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Disentangling compliance with command hallucinations: Heterogeneity of voice intents and their clinical correlates

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ABSTRACT

Background: Earlier studies suggested that perceptions of voice intents (benevolence, malevolence) are associated with different psychological and behavioral responses including compliance with command hallucinations (CH). However, to our knowledge, no studies have examined the clinical differences between subgroups of clients with different perceptions of the intents of their CH. In order to better understand the risk for compliance with CH, our objectives were 1) to compare sociodemographic and clinical profiles of subgroups of clients (based on perceptions of CH intents); and 2) to investigate their specific associated risk factors for compliance with CH.
Method: We analyzed the MacArthur Violence Risk Assessment Study, focusing on 181 participants with psychosis reporting CH. Group comparisons and within-group ordinal logistic regression analyses were performed using sociodemographic and clinical measures such as the BPRS, BIS-11 and NAS-PI.
Results: Of the 181 participants, 102 (56.4%) reported having only malevolent voices, 14 (7.7%) rated them as benevolent only, 58 (32.03%) as benevolent and malevolent, and only 7 (3.86%) as neutral only. Results showed that individuals with malevolent voices had more emotional disturbance while those with benevolent CH had more severe positive psychotic symptoms and were more certain that they would comply in the future. Moreover, childhood physical abuse, belief about having to obey as well as psychotic symptoms significantly predict compliance with malevolent CH in a multivariate model.
Conclusions: Our results suggest that researchers and clinicians should consider perceptions of voice intents when both assessing risk of compliance with CH and developing relevant intervention targets.

1. Introduction

Command hallucinations (CH) are a subtype of auditory verbal hallucinations (AVH) characterized by voice commanding content, ranging from innocuous orders to harmful commands (Byrne et al., 2007). Although rates of CH may vary across samples, approximately 50% (median proportion) of individuals with AVH report experiencing CH (Shawyer et al., 2003). This phenomenon is often described as one of the most distressing psychotic symptoms (Byrne et al., 2007), and may result in behavioral compliance. Three main types of CH emerge from literature: 1) innocuous commands (unrelated to harm content); 2) self-harm CH (SHCH), including self-harm commands (i.e., self-enucleation) and suicide orders (i.e. commit suicide, instructions regarding method); and 3) harm-to-others CH (HOCH; i.e. homicide, stabbing, sexual assault). Although half of clients who hear CHs report experiencing harmful commands (Shawyer et al., 2003), it is estimated that one in three of these individuals have a history of complying with harmful CH (Shawyer et al., 2003). More precisely, rates of compliance with harmful CHs are reported as 15 to 91.7% for compliance with HOCHs (Barrowcliff and Haddock, 2010; Fox et al., 2004; Kasper et al., 1996) and 18 to 66.7% for compliance with SHCH (Barrowcliff and Haddock, 2010; Dugré et al., 2018; Fox et al., 2004; Harkavy-Friedman et al., 2003; Kasper et al., 1996). Therefore, there is a substantial research and clinical (i.e. assessment and treatment) need for improving our understanding of compliance with CH that may result in violent behaviors (Dugré et al., 2018; West, 2018).

In the past thirty years of research on this subject, researchers have attempted to understand the underlying process of compliance with CH. The cognitive model of AVH (Birchwood and Chadwick, 1997) hypothesizes that compliance may result from a vicious cycle of specific beliefs about voices and emotional responses to these beliefs. In fact, earlier results suggest that the core features of compliance may

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include beliefs about voices (voice intents and omnipotence) rather than the voice content itself (Barrowcliff and Haddock, 2006; Braham et al., 2004; Chadwick and Birchwood, 1994, 1995). Therefore, a large range of beliefs about voices has been found to be associated with greater risk of compliance with CH: beliefs about the voice's intent (e.g. malevolence or benevolence), beliefs about the voice's omnipotence (all-powerful), believing that one must comply, believing that one will comply, and perception that one has a lower social rank compared to the voices (Barrowcliff and Haddock, 2010; Barrowcliff and Haddock, 2006; Beck-Sander et al., 1997; Bjørkly, 2002; Braham et al., 2004; Byrne et al., 2007; Dugré et al., 2018; Reynolds and Scragg, 2010). Therefore, it is not surprising to observe that delusional beliefs, and more precisely congruent delusions (with hallucinations), play a crucial role in understanding compliance with CH (Junginger, 1990, 1995; Shawyer et al., 2008).

