Received: 25 August 2022 | Accepted: 8 April 2023

DOI: 10.1002/jclp.23522

RESEARCH ARTICLE

WILEY

A comparison between auditory hallucinations, interpretation of voices, and formal thought disorder in dissociative identity disorder and schizophrenia spectrum disorders

Martin J. Dorahy[1,2] | Amy Nesbit[3] | Rachael Palmer[3] | Bailey Wiltshire[1] | Jacinta R. Cording[1] | Donncha Hanna[4] | Lenaire Seager[2] | Warwick Middleton[1,2]

[1]School of Psychology, Speech and Hearing, University of Canterbury, Christchurch, New Zealand

[2]The Cannan Institute, Belmont Private Hospital, Brisbane, Australia

[3]Ara Poutama Department of Corrections, Christchurch, New Zealand

[4]School of Psychology, Queen's University of Belfast, Northern, Ireland

Correspondence
Martin J. Dorahy, School of Psychology, Speech and Hearing, University of Canterbury, Private Bag 4800, Christchurch 8140, New Zealand.
Email: martin.dorahy@canterbury.ac.nz

Abstract

Objectives: Dissociative identity disorder (DID) and schizophrenia-spectrum disorders (SSD) share some overlapping phenomenological features making accurate diagnosis more difficult. Childhood abuse and depersonalization have been associated with psychotic symptoms across psychological disorders but their relationship to psychotic phenomenology remains understudied.

Method: The present study used quantitative measures to examine (1) similarities and differences in phenomenological voice hearing experiences, interpretations of voices, and thought disorder symptoms in individuals with DID ($n = 44$) or SSD ($n = 45$), and (2) whether depersonalization and childhood maltreatment influenced the initial pattern of findings.

Results: DID participants perceived their voices as being more internally located and generated, louder, and uncontrollable than SSD participants. Furthermore, the DID

We have no known conflicts of interest to declare.

participants endorsed a greater frequency of thought disorder symptoms. Adding the covariates (sex, depersonalization, and child maltreatment) did not change the findings associated with location and origin of voices, and derailment, but there were now no differences in loudness or controllability. However, the schizophrenia sample reported more distress and metaphysical beliefs associated with voices, as well as more thought disorder incoherence and word substitution with the covariates controlled.

Conclusion: While tentative, metaphysical interpretations of voices, incoherent thoughts and word substitution may reflect more psychotic processes.

KEYWORDS
adult mental health, assessment

1 | INTRODUCTION

Dissociative identity disorder (DID) and schizophrenia spectrum disorders (SSD) represent distinct categories of psychiatric illness, but share overlapping phenomenological features including auditory hallucinations and thought insertion (Dorahy et al., 2009; Laddis & Dell, 2012). These overlapping phenomenological experiences can lead to misdiagnosis, with efforts to tease them apart aiding accurate detection and treatment (Renard et al., 2017).

1.1 | Auditory hallucinations in DID and schizophrenia

Most research comparing the phenomenology of symptoms in DID and SSD has examined auditory hallucinations (e.g., Laddis & Dell, 2012; Renard et al., 2017), with reviews suggesting general similarities, but some potential differences (Moskowitz et al., 2017). While voice hearing rates may be influenced by how questions are framed (Shinn et al., 2020), studies show high frequencies of voice hearing in both DID and schizophrenia (e.g., Ross et al., 1990; Waters & Fernyhough, 2017). The location from which auditory hallucinations are experienced as originating (i.e., internal, external) does not cleanly differentiate the disorders, with voices being experienced internally to a similar degree (Honig et al., 1998). However, exclusively external voices appear more common in schizophrenia (24% vs. 3% DID), while a substantial percentage of DID participants (e.g., 45% vs. 18% schizophrenia) report both internal and external voices (Dorahy et al., 2009).

When comparing DID and schizophrenia on aspects of voice hearing, Dorahy et al. (2009) found that the DID group were more likely to hear voices before age 18, hear voices constantly, hear more than two voices, and hear both child and adult voices. Similarly, Laddis and Dell (2012) found that when compared with SSD, DID participants more frequently heard child voices, persecutory voices, angry voices, and voices arguing and commenting.

Interpretation of voices (e.g., metaphysical origin; indicators of control loss) has been assessed in SSD but not DID. Morrison et al. (2004) found metaphysical beliefs about auditory hallucinations (e.g., they come from the spirit world) were common in SSD voice hearers, and predicted the emotional qualities of such hallucinations. Those who negatively interpret and appraise their voices as malevolent and all-powerful find them more distressing (Mawson

et al., 2010). The current study went beyond the phenomenology of voices and also explored if interpretation of voices differed in the two disorder categories.

