions: Broadly, viewing the voice-hearer's behavior as dangerous, being within their personal responsibility, and global (i.e., occurring across all situations) was associated with less helpful/more coercive intentions – and these associations were mediated by increased feelings of fear, anger, and pity (in contrast to previous literature, pity was *negatively* associated with helping in the current study – discussed further below).

The study identified particularly strong (direct and indirect) associations between attributions of dangerousness and avoidant or coercive intentions. This has implications for challenging public perceptions of voice-hearers (or others who experience mental health issues) as inherently 'dangerous', and how media and anti-stigma campaigns describe the experiences of these individuals. The strength of pathways from personal responsibility and globality identify these attributions as additionally important targets for public messaging: For example, in the case of globality attributions, it would seem important to emphasize the contextual variability of voice-hearing experiences – e.g., that voices may 'come and go' and be responsive to particular situational demands – and to avoid descriptions of these as invariant and dispositional phenomena.

Fear was the emotional response most commonly implicated as mediating between attributions and behavioral intentions: Fear tended to increase in association with

ACCEPTED MANUSCRIPT  
attributions of dangerousness, personal responsibility, globality, and controllability

(pathway from attribution to emotion); and was associated with less helpful/more coercive intentions (pathway from emotion to behavioral intention). This finding is important to emphasize: Surprisingly, within attribution theory and research, fear has frequently been overlooked as a mediator of behavioral intention, with attribution theorists tending to highlight the primacy of anger and pity as emotions mediating behavioral intentions (Corrigan et al., 2003; Corrigan and Shapiro, 2010). The prominence of fear in the present study is consistent with broader empirical research implicating fear in discrimination against stigmatized individuals (Pescosolido et al., 2008).

This study found that the emotional response of fear was present in eight out of the ten mediation analyses. Conversely, 'sympathy/concern' only emerged as an influential mediator in one mediation model and pity was implicated in only three of the mediation analyses. Many studies that have used the attribution questionnaire have grouped together pity, sympathy, and concern under one construct. However, in the current study, pity showed a greater association with anger than with feelings of sympathy/concern. This may be accounted for by semantic changes since the term was first used in attribution theory – when pity was considered synonymous with sympathy and compassion (Weiner et al., 1982). It has been claimed that, in contemporary usage, the term pity is now associated with a feeling of superiority over the person being pitied (Goetz et al., 2010). We would hypothesize that this sense of difference (i.e., superiority) may be involved in the process of stigmatization, but this requires further exploration.

Attribution theory is useful for understanding and predicting behavioral intentions; however, a common limitation of previous attribution research has been a failure to measure whether these intentions relate to actual behavioral outcomes. To augment the current study, we included a behavioral outcome measure and found a small-to-moderate relationship between reported intentions and behavior.

ACCEPTED MANUSCRIPT

Because participants were asked to respond to a hypothetical vignette, which was devoid of contextual factors (e.g., location, the voice-hearer's behavioral presentation, likability, etc.), we cannot say with certainty whether participants would respond in the same way in real-life situations. We did examine whether hypothetical intentions were associated with a behavioral outcome measure, but the behavioral outcome measure may have been overly simplistic or transparent, with questionable ecological validity. Nonetheless, the presence (and magnitude) of the association between intentions and this outcome measure are notable, particularly given that this relationship was likely to be suppressed by additional factors: e.g., general willingness/time to engage in further research, and the discrepancy between the target of the reported intention towards voice-hearers (hypothetical case of John within the vignettes) versus the target of the behavioral outcome (a researcher who hears voices) – we know that the intention-behavior relationship is stronger when both are expressed towards the same target (e.g., Ajzen and Madden, 1986). Future research would ideally link attitudinal assessments to behavioral outcomes, perhaps by ensuring that both relate to the same (real) individual. Within the present study, we were concerned that direct linkage would reduce credibility (participants would be more apt to guess that the behavioral outcome was also hypothetical/a continuation of the hitherto hypothetical responses). However, the association between behavioral intention (helping the hypothetical voice-hearer 'John') and behavioral outcome (consenting to be contacted by a researcher with experience of voice-hearing) may be explained by a third variable (e.g., general agreeableness) rather than reflecting the (target-specific) pathways hypothesized within attribution theory.