Recent findings suggest that appraisals of voice intents (e.g. malevolence and benevolence) are determinants of emotions and behaviors associated with AVHs (Peters et al., 2012). Whereas perception of threatening AVHs is, in general, associated with negative schemas about self and negative emotions (e.g. anxious-depressive mood; Thomas et al., 2015), benevolence of AVHs was found to be related to positive schemas about the self and positive emotions in individuals with schizophrenia (Thomas et al., 2015). Moreover, earlier results suggest that perception of voice benevolence correlates positively with more severe positive psychotic symptoms (Zanello and Badan Bâ, 2016), more frequent engagement with voices (Andrew et al., 2008; Peters et al., 2012; Zanello and Badan Bâ, 2016), a stronger desire to keep their voices (Rutten et al., 2007), alterations of social functioning (i.e. communication), a lack of concern about the need for treatment (Favrod et al., 2004; Morrison and Renton, 2001). Furthermore, although general observation suggest that perceiving the voice as benevolent may increase the risk for compliance with CH (Beck-Sander et al., 1997), one study has proposed that pathways to compliance with CH seem to differ whether the voice is perceived as benevolent or malevolent (Shawyer et al., 2008). In fact, by performing group differences, as secondary analyses, between compliers with and without malevolent voices, the authors observed that clients with benevolent voices had higher levels of trait anger and were more likely to report a history of violence (Shawyer et al., 2008).

Investigating the heterogeneity of voice intents, as well as their clinical correlates, is crucial for research on AVHs (including CHs) since there is a growing body of literature suggesting that beliefs about voice intents (e.g. malevolence and benevolence) are associated with specific psychopathological factors and emotional reactions (Thomas et al., 2015). Therefore, past research on AVHs suggests that: 1) distinct voice intents may indicate a specific underlying process of compliance with CH (Shawyer et al., 2008); and 2) earlier results on the relationship between CH and compliance might be biased due to the heterogeneity of perceptions of voice intents within individuals with CHs. Interestingly, no study has specifically investigated clinical correlates of clients with different perceptions of CH intents. In order to overcome the important lack of understanding of the clinical presentation of subgroups of clients with different perception of the voice intents as well as the risk factors for compliance with CHs for these subgroups, the current study aimed to: 1) compare individuals who perceived their CH as malevolent, benevolent, neutral or both simultaneously on demographic, clinical and voice-related characteristics; and 2) investigate risk factors for compliance with CHs within each voice-intents group.

To our knowledge, the current study is the first to specifically aimed to describe clinical presentation of individuals with different CH intents as well as their specific risk factors for compliance with CH. Based on earlier researches on AVHs (including CHs) we hypothesized that clients who perceive their voices as benevolent would be characterized by more severe positive psychotic symptoms as well as higher trait anger, while those perceiving their voices as malevolent would show higher emotional distress. Moreover, we also hypothesized that belief about having to obey would be positively associated with compliance with CH in subgroup of participants who perceive their voices as malevolent, while trait anger would be associated with compliance in subgroup of clients with benevolent voices.

2. Methods

2.1. Procedure

This study analyzed data from the MacArthur Violence Risk Assessment Study (MVRAS) database. Briefly, the MVRAS collected data from 1136 psychiatric inpatients in three civil psychiatric hospitals. A more detailed description of the protocol may be found elsewhere (Appelbaum et al., 2000; Monahan et al., 2001; Steadman et al., 1998). Inclusion criteria in our study were: (a) having a diagnosis of a DSM-IV psychotic or affective disorder with psychotic features; and (b) having CH more than one time during the last two months. A total of 199 people met these criteria. Exclusion criteria were: (a) experiencing CH only when using substances; and (b) having a primary diagnosis of an organic impairment or a substance use disorder alone. Twelve individuals were excluded due to having a diagnosis of a substance use disorder alone, and 6 who experienced CH only when using substances. The final sample included 184 individuals with CH, 102 of whom perceived their voices as malevolent (16 of whom also reported neutral voice intent), 14 perceived their voices as benevolent (6 of whom also reported neutral voice intent), and 58 rated their voices as both malevolent and benevolent (30 of whom also reported neutral voice intent). Seven participants perceived their voices as only neutral.