1.2 | The relationship between trauma, depersonalization, and voice hearing

Research suggests childhood trauma is related to voice-hearing across psychological disorders (Matheson et al., 2013). DID is strongly linked to severe childhood abuse, including sexual and physical maltreatment by a trusted other (Şar et al., 2007). Individuals with schizophrenia also commonly experience childhood and/or adulthood maltreatment (Álvarez et al., 2011), even though it is often less severe than in those with DID (e.g., Dorahy et al., 2009). Moreover, dissociative experiences are related to voice hearing (Longden et al., 2020; Moskowitz et al., 2017). Higher levels of trauma and dissociation in DID may assist in accounting for the presence of voice hearing in the disorder. Depersonalization is commonly associated with voice hearing and has been found to mediate between trauma and the presence of auditory hallucinations (e.g., Cole et al., 2016; Perona-Garcelán et al., 2014). Depersonalization and child maltreatment consequently become important mediator or control variables in understanding if features of auditory hallucinations differentiate DID and schizophrenia.

1.3 | Formal thought disorder (FTD)

FTD reflects a disturbance in the organization of one's thoughts expressed through disorganized speech (Choi et al., 2018), and like the interpretation of voices draws on central cognitive processes. Examples of thought disorder include derailment (ideas slipping off course) and incoherence (speech hard to comprehend). Up to 90% of SSD individuals experience FTD (Roche et al., 2015). Şar and Öztürk (2019) suggest that some FTD symptoms may be evident in DID, especially in episodes of crisis as a result of dissociative symptoms like rapid switching and amnesia. However, they argue that no loosening of associations, neologisms or verbal stereotypies are typically present in DID. A study directly comparing DID and schizophrenia groups on the Millon Clinical Multiaxial Inventory-III's thought disorder scale found significantly higher scores in the DID sample (Welburn et al., 2003). Martinez et al. (2020) have called for further study of thought disorder in DID and schizophrenia, suggesting it may be an area of sharper differentiation than has typically been evident when comparing hallucinations. Thus, fine grain analysis may offer further boundaries that differentiate between, or areas that overlap, in DID and SSD.

1.4 | The present study

The present study further explored the phenomenology of voice hearing in individuals with SSD and DID, and also interpretations of voice hearing. In addition, given the paucity of empirical comparisons, the current study also examined FTD in both diagnostic groups. Child maltreatment and depersonalization were used as covariates to deepen exploration. In light of some findings (e.g., Dorahy et al., 2009; Laddis & Dell, 2012), it was hypothesized there would be phenomenological differences in the voice hearing experiences, as well as interpretations of voices among those with DID and SSD. Given limited research and mixed findings, no specific hypothesis was formulated for FTD symptoms across the two disorders, with this left open for exploration. Finally, childhood maltreatment and depersonalization were hypothesized to account for some significant differences in voice hearing and FTD, and shine light on what phenomena are truly more dissociative versus truly more psychotic.

2 | METHOD

2.1 | Participants

A convenience sample of 100 participants with either DID ($n = 50$) or a SSD (schizophrenia/schizoaffective disorder; $n = 50$) who reported hearing voices were recruited from statutory and NGO services in Christchurch, New Zealand and from a hospital in Brisbane, Australia. Six participants in the DID sample and four in the SSD sample did not complete all assessments and were dropped from analysis. A further SSD participant was excluded because upon testing they did not experience auditory hallucinations. The final SSD group ($n = 45$) did not differ in mean age ($M = 43.49$; SD = 11.14) from the DID sample ($n = 44$; $M = 45.09$; SD = 11.31), $F(1, 87) = 0.45$; $p = 0.50$, $\eta_p^2 = 0.005$. However, most DID participants were female ($n = 43$; 97.7%) and the majority of SSD participants were male ($n = 26$; 57.8%), χ^2 (1, $N = 89$) = 32.43, $p < 0.001$. The most common form of employment was a sickness beneficiary in both DID ($n = 19$; 43.2%) and SSD groups ($n = 35$; 77.8%). In the SSD sample, 34 (75.6%) were single, 6 (13.3%) were separated or divorced, and 5 (11.1%) were married or in a cohabiting relationship. In the DID sample, 13 (29.5%) were single, 15 (34.1%) were separated or divorced and 16 (36.4%) were married or cohabiting.

2.2 | Measures

Participants completed a demographic questionnaire assessing age, sex, employment status, and marital status, and were administered the DID section of the Dissociative Disorders Interview Schedule (DDIS; Ross et al., 1989; DSM-5 version). Additionally, they were administered in random order the Psychotic Symptom Rating Scale (PSYRATS; Haddock et al., 1999); the Interpretation of Voices Inventory (IVI; Morrison et al., 2004); the FTD module of the Scale for the Assessment of Positive Symptoms (SAPS; Andreasen, 1990); the Childhood Trauma Questionnaire (CTQ; Bernstein, et al., 2003); and the Cambridge Depersonalization Scale-2 (CDS-2; Michal et al., 2010).