Our mediational analyses were guided by attribution theory and empirical findings from previous studies that offer support for posited pathways (Rudolph et al., 2004). However, it is important to stress that the models in the present study are based on cross-sectional correlational data: Although we model specific sequential pathways, we are not

able to establish temporal precedence or causal linkage, and associations may be inflated by common method variance and response sets (attributions, emotions, and intentions are all measured via self-report). Additionally, there may be important unmeasured variables that account for observed associations – indeed, recent research highlights the role of perceived difference as an additional determinant of stigmatizing responses which is related (and potentially primary) to attribution constructs (Corrigan et al., 2015). Our primary analyses (comparisons between conditions) are more apt to control for unmeasured differences (through randomization); the uncontrolled secondary analyses must be interpreted more cautiously.

The findings from this study suggest that techniques and communications that seek to reduce attributions of responsibility might be expected to encourage more helpful/facilitative responses towards voice-hearers and other stigmatized groups. This is important in terms of public messaging/education, and also perhaps has implications for decreasing self-stigma in individuals who hear voices (Lebowitz, 2014). However, although reducing attributions of personal responsibility and control may be expected to diminish blame (an important component of stigma) it may also diminish the perception that an individual can achieve self-efficacy with respect to their voice-hearing experiences and any associated difficulties, leading to prognostic pessimism (another important component of stigma) which could inhibit helpful responses. Similarly, messages that lessen perceived controllability could elevate perceptions of unpredictability and dangerousness in a way that counteracts any benefit in decreasing blame. Stigma is a complex and multifaceted phenomenon, such that a given explanatory communication could have concurrently positive and negative effects on different aspects of stigma (Haslam and Kvaale, 2015). The clearest implication of this complexity is an obligation to be mindful of the explanations that we use and their various possible consequences (both intended and unintended) for shaping stigmatizing views and responses. We would expect



ACCEPTED MANUSCRIPT

that all explanatory frameworks have potential to be misconstrued or to promote unhelpful understandings (particularly when presented in simplified and reductive forms) suggesting a need for careful and nuanced communication (e.g., clarifying that individuals can be affected by factors outside of their control yet retain agency to effect changes and manage the impact of those factors) which may be difficult to achieve through traditional (broad and unidirectional) public health messaging.

Moreover, the large-scale experimental nature of the present study may obfuscate an important factor in determining how explanatory communications are received (particularly for people who are experts by experience): that is, the existing explanations that they draw upon. Although this study controlled for existing differences (through randomization) to examine aggregate-level effects over and above these differences, we would in practice want to know how offered explanations interact with extant explanations. With respect to voice-hearing, we know that voice-hearers draw on a multiplicity of explanatory frameworks for understanding their own experiences (Corstens et al., 2014); where these understandings are helpful, the imposition of other (perhaps contradictory) accounts could have invalidating and detrimental effects. Additional work is needed for us to understand how the impact of messaging may vary according to pre-existing explanations, and how different explanations can be helpfully integrated in practice (e.g., in clinical work with voice-hearers who have developed their own understandings of voice-hearing).

Further and more nuanced examination is required if we are to develop a fuller understanding of how accounts of 'mental health' can shape public, personal, and professional perspectives on these phenomena. Moreover, understanding of these accounts and their implications is insufficient: We need to consider the practical difficulties of implementing changes in our communications around 'mental health'. For example, explanations may differ both within and between services and professional groupings,

ACCEPTED MANUSCRIPT

making it difficult to develop consensus or consistency in communication (within clinical or public information contexts). Ultimately, broader implementation research will be needed to consider how efficacious messaging can be translated into effective practices.