2.2. Measures

Following the cognitive model of AVH (Birchwood and Chadwick, 1997), we used measures related to beliefs about voices and emotions, as well as additional characteristics that may influence the risk for compliance with CHs such as psychotic symptoms, sociodemographic characteristics, and history of CPA. The present study used the same subset of MVRAS measures as some past studies, so more details of relevant questionnaires may be found in those manuscripts (Dugré et al., 2018; Monahan et al., 2001). Sociodemographic characteristics such as age, years since first AVHs, age at first hospitalization, ethnicity, sex, and socioeconomic status index (Hollinshead and Redlich, 1958) were assessed in the current study. The DSM-III-R Checklist (Hudziak et al., 1993) was used to assess psychiatric diagnoses such as psychotic and affective disorders with psychotic features as well as current and lifetime substance use disorders (Categorical). The Auditory Hallucinations Schedule (Appelbaum et al., 2000) captures CH domains such as beliefs about voices: general perception of voice intents (categorical: negative, neutral, and/or positive), beliefs about having to obey the voice (dichotomous), belief about obeying CH in the future (Ordinal: no, unsure, certain), but also types of CHs (categorical: innocuous, HOCH, SHCH), frequency of lifetime history of compliance with CH (Ordinal: Never, 1 to 5 times and >5 times), and coping strategies with AVHs (dichotomous). The Brief Psychiatric Rating Scale (BPRS-18; Overall, 1974) is a clinician-rated measure of psychopathology severity over the previous 2–3 days before assessment (i.e., rated on 7-point scale ranging from 1 = not present to 7 = extremely severe). In the current study, we used positive symptoms subscale (i.e. hallucinatory behavior, unusual thought content, grandiosity, and conceptual disorganization; Cronbach's alpha of 0.61), negative symptoms (i.e. flat affect, emotional withdrawal, and motor retardation; Cronbach's alpha of 0.76) and emotional distress (i.e. guilt feelings, anxiety, and depressive mood items; Cronbach's alpha of 0.68). The study also

included the total score of Part A (i.e. cognitive, arousal and behavioral responses to anger; Cronbach's alpha of 0.94) and Part B (i.e. situations provoking anger; Cronbach's alpha of 0.91) of the self-report Novaco Anger Scale (NAS; Novaco, 1994). We also included the total score of the self-report Barratt Impulsiveness Scale (BIS-11; Patton et al., 1995; Cronbach's alpha of 0.72); and the Questionnaire about Childhood Experiences (Monahan et al., 2001), which includes severity (Ordinal: None, Without Injuries, With Injuries) and frequency (Ordinal: Never to Frequently) of childhood abuse (Dugré et al., 2018). More detailed about these measures and their psychometric properties are provided elsewhere (Monahan et al., 2001).

2.3. Statistical analyses

Analyses first investigated more broadly whether participants differed on demographic, clinical, and voice-related variables depending on their perceptions of voice intents. This was performed using Kruskal-Wallis test, since assumptions were violated (i.e., normality and equality of variance) and because of the unequal sample sizes between groups. Thus, pairwise post-hoc tests were performed with Mann-Whitney tests. Categorical variables were analyzed using Chi-square tests. Third, we tested the relationship between each variables and history of compliance with CH using univariate ordinal logistic regression (i.e. unadjusted for other covariates). Multivariate ordinal logistic regression analyses were then performed including factors with a p-value of $p < 0.100$ in univariate regression analyses. Finally, we examined the classification accuracy of multivariate models using area under the curve (AUC) of the receiver operating characteristic curve (ROC curve). Variables included in the models showed low levels of multicollinearity (VIF < 2.00). All statistical analyses were performed using SPSS for Windows version 24.

3. Results

3.1. Sample characteristics

In the current study, the total sample (n = 181) included 95 men (52.5%) and had a mean age of 30.1 (SD = 6.20). On average, participants heard their first AVHs 9 years ago. Ninety-four individuals of the total sample (52%) had a primary diagnosis of an affective disorder (in contrast to 48% having schizophrenia as primary diagnosis), including 81 participants (86.17%) with a major depressive disorder and 13 (13.83%) with bipolar disorder. Moreover, approximately 55% of the total sample was White (See Table 2). In the total sample (n = 181), 102 (56.4%) participants reported having only malevolent voices, 14 (7.7%) rated them as benevolent only, 58 (32.03%) as benevolent and malevolent, and only 7 (3.86%) as neutral only. As presented in Table 1, lifetime history of compliance was approximately 57.1% (4/7) for those with neutral voices; 81% (82/101) for those with malevolent voices; 78.6% (11/14) for those with benevolent voices and 81.03% (47/58) with BM voices. Moreover, participants in these three subgroups reported having complied with diverse commands subtypes, independently of the dangerousness of the content (i.e. innocuous, harm to others, and self-harm). In fact, as described in earlier case reports, voices advancing harmful commands such as SHCH or HOCH are not always perceived as malevolent, but can be considered as benevolent (e.g. *God, who is perceived as benevolent because he wants to help but tell to commit suicide/self-harming behaviors and/or to kill others to have access to heaven/to go to a better place/to save patient's soul since they have sinned*; Castro et al., 2017; Chadwick and Birchwood, 1994; Chebbi et al., 2018; Jones, 1990). Individuals who were unable to identify their CH subtype were kept in further analyses, principally because they were infrequent (<5%) and therefore unlikely to impact findings, and because the aim of this study is to examine correlates of compliance across CH subtypes.

Table 1
Subtypes of CH by time = frame period across groups based on their perception of voice intent (n = 180).

