Trauma-intrusive hallucinations and the dissociative state
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Background
Research has supported a model of dissociation mediating the experience of hearing voices in traumatised individuals.

Aims
To further understand this model by examining subtypes of the dissociative experience involved in trauma-intrusive hallucinations.

Method
The study involved four hospitals, 11 psychiatrists and 69 participants assessed using the Psychotic Symptoms Rating scale, the PTSD Symptoms Scale interview and the Dissociative Subtype of PTSD Score.

Results
In total, 59% (n = 41) of the participants heard voices and they were compared with the 41% (n = 28) who did not. The severity of PTSD symptoms did not predict experience of hearing voices. Regression analysis indicated that two scales of dissociation (derealisation/depersonalisation and loss of awareness) were equally good predictors of the extent of hearing voices. Adding other possible predictors (age of trauma <18, sexual violence) was relevant but did not enhance the prediction.

Conclusions
This research supports the proposal that trauma-intrusive voices are mediated by symptoms of dissociation. The supported model describes general, rather than trauma specific, symptoms of dissociation mediating the experience of hearing voices. The concept of anchoring is discussed and suggests a potential treatment strategy, which could be useful in the clinical management of hearing voices.

Declaration of interest
None.

Keywords
Post-traumatic stress disorder; dissociation; pseudohallucinations; dissociative state.

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The systematic review by Pilton et al. in 2015 regarding the relationship between dissociation and voice hearing, found an effect size that suggested a significant correlation (r = 0.52), between these clinical phenomena. This research aims to provide a better understanding of this relationship by examining subtypes of the dissociative experience involved in trauma-intrusive hallucinations. It aims to improve clinical utility by focusing on the dissociative states in post-traumatic stress disorder (PTSD), rather than the less common diagnostic criteria of dissociative disorders. This research examines two models linking the experience of trauma-intrusive hallucinations with dissociation. The first model focuses on the primary role of the general experience of dissociation, where the individual lacks grounding and disintegration of reality testing results in voice hearing. These different models can be used to inform clinical management.

Method
This research involved four hospitals (private and public), outpatient departments, 11 psychiatrists and 69 participants assessed using the Psychotic Symptoms Rating Scale (PSYRAT), PTSD Symptoms Scale Interview (PSSI-5) and Dissociative Subtype of PTSD Score (DSPS).

This study obtained approval from the following: St John of God Hospital Research and Ethics Committee (1139), Hollywood Hospital Research and Ethics Committee (HPH487), Joondalup Health Campus Human Research and Ethics Committee (1730) and Eastern Metropolitan Health Service Human Research and Ethics Committee (RGS334). Signed consent forms were obtained from participants.

Participant selection was not random. Inclusion criteria required a diagnosis of PTSD with dissociation as assessed by their treating psychiatrist (DSM-5) and age >18. Exclusion criteria included comorbid diagnosis of a primary psychotic disorder or substance misuse. The participants were asked to focus on their worst traumatic experience when completing the PSSI-5. The DSM-5 diagnosis of PTSD with dissociation is a relatively new construct. The DSPS was developed to explore the severity as well as frequency of a broad range of dissociation symptoms that most strongly link to PTSD, and was selected on this basis. The participants were not required to experience hearing voices. They were divided into subgroups in the research process when asked whether they heard voices either inside or outside of their head, before completing the PSYRAT.

Results
As a result of involvement of multiple centres, a broad selection of participants meant the research was able to explore a wide range of traumatic experiences. Participants were asked for details of their worst traumatic experience, which was then categorised into broad ranges. (Table 1) There were 26 individuals who experienced severe, persistent childhood sexual abuse under the age of 12 by a family member or friend and six participants who were raped as adults, meaning that sexual trauma occurred in 46%. Of the participants, 23% were military, describing significant combat trauma, or...
police/firefighters describing significant acute on chronic trauma. In
the non-specific trauma group (30%), the majority experienced
serious physical assaults, vehicle accidents, domestic violence or
were exposed to suicide.

Although the characteristics of the voices was not specifically
targeted in the study, there was a number of features in the
group that heard voices that were of clinical interest. The voices
were more likely to be solely externally located (16/41) than solely
internally located (2/41) and more likely to be negative in content
(23/41 completely negative, 2/41 not negative). Participants
reported the voices as distressing (23/41 extremely distressing all
the time, 2/41 not at all distressing) with a lack of control over
the voices (18/41 no control over voices, 1/41 complete control).

The study participants were divided into a group of participants
who experienced hearing voices either inside or outside their head,
and they were compared with those who did not have this experi-
ence. This process resulted in two groups, 59% (n = 41) of the par-
ticipant who heard voices to compare with the 41% (n = 28) who did
not.