The PSYRATS (Haddock et al., 1999) is a semi-structured interview of the nature and severity of auditory hallucinations (11 items) and delusions (6 items). The present study used the auditory hallucination subscale which assessed frequency (*How often are the voices present?*), duration (*How long do the voices last?*), perceived location (*Where do you feel the voices are coming from?*), loudness (*How loud are the voices?*), beliefs about the origin of voices (*Where do you think the voices are generated from?*; i.e., internally, externally), amount and degree of negative content (*How unpleasant is the content of what the voices say?*; *How bad is the content of the voices?*), amount and intensity of distress (*How often are the voices distressing?*; *To what degree are the voices distressing?*), disruption (*How much do the voices disrupt your life?*) and controllability (*How much can you control the voices?*). Items are rated from 0 to 4 where each number is accompanied by a description related to the specific scale item, and where higher scores signal more of the dimension assessed (e.g., distress; however higher scores for location and origin reflect external, with lower scores internal). The psychometric properties are attested (Kronmüller et al., 2011), with good internal consistency in the present study (Cronbach's $\alpha = 0.82$).

The IVI (Morrison et al., 2004) is a 26-item assessment of positive and negative interpretations of voice hearing. The IVI divides interpretations of voice hearing into three subscales: meta-physical beliefs about voices (e.g., "They mean that I have been chosen"), positive beliefs about voices (e.g., "They allow me to help others"), and interpretations of loss of control (e.g., "They mean I will lose control of my behavior"). Items are rated from 0 (Not at all) to 4 (Very much), with higher scores indicating more identification with that experience. The IVI has good internal consistency (Morrison et al., 2004), including in the current study: meta-physical beliefs about voices, Cronbach's $\alpha = 0.87$, positive beliefs about voices, Cronbach's $\alpha = 0.81$, and interpretations of loss of control, Cronbach's $\alpha = 0.83$.

The SAPS (Andreasen, 1990) assesses positive symptoms of schizophrenia via four subscales: Hallucinations, Delusions, Bizarre Behavior, and FTD. The present study only used the FTD scale to examine the frequency of

thought disorder symptoms. This subscale comprises eight items assessing derailment (transition of thought from one idea to an unrelated or distantly related other idea), tangentiality (replying to questions with something unrelated or vaguely related), incoherence (lack of sentence cohesion concerning syntax and/or semantics), illogicality (reaching a conclusion without using logic), circumstantiality (speech is indirect and slow to address the main speech idea), pressure of speech (speaking rapidly and excitedly), distractible speech (distracted by things affecting the flow of speech) and changing (selecting words which share similar sounds rather than words that produce understandable sentences). Items are rated from 1 (Never) to 5 (Always). The FTD scale has good inter-rater reliability, with good internal consistency in this study (Cronbach's $\alpha = 0.84$).

The CTQ (Bernstein et al., 2003) assesses abuse (physical, sexual, and emotional) and neglect (physical and emotional) during childhood using 28 items rated from 1 (never true) to 5 (very often true). It has good psychometric properties (e.g., $\alpha = 0.96$ in the current study).

The CDS-2 is a two item short form of the CDS (Sierra & Berrios, 2000) where one item measures depersonalization, and the other derealization (Michal et al., 2010). For brevity it was referred to here as a measure of depersonalization. Items are rated from 0 (Not at all) to 3 (Nearly every day). It has adequate psychometrics (e.g., Cronbach's $\alpha = 0.88$ in this study).

The DID section of the DDIS assesses for a DID diagnosis with four structured interview questions mapped to DSM-5 criteria. Responses are in a "yes," "no" or "unsure" format and the measure has good psychometric properties (Ross & Browning, 2017).

2.3 | Procedure

Participants received information on the study (e.g., invitation letter) from someone involved in their care (e.g., treating psychiatrist; psychiatric nurse) and signed informed consent after reading the study information sheet. All questionnaires were administered in structured interview format by the researcher (i.e., read out loud to participants). Participants were assessed in the clinic setting associated with their care, at their own home or in a university laboratory. They were debriefed, given a $10 voucher, and thanked for their participation. This study was approved by relevant University, Hospital and Regional ethics committees. Data are available at: https://osf.io/d78ca/.

2.4 | Data analysis

Analyses were conducted using the Statistical Package for Social Sciences (SPSS; version 25). Multivariate analysis of variance (MANOVA) was used to explore differences across diagnostic groups for items/scales on the 1) PSYRATS, 2) IVI and 3) FTD questionnaires. A second set of MANOVAs were run, identical to the first, but with childhood maltreatment (i.e., CTQ) and depersonalization (i.e., CDS-2) used as covariates, along with sex given it differed between groups (one participant did not report their sex).

3 | RESULTS

Regarding diagnostic clarification, the DDIS showed five DID participants did not meet criteria for DID, because their therapy had recently evolved to the point they no longer met the amnesia criterion. They were maintained in the sample as they were in treatment for DID, had until relatively recently met criteria and, finally, the study examined 'psychotic' symptoms rather than dissociative symptoms. Six of the SSD participants met DDIS criteria for DID, but upon clarificatory follow-up questions did not have experiences consistent with DID (i.e., they misunderstood some items). Thus, they were retained in the SSD group.