Compliance' time-frame period	Subtypes				Total
	Innocuous	HOCH	SHCH	Don't know	
Neutral group (n = 7)					
Never complied[a]	2	1	0	0	3
>Last 2 months	2	0	0	0	2
<Last 2 months[b]	0	0	0	0	0
Last week	0	0	1	1	2
Total	4	1	1	1	7
Malevolent group (n = 101)[c]					
Never complied[a]	0	8	11	0	19
>Last 2 months	4	5	16	2	27
<Last 2 months[b]	0	4	13	1	18
Last week	5	5	25	2	37
Total	9	22	65	5	101
Benevolent group (n = 14)					
Never complied	3	0	0	0	3
>Last 2 months	1	0	0	0	1
<Last 2 months[b]	4	0	1	0	5
Last week	4	0	1	0	5
Total	12	0	2	0	14
Both BM (n = 58)					
Never complied	5	3	3	0	11
>Last 2 months	3	1	4	2	10
<Last 2 months[b]	3	3	5	1	12
Last week	13	1	7	4	25
Total	24	8	19	7	58

[a] Lifetime more severe command type.
[b] Last 2 months refers to compliance within the last 2 months, excluding the last week.
[c] 1 participant was missing due to missing information on the time of last compliance SHCH = Self-harm command hallucinations; HOCH = Harm-to-Others command hallucinations. Both BM = Both Benevolent and Malevolent voice intents group.

3.2. Subgroup comparisons: voice content and clinical presentation

Group comparisons of sociodemographic and clinical variables revealed that age of participants significantly differed between the three groups (see Table 2), such that participants in the benevolent group were older than those in the malevolent group (U = 432.0, p = 0.017). The three groups also significantly differed regarding primary diagnosis, with schizophrenia being more prevalent in the benevolent and the benevolent-malevolent groups than the malevolent ($X^2 = 7.14$, p = 0.008; & $X^2 = 17.8$, p < 0.001, respectively). Group comparisons also revealed that the three groups differed in severity of positive psychotic symptoms ($X^2(2) = 39.08$, p < 0.001). More specifically, post-hoc analyses suggests that the benevolent group and the benevolent-malevolent group had significantly higher severity scores on conceptual disorganization (U = 172.0, p < 0.001; & U = 2310.0, p = 0.011, respectively), grandiosity (U = 318.5; p < 0.001; & U = 1979.5, p < 0.001, respectively) and unusual thought content (U = 236.5, p < 0.001 & U = 1706.0, p < 0.001, respectively) than the malevolent group. Benevolent group also had significantly higher scores on conceptual disorganization than the BM group (U = 209.0; p = 0.003). No difference was observed between groups on severity of hallucinatory behavior, assessed by the BPRS. Moreover, the malevolent group reported significantly higher emotional distress (U = 398.5; p = 0.007) and anger reactivity (U = 435.5; 0.018) than did the benevolent group. No other difference was observed between groups. Concerning voice-related characteristics, although the three groups did not differ in lifetime history of compliance with CH ($X^2 = 6.47$, d.f. = 3, p = 0.167), the did differ in the utilization of coping strategies ($X^2 = 9.4$, d.f. = 2, p = 0.009), in certainty that they would obey in the future ($X^2 = 20.54$, d.f. = 3, p < 0.001), and in certainty that they must obey the voice ($X^2 = 6.84$, d.f. = 2, p = 0.033). Post-hoc analyses revealed that participants with

Table 2
Sociodemographic differences between groups (n = 181).

Characteristics	Total sample (n = 181)	Neutral group (n = 7)	Malevolent group (n = 102)	Benevolent Group (n = 14)	Both BM Group (n = 58)	Statistics		Posthoc comparisons (p-Value)
						X^2	p-Value	
Years since 1st AVHs	9.3 (9.4)	8.43 (9.7)	7.92 (8.8)	10.0 (10.6)	11.4 (9.7)	0.05	0.830	–
Age at 1st hosp.	21.7 (7.3)	18.7 (8.26)	22.1 (7.2)	21.3 (8.78)	21.3 (6.91)	0.242	0.623	–
Age	30.1 (6.2)	27.1 (6.8)	29.3 (6.1)	33.5 (5.85)	30.9 (6.06)	5.73	**0.017**	B > M*
Sex (male, %)	95 (52.5%)	4 (57.1%)	52 (51.0%)	10 (71.4%)	29 (50%)	2.25	0.325	–
Ethnicity (White, %)	100 (55.2%)	4 (57.1%)	60 (58.8%)	9 (64.3%)	27 (46.6)	2.76	0.251	–
ISES[a]	66.1 (11.9)	66.14 (12.0)	64.9 (11.7)	68.07 (9.69)	67.7 (12.57)	0.369	0.543	–

Analysis were restricted to only the malevolent, benevolent and both BM groups due to the small sample size of the Neutral Group (n = 7). Both BM-Group = Both Benevolent and Malevolent voice intents group. Values reported categorical variables are frequency (and percentage %) and values reported for continuous variables are mean (and standard deviation). Post hoc comparisons were performed using Mann-Whitney *U* tests. **Bolded values represent statistically significant results (p < 0.05).**

[a] Socioeconomic status index (ISES) (see Hollingshead & Redlich, 1958).