**Declaration:** On behalf of all authors, the corresponding author states that there is no conflict of interest.

Accepted manuscript

- Abramson, L.Y., Seligman, M.E., Teasdale, J.D., 1978. Learned helplessness in humans: critique and reformulation. *Journal of Abnormal Psychology* 87 (1), 49.
- Ajzen, I., Madden, T.J., 1986. Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology* 22 (5), 453-474.
- American Psychiatric Association [APA], 2013. Diagnostic and statistical manual of mental disorders, (DSM-5). American Psychiatric Publications Inc.
- Angermeyer, M.C., Buyantugs, L., Kenzine, D., Matschinger, H., 2004. Effects of labelling on public attitudes towards people with schizophrenia: are there cultural differences? *Acta Psychiatrica Scandinavica* 109 (6), 420-425.
- Angermeyer, M.C., Dietrich, S., 2006. Public beliefs about and attitudes towards people with mental illness: a review of population studies. *Acta Psychiatrica Scandinavica* 113 (3), 163-179.
- Angermeyer, M.C., Holzinger, A., Carta, M.G., Schomerus, G., 2011. Biogenetic explanations and public acceptance of mental illness: systematic review of population studies. *The British Journal of Psychiatry* 199 (5), 367-372.
- Anthony, D., 2004. The cognitive neuropsychiatry of auditory verbal hallucinations: an overview. *Cognitive Neuropsychiatry* 9 (1-2), 107-123.
- Bannatyne, A.J., Abel, L.M., 2015. Can we fight stigma with science? The effect of aetiological framing on attitudes towards anorexia nervosa and the impact on volitional stigma. *Australian Journal of Psychology* 67 (1), 38-46.
- Beavan, V., Read, J., 2010. Hearing voices and listening to what they say: The importance of voice content in understanding and working with distressing voices. *The Journal of Nervous and Mental Disease* 198 (3), 201-205.

- Beavan, V., Read, J., Cartwright, C., 2011. The prevalence of voice-hearers in the general population: a literature review. *Journal of Mental Health* 20 (3), 281-292.
- Beck, A.T., Rush, A.J., Shaw, B.F., Emery, G., 1979. *Cognitive therapy of depression*. Guilford Press, UK.
- Bentall, R.P., 1990. The illusion of reality: a review and integration of psychological research on hallucinations. *Psychological Bulletin* 107 (1), 82.
- Birchwood, M., Gilbert, P., Gilbert, J., Trower, P., Meaden, A., Hay, J., Murray, E., Miles, J.N., 2004. Interpersonal and role-related schema influence the relationship with the dominant 'voice' in schizophrenia: a comparison of three models. *Psychological Medicine* 34 (08), 1571-1580.
- Brohan, E., Slade, M., Clement, S., Thornicroft, G., 2010. Experiences of mental illness stigma, prejudice and discrimination: a review of measures. *BMC Health Services Research* 10 (1), 80.
- Butzlaff, R.L., Hooley, J.M., 1998. Expressed emotion and psychiatric relapse: a meta-analysis. *Archives of General Psychiatry* 55 (6), 547-552.
- Chadwick, P., Birchwood, M., 1994. The omnipotence of voices. A cognitive approach to auditory hallucinations. *The British Journal of Psychiatry* 164 (2), 190-201.
- Corrigan, P.W., 2000. Mental health stigma as social attribution: Implications for research methods and attitude change. *Clinical Psychology: Science and Practice* 7 (1), 48-67.
- Corrigan, P.W., Bink, A.B., Fokuo, J.K., Schmidt, A., 2015. The public stigma of mental illness means a difference between you and me. *Psychiatry Research* 226 (1), 186-191.
- Corrigan, P.W., Markowitz, F.E., Watson, A., Rowan, D., Kubiak, M.A., 2003. An attribution model of public discrimination towards persons with mental illness. *Journal of Health and Social Behavior*, 162-179.