3.1 | Comparing voice hearing experiences and thought disorder between groups

Means and standard deviations for the two diagnostic groups on the auditory hallucination, interpretation of voices and thought disorder measures are shown in Table 1, along with descriptives for the covariate analyses. The covariates childhood maltreatment, $F(1, 87) = 76.86$, $p < 0.001$, $\eta_p^2 = 0.47$, and depersonalization, $F(1, 87) = 27.04$, $p < 0.001$, $\eta_p^2 = 0.24$, were significantly higher in the DID ($M = 92.13$, SD = 17.44; $M = 1.83$, SD = 1.05, respectively) compared to the SSD ($M = 55.42$, SD = 21.78; $M = 0.74$, SD = 0.91, respectively) group.

3.1.1 | Auditory hallucination characteristics

A MANOVA across diagnostic groups for the 11 PSYRATS auditory hallucination items showed a significant multivariate effect for diagnosis, Pillai's Trace = 0.53, $F(11, 77) = 7.71$, $p < 0.001$, $\eta_p^2 = 0.52$. Univariate analysis showed DID participants were more likely to experience voices as internally located, $F(1, 87) = 20.56$, $p = 0.001$, and internally generated (i.e., believing they have an internal origin), $F(1, 87) = 44.05$, $p = 0.001$. In addition, individuals with DID reported experiencing the voices as louder than those with SSD, $F(1, 87) = 16.51$, $p = 0.001$. There was no significant difference between the two groups for duration, $F(1, 87) = 3.68$, $p = 0.058$, frequency, $F(1, 87) = 1.56$, $p = 0.216$, amount of negative content, $F(1, 87) = 3.07$, $p = 0.083$, degree of negative content, $F(1, 87) = 1.58$, $p = 0.212$, amount of distress, $F(1, 87) = 0.64$, $p = 0.425$, intensity of distress, $F(1, 87) = 0.12$, $p = 0.729$, disruption, $F(1, 87) = 0.16$, $p = 0.693$, and controllability, $F(1, 87) = 0.77$, $p = 0.382$.

Re-running the MANOVA with sex, depersonalization (CDS-2) and childhood maltreatment (CTQ) controlled showed the covariates were significant: sex, Pillai's Trace = 0.24, $F(11, 74) = 2.13$, $p = 0.028$, $\eta_p^2 = 0.24$, depersonalization, Pillai's Trace = 0.27, $F(11, 74) = 2.53$, $p = 0.009$, $\eta_p^2 = 0.27$, and childhood maltreatment, Pillai's Trace = 0.23, $F(11, 74) = 2.04$, $p = 0.037$, $\eta_p^2 = 0.23$. Nonetheless, the multivariate effect for diagnosis remained significant, Pillai's Trace = 0.46, $F(11, 74) = 5.75$, $p < 0.001$, $\eta_p^2 = 0.46$ (Table 1).

Univariate analyses for location and origin of auditory hallucinations remained significant, with DID participants being more likely to experience the voices as internally located, $F(1, 84) = 13.92$, $p = 0.001$, and internally generated, $F(1, 84) = 2.55$, $p = 0.001$. After controlling for the covariates, loudness of voices was no longer significant, $F(1, 84) = 0.07$, $p = 0.786$, with child maltreatment ($p = 0.009$), but not depersonalization ($p = 0.095$) nor sex, ($p = 0.097$), accounting for significant variance. However, amount of distress became significant, $F(1, 84) = 4.25$, $p = 0.042$, with sex ($p = 0.031$) and child maltreatment ($p = 0.049$) significant covariates, but not depersonalization ($p = 0.293$). Intensity of distress also became significant, $F(1, 84) = 10.37$, $p = 0.002$, with depersonalization ($p < 0.001$) and sex ($p = 0.037$) being significant covariates, but not maltreatment ($p = 0.193$). The amount and intensity of distress about voices were higher in those diagnosed with SSD. After controlling for the covariates there were no significant changes in duration, $F(1, 84) = 1.44$, $p = 0.234$, frequency, $F(1, 84) = 0.04$, $p = 0.851$, amount of negative content, $F(1, 84) = 0.31$, $p = 0.578$, degree of negative content, $F(1, 84) = 0.20$, $p = 0.655$, disruption, $F(1, 84) = 1.82$, $p = 0.182$, or controllability, $F(1, 84) = 0.21$, $p = 0.649$, all of which remained nonsignificant.

3.1.2 | Interpretation of voices

MANOVA examining the three IVI subscales across groups showed a multivariate effect, Pillai's Trace = 0.16, $F(3, 85) = 5.26$, $p = 0.002$, $\eta_p^2 = 0.16$. Univariate analyses indicated the DID sample felt the voices meant they would lose control more than the SSD sample, $F(1, 87) = 7.41$, $p = 0.008$. There was no significant difference in metaphysical beliefs about voices, $F(1, 87) = 0.001$, $p = 0.969$, nor positive beliefs about voices, $F(1, 87) = 0.05$, $p = 0.827$.