* p > 0.05.

benevolent voices more frequently denied using coping strategies to manage voices ($X^2 = 9.40$, $p = 0.002$; & $X^2 = 5.98$, $p = 0.014$, respectively) and were more certain that they would obey in the future ($X^2 = 18.65$; $p < 0.001$; & $X^2 = 10.69$, $p = 0.005$), than the malevolent and the BM groups. Perception about having to comply was significantly more prevalent in the malevolent and benevolent (marginally significant) groups than in the BM group ($X^2 = 5.73$, $p = 0.017$; & $X^2 = 3.68$, $p = 0.055$, respectively), but did not differ from each other (see Tables 3 and 4).

3.3. Risk factors for compliance with CH within groups

In order to evaluate risk factors for frequency of lifetime history of compliance (i.e., never, few times, multiple times), within groups ordinal logistic regressions were performed. Within the benevolent group, the univariate ordinal logistic regression revealed that no factors were significantly associated with frequency of lifetime history of compliance. For the BM group, the univariate logistic regression revealed that years since first AVHs (OR = 1.09, 95% CI: 1.02–1.18, p = 0.014) and conviction to obey in the future (OR = 2.82, 95% CI:

Table 3
Group differences on clinical characteristics (n = 181).

Characteristics	Total sample (n = 181)	Neutral Group (n = 7)	Malevolent group (n = 102)	Benevolent Group (n = 14)	Both BM Group (n = 58)	Statistics		Posthoc comparisons (p-Value)
						X2	p-Value	
Schizophrenia (%)	87 (48.1%)	2 (28.6%)	35 (34.3%)	10 (71.4%)	40 (69.0%)	**20.88**	**<0.001**	B > M**; BM > M***
Lifetime SUDs (%)	141 (78.3%)	4 (57.1%)	80 (79.2%)	10 (71.4%)	47 (81.0%)	0.632	0.729	–
Current SUDs (%)	88 (48.6%)	4 (57.1%)	46 (45.1%)	5 (35.7%)	33 (56.9%)	3.02	0.221	–
BPRS								
Positive Sx	11.9 (4.8)	11.6 (5.6)	9.9 (3.8)	16.6 (4.7)	14.1 (4.7)	**19.75**	**<0.001**	B > M***; BM > M***
Concept. dis.	1.9 (1.1)	2.0 (1.0)	1.5 (0.7)	3.1 (1.0)	2.1 (1.3)	**25.77**	**<0.001**	B > M & BM***; BM > M*
Grandiosity	2.0 (1.8)	2.6 (1.9)	1.4 (1.1)	3.6 (2.3)	2.7 (2.1)	**24.94**	**<0.001**	B > M***; BM > M***
Hallucin. behav.	4.6 (1.7)	3.6 (0.9)	4.5 (1.9)	4.6 (1.5)	4.9 (1.6)	0.01	0.993	–
Unus. thought.	3.4 (2.2)	3.4 (2.3)	2.6 (2.0)	5.2 (1.6)	4.3 (2.1)	**17.94**	**<0.001**	B > M***; BM > M***
Negative Sx	6.9 (3.5)	5.7 (2.9)	7.3 (3.8)	7.4 (2.9)	6.3 (2.9)	0.225	0.635	–
Emo. distress	13.3 (5.8)	12.1 (5.7)	14.0 (5.6)	9.8 (4.4)	12.9 (6.2)	**7.17**	**0.007**	M > B**
BIS-11 Total	72.1 (10.4)	71.6 (12.2)	69.9 (10.2)	76.1 (12.0)	74.9 (9.5)	3.75	0.053	–
NAS-PI								
Part A	100.5 (16.6)	97.4 (10.7)	101.7 (18.6)	97.6 (8.6)	99.5 (15.0)	0.878	0.349	–
Part B	72.79 (14.1)	63.3 (15.4)	75.2 (14.1)	65.7 (12.4)	71.5 (13.5)	**5.56**	**0.018**	M > B*
CPA-severity								
None	34 (19.0%)	2 (28.6%)	20 (20.0%)	4 (28.6%)	8 (13.8%)	2.3	0.681	–
W/O injuries	98 (54.7%)	3 (42.9%)	54 (54.0%)	6 (42.9%)	35 (60.3%)			
W/injuries	47 (26.3%)	2 (28.6%)	26 (26.0%)	4 (28.6%)	15 (25.9%)			
CPA-frequency								
Never	34 (19.0%)	2 (28.6%)	20 (20.0%)	4 (28.6%)	8 (13.8%)	3.79	0.706	–
Once/twice	74 (41.3%)	3 (42.9%)	39 (39.0%)	4 (28.6%)	28 (48.3%)			
Sometimes	38 (21.2%)	0 (0%)	21 (21.0%)	4 (28.6%)	13 (22.4%)			
Frequently	33 (18.4%)	2 (28.6%)	20 (20.0%)	2 (14.3%)	9 (15.5%)			