- ACCEPTED MANUSCRIPT
- Corrigan, P.W., Shapiro, J.R., 2010. Measuring the impact of programs that challenge the public stigma of mental illness. *Clinical Psychology Review* 30 (8), 907-922.
- Corstens, D., Longden, E., McCarthy-Jones, S., Waddingham, R., Thomas, N., 2014. Emerging perspectives from the Hearing Voices Movement: implications for research and practice. *Schizophrenia Bulletin* 40 (Suppl 4), S285-S294.
- Dietrich, S., Beck, M., Bujantugs, B., Kenzine, D., Matschinger, H., Angermeyer, M.C., 2004. The relationship between public causal beliefs and social distance toward mentally ill people. *Australian and New Zealand Journal of Psychiatry* 38 (5), 348-354.
- Field, A., 2013. *Discovering Statistics Using IBM SPSS Statistics*. SAGE, UK.
- Garety, P.A., 2003. The future of psychological therapies for psychosis. *World Psychiatry* 2 (3), 147.
- Goetz, J.L., Keltner, D., Simon-Thomas, E., 2010. Compassion: an evolutionary analysis and empirical review. *Psychological Bulletin* 136 (3), 351.
- Grist, R.M., Field, A.P., 2012. The mediating effect of cognitive development on children's worry elaboration. *Journal of Behavior Therapy and Experimental Psychiatry* 43 (2), 801-807.
- Haslam, N., Kvaale, E.P., 2015. Biogenetic Explanations of Mental Disorder: The Mixed-Blessings Model. *Current Directions in Psychological Science* 24 (5), 399-404.
- Hayward, M., Strauss, C., McCarthy-Jones, S., 2014. *Psychological approaches to understanding and treating auditory hallucinations: From theory to therapy*. Routledge, Hove.
- Imhoff, R., 2015. Zeroing in on the Effect of the Schizophrenia Label on Stigmatizing Attitudes: A Large-scale Study. *Schizophrenia Bulletin*.

- Johns, L.C., Nazroo, J.Y., Bebbington, P., Kuipers, E., 2002. Occurrence of hallucinatory experiences in a community sample and ethnic variations. *The British Journal of Psychiatry* 180 (2), 174-178.
- Jorm, A.F., Griffiths, K.M., 2008. The public's stigmatizing attitudes towards people with mental disorders: how important are biomedical conceptualizations? *Acta Psychiatrica Scandinavica* 118 (4), 315-321.
- Jorm, A.F., Reavley, N.J., Ross, A.M., 2012. Belief in the dangerousness of people with mental disorders: a review. *Australian and New Zealand Journal of Psychiatry* 46 (11), 1029-1045.
- Klare, G.R., 1974. Assessing readability. *Reading Research Quarterly* 10, 62-102.
- Kvaale, E.P., Haslam, N., Gottdiener, W.H., 2013. The 'side effects' of medicalization: A meta-analytic review of how biogenetic explanations affect stigma. *Clinical Psychology Review* 33 (6), 782-794.
- Lebowitz, M.S., 2014. Biological conceptualizations of mental disorders among affected individuals: A review of correlates and consequences. *Clinical Psychology: Science and Practice* 21 (1), 67-83.
- Lebowitz, M.S., Ahn, W., 2014. Combining biomedical accounts of mental disorders with treatability information to reduce mental illness stigma. *Psychiatric Services* 63 (5), 496-499.
- Leudar, I., Thomas, P., 2000. *Voices of reason. Voices of Insanity: Studies of verbal hallucinations*. Brunner-Routledge, London.
- Lincoln, T.M., Arens, E., Berger, C., Rief, W., 2008. Can antistigma campaigns be improved? A test of the impact of biogenetic vs psychosocial causal explanations on implicit and explicit attitudes to schizophrenia. *Schizophrenia Bulletin* 34 (5), 984-994.

ACCEPTED MANUSCRIPT  
Link, B.G., Cullen, F.T., Frank, J., Wozniak, J.F., 1987. The social rejection of former

mental patients: Understanding why labels matter. *American Journal of Sociology*, 1461-1500.

Link, B.G., Phelan, J.C., Bresnahan, M., Stueve, A., Pescosolido, B.A., 1999. Public conceptions of mental illness: labels, causes, dangerousness, and social distance. *American Journal of Public Health* 89 (9), 1328-1333.

Link, B.G., Yang, L.H., Phelan, J.C., Collins, P.Y., 2004. Measuring mental illness stigma. *Schizophrenia Bulletin* 30 (3), 511-541.

Magliano, L., Fiorillo, A., De Rosa, C., Malangone, C., Maj, M., 2004. Beliefs about schizophrenia in Italy: a comparative nationwide survey of the general public, mental health professionals, and patients' relatives. *Canadian Journal of Psychiatry* 49 (5), 322-330.

Martin, J.K., Pescosolido, B.A., Tuch, S.A., 2000. Of fear and loathing: the role of 'disturbing behavior' labels and causal attributions in shaping public attitudes toward people with mental illness. *Journal of Health and Social Behavior*, 208-223.