TABLE 1 Descriptive statistics, MANOVA *p*-values and effect sizes for dependent variables across groups with covariates (sex, childhood maltreatment, and depersonalization) not controlled and controlled.

	Covariates not controlled			Covariates controlled		
	DID	SSD		DID	SSD	
	Mean (SD)	Mean (SD)	p/η_p^2	Estimated mean (*SE*)	Estimated mean (*SE*)	p/η_p^2
Auditory Hallucination Items (PSYRATS)						
Frequency	2.89 (1.41)	2.51 (1.42)	0.216/0.02	2.74 (0.29)	2.65 (0.29)	0.851/<0.01
Duration	3.07 (1.15)	2.59 (1.20)	0.058/0.04	3.07 (0.24)	2.58 (0.24)	0.234/0.02
Location	1.75 (0.92)	2.73 (1.12)	<0.001*/0.19	1.60 (0.21)	2.88 (0.21)	<0.001*/0.14
Loudness	2.78 (1.05)	1.91 (0.97)	<0.001*/0.16	2.30 (0.19)	2.39 (0.19)	0.786/<0.01
Origin	1.61 (0.95)	3.12 (1.18)	<0.001*/0.34	1.47 (0.21)	3.26 (0.20)	<0.001*/0.24
Amount of negative content	2.78 (1.08)	2.33 (1.33)	0.083/0.03	2.44 (0.24)	2.67 (0.24)	0.578/<0.01
Degree of negative content	3.16 (1.20)	2.82 (1.32)	0.212/0.02	2.89 (0.25)	3.08 (0.25)	0.655/<0.01
Amount of distress	2.75 (1.09)	2.56 (1.20)	0.425/0.01	2.26 (0.22)	3.03 (0.22)	0.042*/0.05
Intensity of distress	2.65 (1.17)	2.73 (1.16)	0.729/0.<01	2.09 (0.22)	3.27 (0.21)	0.002*/0.11
Disruption	2.15 (1.18)	2.04 (1.28)	0.693/<0.01	1.81 (0.25)	2.37 (0.24)	0.182/<0.01
Control	3.18 (1.04)	3.00 (1.36)	0.382/0.01	2.97 (0.24)	3.16 (0.24)	0.649/<0.01
Interpretation of Voices (IVI)						
Metaphysical	1.84 (0.64)	1.84 (0.66)	0.969/<0.01	1.58 (0.12)	2.10 (0.12)	0.013*/0.07
Positive	1.82 (0.62)	1.85 (0.75)	0.827/<0.01	1.76 (0.14)	1.91 (0.14)	0.533/<0.01
Loss of control	2.63 (0.82)	2.15 (0.85)	0.008*/0.08	2.34 (0.16)	2.43 (0.16)	0.751/<0.01
Formal Thought Disorder Items (SAPS)						
Derailment	3.58 (1.18)	2.37 (1.13)	<0.001*/0.22	3.40 (0.22)	2.55 (0.22)	0.029*/0.06
Tangential	2.52 (1.18)	2.00 (1.27)	0.051/0.04	2.15 (0.24)	2.38 (0.24)	0.563/<0.01

(Continues)

TABLE 1 (Continued)

	Covariates not controlled			Covariates controlled		
	DID	SSD		DID	SSD	
	Mean (SD)	Mean (SD)	p/η_p^2	Estimated mean (*SE*)	Estimated mean (*SE*)	p/η_p^2
Incoherence	1.88 (1.10)	2.21 (1.37)	0.228/0.02	1.53 (0.23)	2.56 (0.23)	0.011*/0.08
Illogicality	2.71 (1.38)	1.86 (0.97)	0.001*/0.12	2.50 (0.24)	2.07 (0.24)	0.314/0.01
Circumst-antiality	2.77 (1.31)	2.21 (1.21)	0.043*/0.05	2.40 (0.24)	2.58 (0.24)	0.671/<0.01
Pressure of speech	2.40 (1.33)	1.74 (1.00)	0.012*/0.07	2.15 (0.24)	1.99 (0.24)	0.698/<0.01
Distractible speech	3.19 (1.22)	2.50 (1.12)	0.008*/0.08	2.80 (0.22)	2.89 (0.22)	0.800/<0.01
Changing	1.60 (1.05)	1.64 (1.05)	0.878/<0.01	1.17 (0.21)	2.07 (0.21)	0.011*/0.08

Controlling for sex, depersonalization and childhood maltreatment continued to show a significant multivariate effect, Pillai's Trace = 0.18, $F(3, 82) = 3.62$, $p = 0.016$, $\eta_p^2 = 0.12$, with the covariates except sex, Pillai's Trace = 0.01, $F(3, 82) = 0.32$, $p = 0.809$, $\eta_p^2 = 0.01$, also producing significant multivariate effects (depersonalization, Pillai's Trace = 0.11, $F(3, 82) = 3.24$, $p = 0.026$, $\eta_p^2 = 0.11$; child maltreatment, Pillai's Trace = 0.12, $F(3, 82) = 3.62$, $p = 0.016$, $\eta_p^2 = 0.12$). The univariate analysis for feeling the voices take control was no longer significant, $F(1, 84) = 0.10$, $p = 0.751$, with child maltreatment ($p = 0.046$) and depersonalization ($p = 0.014$), but not sex ($p = 0.972$), significant. However, after adding the covariates, where child maltreatment ($p = 0.002$) and depersonalization ($p = 0.006$) were significant (but not sex, $p = 0.573$), metaphysical beliefs about voices became significant, $F(1, 84) = 6.41$, $p = 0.013$, with SSD participants reporting more metaphysical beliefs about their voices. There were no significant changes in positive beliefs about voices, $F(1, 84) = 0.39$, $p = 0.533$.