Analysis were restricted to only the malevolent, benevolent and both BM groups due to the small sample size of the Neutral Group (n = 7). Both BM-Group = Both Benevolent and Malevolent voice intents group. Values reported categorical variables are frequency (and percentage %) and values reported for continuous variables are mean (and standard deviation). Post hoc comparisons were performed using Mann-Whitney U tests. **Bolded values represent statistically significant results (p < 0.05).**

* p > 0.05.

** p > 0.01.

*** p > 0.001.

Table 4
Group differences on voices-related characteristics (n = 181).

Characteristics	Total sample (n = 181)	Neutral group (n = 7)	Malevolent group (n = 102)	Benevolent group (n = 14)	Both BM group (n = 58)	Statistics		Posthoc comparisons (p-Value)
						X2	p-Value	
Coping strategy (yes)	126 (69.6%)	3 (42.9%)	77 (75.5%)	5 (35.7%)	41 (70.7%)	**9.4**	**0.009**	M > B**; BM > B*
Obey in the future								
No	49 (27.1%)	2 (28.6%)	27 (26.5%)	1 (7.1%)	19 (32.8%)	**20.54**	**<0.001**	B > M***; B > BM**
Unsure	78 (43.1%)	3 (42.9%)	52 (51.0%)	2 (14.3%)	21 (36.2%)			
Yes	54 (29.8%)	2 (28.6%)	23 (22.5%)	11 (78.6%)	18 (31.0%)			
History of compliance								
Never	36 (20.0%)	3 (42.9%)	19 (18.8%)	3 (21.4%)	11 (19.0%)	6.47	0.167	–
1 to 5 times	44 (24.4%)	1 (14.3%)	32 (31.7%)	2 (14.3%)	9 (15.5%)			
>5 times	100 (55.6%)	3 (42.9%)	50 (49.5%)	9 (64.3%)	38 (65.5%)			
Have to obey (yes, %)	76 (42.9%)	2 (28.6%)	49 (49.5%)	8 (57.1%)	17 (29.8%)	**6.84**	**<0.033**	B > M^T; M > BM*

Note. Analysis were restricted to only the malevolent, benevolent and both BM groups due to the small sample size of the Neutral Group (n = 7). Both BM-Group = Both Benevolent and Malevolent voice intents group. Values reported categorical variables are frequency (and percentage %) and values reported for continuous variables are mean (and standard deviation). Post hoc comparisons were performed using Mann-Whitney U tests. **Bolded values represent statistically significant results (p < 0.05).**
T = Trend (between p = 0.051 and 0.070).
* p > 0.05.
** p > 0.01.
*** p > 0.001

1.32–6.05, p = 0.007) significantly predicted frequency of lifetime history of compliance. However, in multivariate model, including covariates such as negative symptoms as well as perception of having to obey the voice (i.e. which were p < 0.100 in univariate analyses), none of these factors remained statistically significant.

Finally, within the malevolent group, age (OR = 1.07, 95% CI: 1.00–1.13, p = 0.044), years since first AVHs (OR = 1.08, 95% CI: 1.03–1.14, p = 0.003), severity of unusual thought content (OR = 1.37, 95% CI: 1.12–1.69, p = 0.003) and conceptual disorganization (OR = 2.10, 95% CI: 1.17–3.74, p = 0.012), frequency of childhood abuse (OR = 1.47, 95% CI: 1.01–2.13, p = 0.045), conviction of having to obey (OR = 1.84, 95% CI: 1.07–3.19, p = 0.028) and beliefs about compliance in the future (OR = 1.35, 95% CI: 1.04–1.74, p = 0.022), were all statistically significant and then entered in a multivariate model (See Supplementary Table for complete univariate ordinal logistic regression results). The multivariate model of the malevolent group revealed that frequency of CPA (OR = 1.59, 95% CI: 1.01–2.52, p = 0.047), feeling having to obey (OR = 1.42, 95% CI: 1.05–1.90, p = 0.021), conceptual disorganization (OR = 2.23, 95% CI: 1.14–4.40, p = 0.020) and unusual thought content (OR = 1.28, 95% CI: 1.00–1.62, p = 0.046) significantly predicted, independently, frequency of lifetime compliance with CH. The model explained 31% of the variance (Cox & Snell R-square statistic). Moreover, the AUCs under the ROC curve suggests that the model has an excellent ability to classify individuals who had never complied versus those who had complied (AUC = 0.86, 95%: 0.77–0.96, p < 0.001), and a moderate ability to classify those who complied >5 times versus others (ie. Never complied to 5 times complied to CH) (AUC = 0.78, 95%: 0.69–0.87, p < 0.001).