The demographics showed a similar age range between the
group of participants who experienced hearing voices and those
who did not, but there were proportionately more women in the
group that heard voices. The group that heard voices was signifi-
cantly younger at the time of their worst traumatic experience
and it was significantly more likely to involve sexual violence
(Table 2).

The diagnosis of PTSD with dissociation tends to be associated
with more severe symptoms of PTSD and this was consistent in this
study with both groups’ mean score in the severe range for PTSD
symptomatology (46–80). The first important finding was that the
severity of PTSD symptoms did not predict experience of hearing
voices. Subscale analysis confirmed there was no significant correl-
ation with avoidance symptoms, changes in mood or cognition,
changes in arousal or reactivity or re-experiencing phenomena
(Table 2).

The second important finding was that the DSPS significantly
 correlated with the experience of hearing voices. Subscale analysis
showed this correlation was with derealisation/depersonalisation
and loss of awareness but did not include psychogenic amnesia
(Table 2).

Regression analysis indicated that two scales of dissociation
derealisation/depersonalisation and loss of awareness) were
equally good predictors of the extent of hearing voices (PSYRAT),
whereas psychogenic amnesia was not relevant. Together, the
DSPS scales predicted 23% of the variance in PSYRAT scores
(F(3,59) = 5.89, P = 0.001). Adding other possible predictors (age
of trauma <18, sexual violence, PSSI score) did not enhance the
prediction (R²Δ = 0.067, F(3,56) = 1.80, P = 0.160) (Table 3).

Discussion

Main findings
This research shows that in these individuals with PTSD, the experi-
ence of trauma-intrusive hallucinations is best predicted by the
experience of dissociation, specifically derealisation/depersonalisa-
tion and loss of awareness, rather than the severity of the PTSD
symptoms. It supports the proposal that trauma-intrusive voices
are mediated by symptoms of dissociation and describes general,
rather than trauma-specific, symptoms of dissociation as most
relevant.

Interpretation of our findings
The measures of severity of PTSD symptoms were consistent
between the groups hearing voices and those not hearing them,
which suggests that the experience of trauma-intrusive hallucina-
tions is not directly associated with trauma-specific symptoms.
The PTSD subscale of re-experiencing phenomena,8 includes
dissociative symptoms such as flashbacks, but these are trauma
specific, rather than the more general symptoms of dissociation.

In contrast trauma-intrusive hallucinations were strongly asso-
ciated with general, non-specific symptoms of dissociation includ-
ing loss of awareness, derealisation and depersonalisation. In the
DSPS2 loss of awareness described symptoms such as feeling
dazed, foggy, disoriented or confused, the familiar perceived as

| Table 1 Description of trauma category |
|----------------------------------------|
|                                      |
| Non-specific trauma                   |
| Specific                               |
| Sexual trauma                         |
| Military/emergency services            |
|                                      |
| Adult at time of worst traumatic event |
| Child at time of worst traumatic event |
|                                      |

| Table 2 Comparing variables between the hearing voices group versus not hearing voices group |
|---------------------------------------------------------------------------------------------|
| Hearing voices group (n = 41) | Not hearing voices group (n = 28) | t | χ²  | P  |
|--------------------------------|----------------------------------|---|-----|----|
| Current age, mean (s.d.)       | 40.83 (15.28)                    | 43.50 (10.05) | 0.81 | 0.420 |
| Age of first trauma, mean (s.d.) | 14.71 (11.91)                   | 26.32 (14.95) | 3.58 | 0.001* |
| PSSI total, mean (s.d.)         | 54.76 (17.09)                    | 49.02 (14.87) | 1.44 | 0.154 |
| Re-experiencing                 | 14.20 (4.84)                     | 11.82 (5.42) | 1.90 | 0.61  |
| Avoidance                       | 5.80 (2.18)                      | 5.46 (1.83)  | 0.68 | 0.500  |
| Changes in mood/cognition       | 19.69 (6.68)                     | 17.79 (6.23) | 1.17 | 0.246  |
| Arousal/reactivity              | 12.62 (4.40)                     | 11.70 (4.70) | 0.83 | 0.407  |
| DSPS total, mean (s.d.)         | 70.61 (24.40)                    | 44.85 (25.30) | 4.20 | <0.001* |
| Derealisation/depersonalisation | 30.76 (14.04)                    | 18.82 (12.95) | 3.35 | 0.001* |
| Loss of awareness               | 30.80 (12.10)                    | 21.84 (12.26) | 2.93 | 0.005* |
| Psychogenic amnesia             | 9.05 (6.53)                      | 8.40 (6.43)  | 0.39 | 0.696  |
| Gender, n                       |                                  |                |     |       |
| Men                             | 11                               | 14              | –   |       |
| Women                           | 30                               | 14              | –   | 3.87  | 0.049* |
| Trauma, n                       |                                  |                |     |       |
| Sexual violence trauma          | 28                               | 11              | –   |       |
| Other trauma                    | 13                               | 17              | –   | 5.70  | 0.017* |

PSSI, PTSD Symptoms Scale Interview; DSPS, Dissociative Subtype of PTSD Score.
* P<0.05.
unfamiliar, or loss of time sense. Derealisation was characterised by a loss of boundary between the self and the external world, where clinically the world was experienced as not real, ‘like a movie’. Depersonalisation was a sense of disconnection within the self where the body was seen as not real, and the individual might have ‘out of body’ experiences.