3.1.3 | FTD symptoms

For the eight SAPS FTD items (derailment, tangentiality, incoherence, illogicality, circumstantiality, pressure of speech, distractible speech, changing), MANOVA showed a significant multivariate effect for diagnosis, Pillai's Trace = 0.37, $F(8, 77) = 5.62$, $p < 0.001$, $\eta_p^2 = 0.37$. Univariate analyses indicated more derailment of speech, $F(1, 84) = 23.47$, $p < 0.001$, illogicality, $F(1, 84) = 10.96$, $p = 0.001$, circumstantiality, $F(1, 84) = 4.24$, $p = 0.043$, pressure of speech, $F(1, 84) = 6.58$, $p = 0.012$, and distractible speech, $F(1, 84) = 7.39$, $p = 0.008$, in the DID group. There was no significant difference in tangentiality, $F(1, 84) = 3.91$, $p = 0.051$, incoherence, $F(1, 84) = 1.48$, $p = 0.228$, or changing, $F(1, 84) = 0.02$, $p = 0.878$, between groups.

With sex, depersonalization and child maltreatment as covariates, the multivariate effect for diagnosis remained significant, Pillai's Trace = 0.25, $F(8, 74) = 3.10$, $p = 0.004$, $\eta_p^2 = 0.25$. Sex was not significant, Pillai's Trace = 0.08, $F(8, 74) = 0.78$, $p = 0.618$, $\eta_p^2 = 0.08$, but depersonalization, Pillai's Trace = 0.28, $F(8, 74) = 3.57$, $p = 0.002$, $\eta_p^2 = 0.28$, and child maltreatment, Pillai's Trace = 0.20, $F(8, 74) = 2.33$, $p = 0.028$, $\eta_p^2 = 0.20$, were.

The univariate analysis for derailment remained significant, $F(1, 81) = 4.95$, $p = 0.029$, with the DID group showing more derailment than those with SSD. After adding the covariates, illogicality, $F(1, 81) = 1.03$, $p = 0.314$, circumstantiality, $F(1, 81) = 0.18$, $p = 0.671$, pressure of speech, $F(1, 81) = 0.15$, $p = 0.698$, and distractible speech, $F(1, 81) = 0.07$, $p = 0.800$, were no longer significant. For illogicality no covariate was significant (sex, $p = 0.625$; child maltreatment, $p = 0.494$; depersonalization, $p = 0.287$). For circumstantiality, depersonalization ($p = 0.002$) and child maltreatment ($p = 0.039$) were significant covariates, while sex was not ($p = 0.247$). For pressure of speech, child maltreatment ($p = 0.053$), depersonalization ($p = 0.389$) and sex ($p = 0.626$) were not significant. Finally for distractible speech, child maltreatment ($p = 0.041$) and depersonalization ($p = 0.002$) were significant covariates, but not sex ($p = 0.520$).

With covariates controlled, incoherence became significant, $F(1, 81) = 6.71$, $p = 0.01$, with SSD participants reporting more incoherence than those with DID. Depersonalization ($p = <0.001$) but not child maltreatment ($p = 0.137$) nor sex ($p = 0.296$) had a significant impact. Changing also became significant, $F(1, 81) = 6.72$, $p = 0.01$, with higher scores in the SSD group, and child maltreatment being a significant covariate ($p = 0.027$), but not depersonalization ($p = 0.052$) or sex ($p = 0.341$). Tangentiality was not significant after the addition of the covariates, $F(1, 81) = 0.34$, $p = 0.563$, with child maltreatment ($p = 0.006$) and depersonalization ($p = 0.028$), but not sex ($p = 0.239$), significant.

4 | DISCUSSION

The hypotheses of differences between DID and SSD in at least some auditory hallucination phenomena and interpretation of voices were partially supported, and some differences were found for FTD symptoms. Location and origin of voices were more internal for the DID sample, and these differences persisted with large effect sizes

when sex, child maltreatment and depersonalization were controlled. Such findings suggest DID is characterized by voice hearing being experienced more as an internal phenomenon believed to be generated by internal means compared to SSD. This internal perception and locus of control was not explained by the covariates. In addition, FTD derailment was higher in DID and remained so after covariate inclusion, suggesting sex, child maltreatment and depersonalization did not impact on derailment symptoms.