4. Discussion

The present cross-sectional study of individuals with CH aimed to explore whether: 1) participants with different perceptions of their CH intent (i.e. benevolent, malevolent, both simultaneously) differ significantly on sociodemographic and clinical factors and 2) whether the subgroups differ in risk factors for compliance with CHs. Results from our study suggest that individuals with benevolent CH, in comparison with those perceiving their CH as malevolent, were older, exhibited more severe positive symptoms such as conceptual disorganization, grandiosity, and unusual thought content, but not severity of hallucinatory behavior. The Benevolent group were also more certain that they would comply in the future than those with malevolent CH and were less likely to report using coping strategies to resist the voices. Although there are very few studies that investigated sociodemographic and clinical correlates of individuals with benevolent voices, our results followed general observations suggesting that participants who perceive their AVHs as benevolent reported more engagement with the voices and less resistance (Andrew et al., 2008; Peters et al., 2012; Zanello and Badan Bâ, 2016; Sayer et al., 2000), more severe positive symptoms (Zanello and Badan Bâ, 2016), more alterations of social functioning (i.e. communication; Favrod et al., 2004), and less emotional disturbance (Sanjuan et al., 2004; Simms et al., 2007; van der Gaag et al., 2003). Thus, individuals perceiving their CH as benevolent would be less likely to use coping strategies to resist them. Although the relationship between perception of voice benevolence and positive psychotic symptoms remains unclear, it is possible that perceiving voices as benevolent would be indirectly associated with positive symptoms through greater investment with voices both cognitively and emotionally, consequently increasing the severity of the conceptual disorganization and delusions. Interestingly, participants in the benevolent group were older than those in the malevolent group. Research on trustworthiness in healthy subjects has shown that a positivity bias increases across the adult age (i.e. judging less negatively negative faces) (Cassidy et al., 2019; Czerwon et al., 2011; Sutter and Kocher, 2007). Considering this, it could be inferred that older adults would perceive their CHs as being more benevolent and trustworthy than younger adults with CHs. Nevertheless, further research is needed on patients perceiving their voice as benevolent to better describe their clinical correlates. Our results also suggest that individuals who perceive their voices as malevolent were more likely (than those with benevolent CH) to have received an affective disorder diagnosis; to score higher on emotional disturbance and anger reactivity; and to use coping strategies to manage the voices. Perception of AVH's malevolence is systematically associated with voice related distress and emotional disturbance (i.e. anxiety and depression) in earlier studies (Thomas et al., 2015; Chadwick et al., 2000; Peters et al., 2012). Moreover, while individuals with malevolent voices tend to resist them (Chadwick and Birchwood, 1994), resisting voices perceived as malevolent may also contribute to emotional disturbance (Gmeiner et al., 2018; Monestes et al., 2015; Thomas et al., 2015; Zanello and Badan Bâ, 2016). Since half of individuals with malevolent CHs had an affective disorder in the current study, it is also possible that these effects were much

stronger in individuals with affective disorders than those with schizophrenia. However, the relationships among voice malevolence, voice resistance, and emotional disturbance are also observed in several studies focusing only on clients with schizophrenia (Gmeiner et al., 2018; Monestes et al., 2015; Thomas et al., 2015). As the cognitive model of AVHs suggests, specific cognitive (e.g. beliefs about voices; social rank, etc.) and emotional factors (e.g. emotional disturbance, anger, elation) may increase the risk for compliance with CHs (Byrne et al., 2007). Therefore, we examined risk factors for compliance within each group in a multivariate model. As for the benevolent group, none of the factors assessed in the current study were significantly associated with lifetime frequency of compliance with CHs. The only study investigating correlates of compliance with benevolent voices revealed that clients were more likely to comply (than those with malevolent CH) if they had higher anger and a history of violence (Shawyer et al., 2008). However, these conflicting results may be partially explained by the fact that the majority of our sample of individuals with benevolent CHs had innocuous CHs (86%) and none of them reported HOCH, while Shawyer et al. (2008)'s total sample included 56% clients with HOCH. This pattern could suggest that the content of CH (i.e. innocuous, HOCH, SHCH) may also play an important in explaining discrepancies between studies. Within the malevolent subgroup, a multivariate model revealed that frequency of CPA, feeling of having to obey the malevolent voice, conceptual disorganization, and unusual thought content were all significantly and independently associated with lifetime frequency of compliance with CH. First, our results on the relationship between CPA and compliance with CHs follows earlier observations suggesting that CPA may be an indicator of submissive behaviors in social relationships that could be extended to relationship with voices (Çelik and Odacı, 2012; Dugré et al., 2018; Gilbert et al., 2003). Interestingly, unusual thought content, conceptual disorganization, and perception of having to obey the malevolent CH were also associated with lifetime frequency of compliance with CH in this specific subgroup. Delusions are known to enhance the likelihood for compliance with CH (Mackinnon et al., 2004), and even more there is present of hallucinations-related delusions (Junginger, 1990, 1995; Shawyer et al., 2008). It is thus possible that the presence of congruent delusions (e.g. persecutory delusions), alongside with greater disruption of normal thought processes would increase reality distortion when experiencing malevolent CHs. Therefore, this would subsequently strengthen the perception of having to obey the voice making these individuals highly vulnerable to compliance with malevolent CHs.