McCarthy-Jones, S., Waegeli, A., Watkins, J., 2013. Spirituality and hearing voices: considering the relation. *Psychosis* 5 (3), 247-258.

Morrison, A.P., Frame, L., Larkin, W., 2003. Relationships between trauma and psychosis: a review and integration. *British Journal of Clinical Psychology* 42 (4), 331-353.

Morrison, A.P., Haddock, G., 1997. Cognitive factors in source monitoring and auditory hallucinations. *Psychological Medicine* 27 (03), 669-679.

Moskowitz, A., Corstens, D., Kent, J., 2011. What can auditory hallucinations tell us about the dissociative nature of personality?, in: Sinason, V. (Ed.), *Trauma, Dissociation and Multiplicity: Working on Identity and Selves*. Routledge, London, UK, pp. 22-35.

- National Institute for Health and Care Excellence [NICE], 2010. Schizophrenia (updated), NICE Guidance/Clinical Guidelines.
- Pescosolido, B.A., Martin, J.K., Lang, A., Olafsdottir, S., 2008. Rethinking theoretical approaches to stigma: A framework integrating normative influences on stigma (FINIS). *Social Science and Medicine* 67 (3), 431-440.
- Preacher, K.J., Hayes, A.F., 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods* 40 (3), 879-891.
- Rao, H., Mahadevappa, H., Pillay, P., Sessay, M., Abraham, A., Luty, J., 2009. A study of stigmatized attitudes towards people with mental health problems among health professionals. *Journal of Psychiatric and Mental Health Nursing* 16 (3), 279-284.
- Read, J., 2007. Why promoting biological ideology increases prejudice against people labelled "schizophrenic". *Australian Psychologist* 42 (2), 118-128.
- Reber, A.S., Reber, E., 1995. *Dictionary of Psychology*, 2nd ed. Penguin, UK.
- Rudolph, U., Roesch, S., Greitemeyer, T., Weiner, B., 2004. A meta-analytic review of help giving and aggression from an attributional perspective: Contributions to a general theory of motivation. *Cognition and Emotion* 18 (6), 815-848.
- Schulze, B., Angermeyer, M.C., 2003. Subjective experiences of stigma. A focus group study of schizophrenic patients, their relatives and mental health professionals. *Social Science and Medicine* 56 (2), 299-312.
- Thomas, N., Hayward, M., Peters, E., van der Gaag, M., Bentall, R.P., Jenner, J., Strauss, C., Sommer, I.E., Johns, L.C., Varese, F., 2014. Psychological therapies for auditory hallucinations (voices): current status and key directions for future research. *Schizophrenia Bulletin* 40 (Suppl), S202-S212.
- Thomas, P., Leudar, I., 1996. Verbal hallucinations or hearing voices: What does the experience signify? *Journal of Mental Health* 5 (3), 215-218.



- Tien, A.Y., 1991. Distribution of hallucinations in the population. *Social Psychiatry and Psychiatric Epidemiology* 26 (6), 287-292.
- Waters, F., Allen, P., Aleman, A., Fernyhough, C., Woodward, T.S., Badcock, J.C., Barkus, E., Johns, L., Varese, F., Menon, M., 2012. Auditory hallucinations in schizophrenia and nonschizophrenia populations: a review and integrated model of cognitive mechanisms. *Schizophrenia Bulletin* 38 (4), 683-693.
- Weiner, B., 1979. A theory of motivation for some classroom experiences. *Journal of Educational Psychology* 71 (1), 3.
- Weiner, B., 1980. A cognitive (attribution)-emotion-action model of motivated behavior: An analysis of judgments of help-giving. *Journal of Personality and Social Psychology* 39 (2), 186.
- Weiner, B., 1985. An attributional theory of achievement motivation and emotion. *Psychological Review* 92 (4), 548.
- Weiner, B., 1995. Judgements of responsibility: A foundation for a theory of social conduct. Guilford Press, USA.
- Weiner, B., Graham, S., Chandler, C., 1982. Pity, Anger, and Guilt: An Attributional Analysis. *Personality and Social Psychology Bulletin* 8 (2), 226-232.
- Weiner, B., Nierenberg, R., Goldstein, M., 1976. Social learning (locus of control) versus attributional (causal stability) interpretations of expectancy of success. *Journal of Personality* 44 (1), 52-68.
- Zubin, J., Spring, B., 1977. Vulnerability: a new view of schizophrenia. *Journal of Abnormal Psychology* 86 (2), 103.