Compared to SSD, voices were reported as louder in DID and interpreted more as meaning the person was losing control. But neither were significant after the covariates were added. One explanation may be child maltreatment and/or depersonalization have a greater impact on these aspects of voice hearing than the diagnoses themselves.

The following FTD symptoms were higher in DID before the covariates were entered: illogicality, pressure of speech, circumstantiality, and distractibility. Once sex, child maltreatment and depersonalization were included, these four markers of FTD were not significant. Depersonalization and child maltreatment were significant covariates for circumstantiality and distractibility. Thus, results suggest these manifestations of FTD are influenced by depersonalization and/or child maltreatment more so than diagnosis.

Intensity and amount of distress associated with voice hearing, metaphysical interpretations of voices, FTD incoherence and FTD changing (word substitution) did not differ between DID and SSD groups before the addition of the covariates but were all higher for SSD participants after their addition. For intensity of distress, metaphysical voice interpretations and incoherence, depersonalization was a significant covariate. Thus depersonalization may have suppressed differences in the intensity of voice distress, metaphysical beliefs about voices, and incoherent speech between DID and SSD groups. Several studies have shown depersonalization is associated with the presence of voice hearing in SSD (e.g., Cole et al., 2016; Perona-Garcelán et al., 2014), and its influence may mask symptoms more unique to SSD and more psychotic in nature (e.g., metaphysical beliefs about voices, incoherent speech). Child maltreatment was also a significant covariate for metaphysical beliefs, as well as amount of distress, and when controlled such beliefs and distress about voices were elevated in SSD, suggesting they may be more related to the diagnosis itself than to child maltreatment specifically. For changing, depersonalization fell marginally short of significance ($p = 0.052$), and child maltreatment was significant. This suggests word substitution in SSD is not explained by child maltreatment nor potentially depersonalization, but rather other variable/s more unique to SSD.

Seven of the eight FTD markers (excluding tangentiality) differed across diagnostic groups either before and/or after the addition of the covariates. However, the following voice-related characteristics did not differ across DID and SSD before or after the inclusion of the covariates: voice frequency, degree of negative voice content, disruption to life from voices, feeling that voices can be controlled, and having positive interpretations of voices (which was generally low in both groups). These characteristics of voice hearing did not differentiate DID from SSD, and maltreatment and depersonalization were not associated with them.

4.1 | Review of key findings

Studies examining the prevalence of internal and external voice hearing in DID and SSD show similar rates of internally experienced voices (Honig et al., 1998), but higher external voices in SSD (Dorahy et al., 2009). The current study, focused on a categorical assessment of voice hearing (with the experience ranging from internal to external) rather than a dichotomous assessment (e.g., yes and no), suggested that auditory hallucinations overall tended to be experienced as more of an internal phenomenon in DID than in SSD. In addition, DID participants were more likely to believe such experiences had an internal origin, perhaps consistent with generally better reality testing in DID compared to SSD (Şar & Öztürk, 2019). Comparative challenges with reality testing may explain why those with SSD had more metaphysical beliefs about voices. Such beliefs may be derived from more delusional

thinking, which is higher in SSD compared to DID (Laddis & Dell, 2012), especially those related to self-referential ideas (Martinez et al., 2020; e.g., voices are a sign I am being punished).

Voices were reported as louder in the DID sample, however this relationship was at least partly explained by experiences of child maltreatment, with DID and SSD groups showing no difference once it was controlled. Consistent with other studies (e.g., Dorahy et al., 2009), child maltreatment was higher in the DID sample than the SSD group. This higher severity may be associated with a greater internalization of abuse messages and their higher salience (i.e., loudness), that when controlled, accounts for the original difference in volume.

In the current study, interpretations of loss of control on the IVI assessed whether participants understood voices to be associated with feelings of being taken over or losing control, while the PSYRATS controllability item assessed whether they can control the actual voices. This latter variable showed no difference between groups. Conversely, interpretation of loss of control was higher in DID, consistent with Moskowitz et al.'s (2017) conclusion that voices exert more control over behavior in dissociative disorders than schizophrenia. However, this difference appeared to be fully explained by levels of depersonalization and maltreatment, with differences between groups no longer significant once these factors were controlled. One possibility for maltreatment and depersonalization neutralizing higher feelings of losing control in DID is that they both reflect a loss of agency (i.e., control). This may translate into interpreting voices as experiences in which, like abuse and depersonalization, one is more passive against intrusions.

Empirical assessment of different aspects of FTD across DID and SSD has attracted little attention. This is surprising given thought disorder is a critical feature of SSD and is elevated in DID and related disorders (e.g., Stadnik et al., 2013), perhaps being experienced more in these disorders than SSD (Welburn et al., 2003). In this study, the majority of FTD symptoms were initially elevated in the DID group (derailment, illogicality, pressure of speech, circumstantiality, and distractibility), suggesting such symptoms may lead to an erroneous SSD diagnosis if their presence in DID is not appreciated. Once maltreatment and depersonalization were controlled, only derailment remained elevated in the DID group. Yet, depersonalization and maltreatment were not uniformly associated with the reduction of differences for the other symptoms (e.g., depersonalization was associated with circumstantiality but not pressure of speech and neither depersonalization or maltreatment were related to illogicality). One question for future work is whether the FTD experiences in DID and SSD (or even for individuals within each disorder) are derived from the same psychological processes. For example, depersonalization was associated with reduced circumstantiality and tangentiality, though it may not be a driving force in these and other manifestations of FTD symptoms.