4.1. Limitations

This study is limited by the measures included in the MVRAS, and as a result could not incorporate all potentially relevant risk factors or clinical characteristics. Perceptions of voice intents may not always be clearly distinguished. For example, this is the case of subgroups perceiving their CH as both malevolent and benevolent. In fact, by using continuous measures to assess voice-intents (i.e., BAVQ-R; Chadwick et al., 2000), future research should acknowledge the potential "neutral" voice-intent (e.g. low levels of malevolence and benevolence) or high co-occurrence of these voice-intents, to inform researchers about the risk factors of compliance in these specific groups.

Additionally, some methodological limitations of the current are the small sample size in subgroups, retrospective design, and categorization/dichotomization of variables. This study had only a small sample size of individuals who perceived their CH as benevolent, which could have reduced the ability to detect significant differences for this group. Also, the retrospective cross-sectional design of the current study limits the generalization of the results, such as in beliefs about voices (e.g. perception of voices could have changed after having obeyed). Use of self-report data may have increased the risk of memory biases regarding reports of hallucinatory experiences (Mott et al., 1965). This study also relied on a dichotomous (presence/absence) measure of historical compliance with commands, which fails to capture more nuanced aspects of compliance that are likely relevant for risk assessment (i.e., that a person may comply once but generally resist, versus comply multiple times, or comply every time they experience CH). Thus, categorization and dichotomization of data results in decreased variability and power to detect significant results.

Finally, several factors could have moderated the results found in the current study such as information about psychotropic medication (i.e. type, dosage, duration, adherence), treatment engagement (i.e. past or current), frequency of AVHs, past behaviors (e.g. suicide attempts, non-suicidal self-injury and violent and delinquent behaviors), patient's identification of the ego-syntonic/dystonic nature of the command. Additionally, these findings may not generalize to outpatient or community samples of individuals who experience CH but may not be hospitalized (i.e., inpatient and incarcerated samples may tend to have higher rates of CH compliance).

5. Conclusions

The results of the current study are consistent with previous research supporting the importance of considering perceptions of voice intents in AVH (Chadwick and Birchwood, 1995; Favrod et al., 2004; Thomas et al., 2015). Since beliefs about the voice intents (e.g. malevolence and benevolence) seems to be stable across time (from 6 weeks to a year) and independently of treatments (Csipke and Kinderman, 2006; Hartigan et al., 2014; Trower et al., 2004; Zanello and Badan Bâ, 2016), there is a substantial importance of studying heterogeneity of these beliefs as well as their clinical correlates in order to specify targets for treatment (depending of the patient's perception about voice intents) to increase preventive strategies to manage the risk of compliance with CHs. Moreover, clients may experience multiple types of CH content in short timeframes (Barrowcliff and Haddock, 2010; Buccheri et al., 2007). For example, in one study of clients with CH focusing on a specific timeframe (the past month), 51% of the sample had one type of CH, 37% had two types, and 12% had all types (Barrowcliff and Haddock, 2010). Another study found that 56.3% had more than one type of CH within the same timeframe (Bucci et al., 2013). Moreover, 75% of people with HOCH also reported SHCH, and 36% of people with SHCH also reported HOCH (Buccheri et al., 2007). In order to better understand the dynamic associations between CH intents (e.g. benevolence, malevolence), content (i.e. innocuous, HOCH, SHCH) and compliance type (i.e. ego-syntonic or ego dystonic) future studies should aim to use Ecological Momentary Assessment (EMA).

Declaration of competing of interest

All of the authors declare that they have no conflicts of interest.

Contributors

JRD wrote the first draft of the manuscript. Subsequent drafts were reviewed by Author MW. Author JRD analyzed the data. All authors contributed to the interpretation of the results and have approved the final manuscript.

Role of the funding sources

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Appendix A. Supplementary data

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