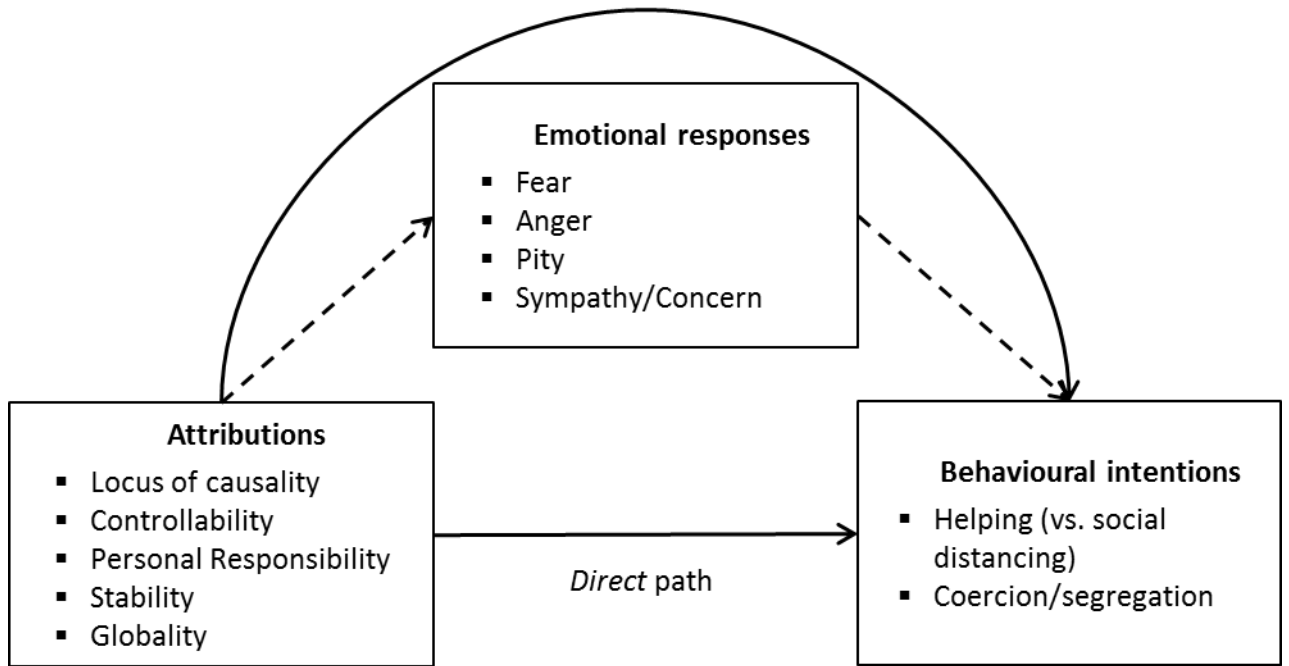
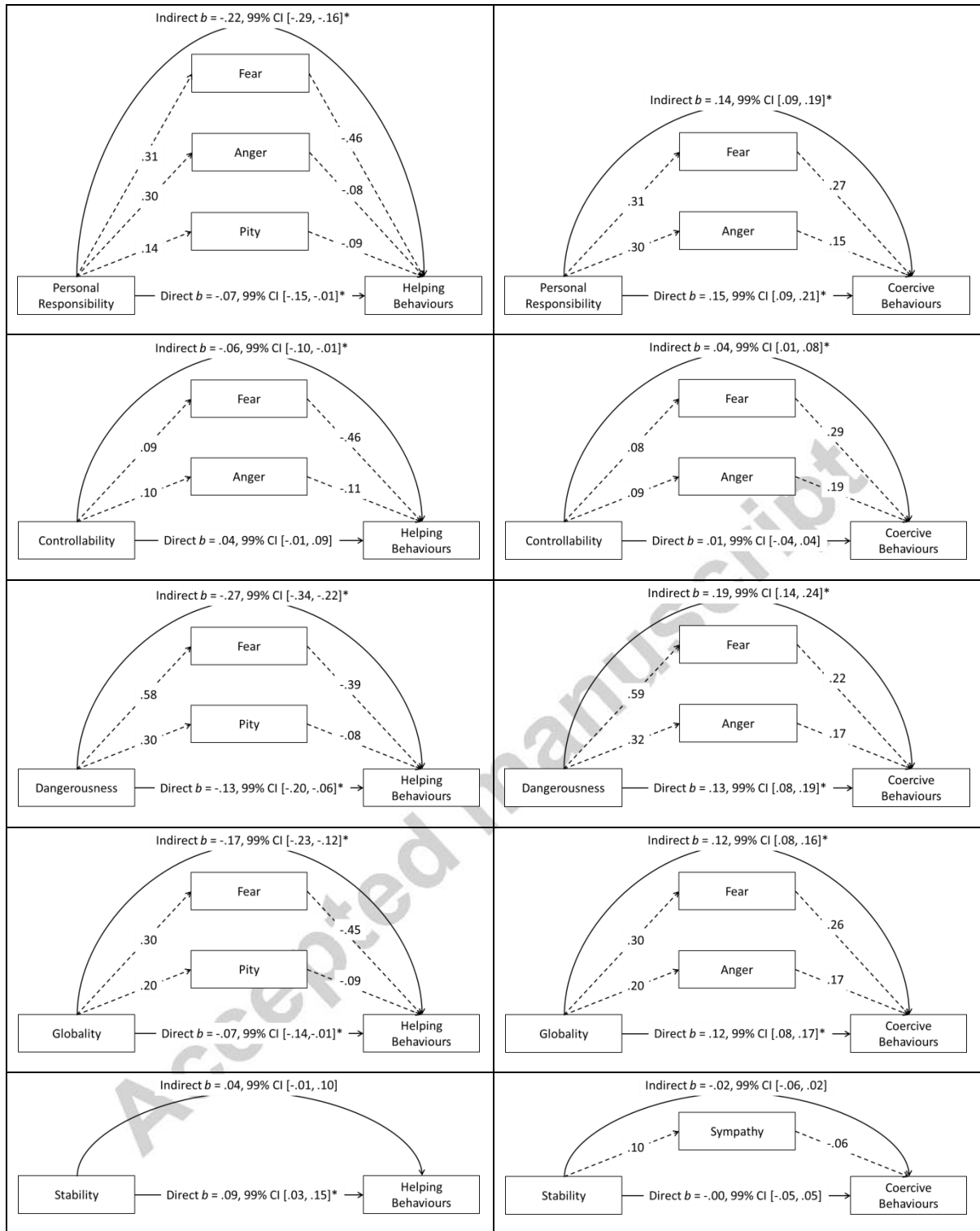