While depersonalization experiences are higher in DID, they are also quite prevalent in SSD (e.g., Gonzalez-Torres et al., 2010). Thus once depersonalization is controlled, a shared feature of both sets of disorders is isolated, so that what separates DID from SSD may be made more evident. At the heart of DID is structural dissociation (compartmentalization), the partitioning of identity into discrete, organized units of experience each with its own sense of self and first-person perspective (Nijenhuis, 2015). At the heart of SSD is psychosis, characterized chiefly by a loss of contact with reality. With the exception of comorbidity between DID and SSD, and DID cases in crisis and experiencing brief reactive psychosis (e.g., Şar & Öztürk, 2019), the central feature of DID (structural dissociation) is not present in schizophrenia, and the central feature of SSD (psychosis) is less evident in DID. Thus, voice characteristics and FTD symptoms elevated in one disorder after controlling for depersonalization (and child maltreatment), may reflect unique feature/s of that disorder.

This theorizing prompts hypotheses for future work. Namely, metaphysical interpretations of voices, incoherence of thought, and word substitution (all elevated in the SSD group after sex, depersonalization and child maltreatment were controlled) may reflect psychotic rather than structural dissociative processes. Alternatively, a perceived internal location and origin of voice, and derailment of ideas (i.e., ideas slipping off track while talking) may be more related to structural dissociation. This latter symptom may be explained by dissociative amnesia and dissociative identities influencing or intruding on thought processes, creating challenges for focused thinking (Şar & Öztürk, 2019). Regarding greater internalization of voices in DID, one possible account is

the internalization of someone influential, who has been compartmentalized in a different dissociative identity and intrudes on consciousness as an internally attributed experience (Dorahy et al., 2009). Those with SSD, not having dissociative compartmentalization/structural dissociation to draw on, could experience decontextualized memories of past experiences (e.g., someone berating them), so they do not remember explicitly what happened and with whom, but experience the voice as external, as it would be if it was coming from someone else (Moskowitz et al., 2017).

The findings need to be interpreted in light of limitations. Firstly, the two samples were obtained by convenience to maximize numbers but were are not matched on some demographics including sex, which in keeping with general clinical practice and most research (e.g., Laddis & Dell, 2012; Renard et al., 2017) resulted in a higher prevalence of females in the DID group. Sex was controlled for in the analyses and generally had little impact on the majority of univariate findings, but future work may benefit from more tightly matched samples. Second, although this study was exploratory in nature, the relatively small sample size and the use of multivariate analyses may have impacted on the reliability of statistical findings, with the sample size able to detect differences with medium effects, prompting the need for replication. Third, self-report is prone to bias that more thorough interview assessment and/or prospective work could minimize.

5 | CONCLUSIONS

Voice hearing and symptoms of FTD, historically connected with SSD, are common in DID, as evident from the findings of this study. Yet, despite overlapping phenomenology in DID and SSD, the current results suggest areas where genuine differences may exist. After controlling for sex, depersonalization, and child maltreatment, the DID group more frequently perceived voices as internally located and generated, and experienced more derailment in their thought processes. These phenomenological experiences may arguably reflect different by-products of structural dissociation. For the SSD group, controlling for covariates showed them to have greater intensity of distress for voice hearing, more metaphysical voice interpretations, and greater loosening of associations in the form of incoherence and word substitution when compared to the DID sample. These experiences may be more uniquely associated with psychosis rather than dissociation. The findings add to the fairly limited empirical literature comparatively examining symptoms in DID or SSD.

ACKNOWLEDGEMENTS

Open access publishing facilitated by University of Canterbury, as part of the Wiley - University of Canterbury agreement via the Council of Australian University Librarians.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in OSF at https://osf.io/d78ca/, reference number https://osf.io/d78ca/.

ORCID

Martin J. Dorahy http://orcid.org/0000-0003-0171-4913
Donncha Hanna http://orcid.org/0000-0003-3382-4842

PEER REVIEW

The peer review history for this article is available at https://www.webofscience.com/api/gateway/wos/peer-review/10.1002/jclp.23522.

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How to cite this article: Dorahy, M. J., Nesbit, A., Palmer, R., Wiltshire, B., Cording, J. R., Hanna, D., Seager, L., & Middleton, W. (2023). A comparison between auditory hallucinations, interpretation of voices, and formal thought disorder in dissociative identity disorder and schizophrenia spectrum disorders. *Journal of Clinical Psychology*, *79*, 2009–2022. https://doi.org/10.1002/jclp.23522