Figure 1. Overview of the attribution model (based on pathways outlined by Corrigan, 2000)



Note. \*significant pathway at  $p < .05$

Figure 2. Mediation models depicting pathways between attributions and behavioural intentions.

Table 1a

Descriptive statistics and between-condition comparisons for Internal Locus of Causality attributions

Internal Locus of Causality	Condition	Mean	(SD)	Significant	
				Differences between Conditions	Effect Size ( <i>d</i> )
Own Character	Control	2.10	(1.99)	Control > Biological	0.30*
	Biological	1.53	(1.81)	Cognitive > Biological	0.40**
	Cognitive	2.31	(2.07)	Stress > Biological	0.41**
	Stress	2.35	(2.19)		
	Spiritual	2.02	(2.15)		
Chemical Imbalance	Control	4.85	(2.04)	Control > Cognitive	0.30*
	Biological	5.56	(2.16)	Biological > Cognitive	0.63**
	Cognitive	4.23	(2.06)	Biological > Stress	0.58**
	Stress	4.26	(2.37)	Biological > Spiritual	0.50**
	Spiritual	4.47	(2.19)	Biological > Control	0.34*
Genetic	Control	3.48	(2.12)	Biological > Cognitive	0.66**
	Biological	4.72	(2.12)	Biological > Stress	0.60**
	Cognitive	3.37	(1.98)	Biological > Spiritual	0.49**
	Stress	3.49	(2.01)	Biological > Control	0.59**
	Spiritual	3.70	(2.10)		

Accepted manuscript

Descriptive statistics and between-condition comparisons for External Locus of Causality attributions

External Locus of Causality	Condition	Mean	(SD)	Significant	
				Differences between Conditions	Effect Size ( <i>d</i> )
Upbringing	Control	2.61	(2.13)	Control > Biological	0.27*
	Biological	2.04	(2.10)		
	Cognitive	2.70	(2.07)	Stress > Biological	0.42**
	Stress	2.93	(2.17)		
	Spiritual	2.51	(2.05)		
Stressful Life Experiences	Control	4.68	(1.84)	Stress > Control	0.44*
	Biological	4.24	(2.03)	Cognitive > Biological	0.38*
	Cognitive	4.97	(1.78)	Cognitive > Spiritual	0.30*
	Stress	5.44	(1.67)	Stress > Biological	0.64**
	Spiritual	4.42	(1.91)	Stress > Spiritual	0.57**
God's Will	Control	0.37	(1.32)	Spiritual > Cognitive	0.31*
	Biological	0.44	(1.36)	Spiritual > Stress	0.29*
	Cognitive	0.24	(0.87)		
	Stress	0.25	(1.05)		
	Spiritual	0.63	(1.55)		

Accepted manuscript

Table 2

Mean (SD) scores for attributions, emotions, and behavioral responses within each explanatory condition

	Explanatory Condition				
	Control ( <i>n</i> =187)	Biological ( <i>n</i> =216)	Cognitive ( <i>n</i> =199)	Stress ( <i>n</i> =192)	Spiritual ( <i>n</i> =210)
<b>Attributions</b>					
Personal Responsibility	1.25 (1.64)	.78 (1.17)	1.40 (1.69)	1.14 (1.70)	1.12 (1.63)
Controllability	2.81 (2.33)	3.24 (2.27)	3.50 (2.21)	3.42 (2.23)	3.02 (2.16)
Dangerousness	2.33 (2.15)	2.42 (1.92)	2.24 (1.97)	2.23 (2.05)	2.16 (1.86)
Globality	2.15 (2.09)	2.57 (2.12)	2.27 (1.85)	2.11 (1.89)	2.57 (2.14)
Stability	4.49 (1.91)	4.05 (2.13)	4.58 (1.93)	4.64 (1.85)	4.59 (1.96)
<b>Emotions</b>					
Fear	2.25 (1.99)	1.77 (1.99)	1.80 (1.87)	1.81 (1.96)	2.00 (2.03)
Anger	1.25 (1.57)	1.20 (1.53)	1.23 (1.43)	1.23 (1.52)	1.18 (1.44)
Pity	3.30 (2.46)	3.35 (2.41)	3.16 (2.36)	3.10 (2.38)	3.02 (2.36)
Sympathy	5.64 (1.77)	5.64 (1.81)	5.39 (1.85)	5.57 (1.84)	5.40 (1.90)
<b>Behavioral Intentions</b>					
Helping	5.24 (1.92)	5.70 (1.76)	5.48 (1.68)	5.44 (1.92)	5.44 (1.74)
Coercive	1.07 (1.54)	.97 (1.41)	0.92 (1.30)	0.90 (1.37)	0.96 (1.26)
Behavioral Outcome	0.27 (0.45)	0.32 (0.47)	0.33 (0.47)	0.31 (0.46)	0.28 (0.45)

*Note.* Attributions, emotions, and behavioral intentions were scored 0-8 with higher scores indicating greater endorsement. The *Behavioral Outcome* measure was dichotomous, scored as 0 = refusal to be contacted by a voice-hearer and 1 = providing consent to be contacted.



- Vignettes successfully primed differential understandings of voice-hearing etiology
- Cognitive (relative to biological) explanations of voice-hearing augmented blame
- Perceived dangerousness increased negative intentions towards voice-hearers
- Reported behavioral intentions were associated with our behavioral outcome measure

Accepted manuscript