Psychogenic amnesia was not associated with trauma-intrusive hallucinations. This DSPS subscale relates to two questions regarding memory loss of the specific traumatic event. There have been some questions in the literature as to whether this subscale is helpful in identifying the subgroup of people with PTSD with dissociation. The lack of association with this data in this study again supports the proposal that trauma-intrusive hallucinations link with general dissociation not trauma-specific dissociation.

Characteristics of the trauma were predictive of the experience of hearing voices. In particular age <18 at time of worst trauma and sexual violence predicted hearing voices. This outcome is consistent with the knowledge that the incidence of dissociation is significantly higher in traumatised children and in situations of sexual violence.

As described there appears to be two types of models in understanding the relationship between trauma, hearing voices and dissociation. One model of trauma-intrusive hallucinations emphasises lack of integration of the specific trauma within the self-identity, leading to fragmentation of the self. This model is not supported by this research as the lack of trauma integration would be likely to associate with higher PTSD symptoms in the voice hearing group.

This is important because it makes clinical sense to treat the dissociation actively through psychological strategies. There is good evidence for the effectiveness of desensitisation treatment strategies aimed at managing PTSD symptoms, via the restructuring of traumatic memories. However, although these treatment strategies may be useful for trauma-specific dissociation such as flashbacks, they may not be appropriate for dealing with general dissociative symptoms or trauma-intrusive hallucinations.

This research supports the alternate model that trauma-intrusive voices are mediated by symptoms of dissociation. However, although these treatment strategies may be useful for trauma-specific dissociation such as flashbacks, they may not be appropriate for dealing with general dissociative symptoms or trauma-intrusive hallucinations.

This research supports the proposal that trauma-intrusive voices are mediated by symptoms of dissociation. It builds on other studies to encourage exploration of symptoms of loss of awareness, derealisation and depersonalisation in patients when trauma-intrusive hallucinations are considered.

Clinicians report being able to differentiate between ‘true’ and ‘pseudos’ hallucinations, possibly because they identify the state of dissociation and assess hearing voices in that context. Consideration needs to be given to psychological strategies targeting trauma and dissociative symptoms, rather than predominantly focusing on medication strategies, in managing trauma-induced hallucinations.

Desensitisation treatment strategies may be useful for trauma-specific dissociation such as flashbacks, but may not be appropriate for dealing with general dissociative symptoms including trauma-intrusive hallucinations. The concept of anchoring in terms of the self and the external world may be more useful in managing the experience of trauma-intrusive hallucinations.

Table 3 Regression statistics for prediction of Psychotic Symptoms Rating Scale

| Model 1 | B     | s.e.  | β    | P     |
|---------|-------|-------|------|-------|
| Derealisation/depersonalisation | 0.310 | 0.158 | 0.285 | 0.055 |
| Loss of awareness | 0.312 | 0.184 | 0.252 | 0.095 |
| Psychogenic amnesia | −0.010 | −0.288 | −0.004 | 0.973 |
| Model 2 | B     | s.e.  | β    | P     |
| Derealisation/depersonalisation | 0.341 | 0.175 | 0.314 | 0.056 |
| Loss of awareness | 0.368 | 0.189 | 0.297 | 0.057 |
| Psychogenic amnesia | 0.051 | 0.293 | 0.021 | 0.863 |
| Sexual violence | −7.462 | 3.965 | −0.233 | 0.065 |
| Age of patient | −0.103 | 0.129 | −0.091 | 0.426 |
| PTSD Symptoms Scale Interview | −0.269 | 0.203 | −0.217 | 0.191 |

regarding sense of self and the outside world as well as poor reality testing, as causing trauma-intrusive hallucinations. The concept of anchoring is useful because it suggests a potential treatment strategy, where anchoring in terms of the self and the external world could be used to manage the experience of trauma-intrusive hallucinations.

Limitations

This research has clear limitations and methodological problems. By its nature this research is retrospective and relies on current descriptions of past trauma, which leaves memories open to retrospective contamination. It also requires retrospective description of experiences like dissociation and hallucinations, which by their nature are unreliable. The internal cognitive experience of dissociation is difficult to describe both subjectively and objectively, which makes dissociative experiences difficult to operationalise.

It was a non-random sample that was dependent on clinical accuracy regarding diagnosis. Multiple diagnoses and comorbidity can also present significant difficulties in these complex cases, when examining hearing voices. The experience of hearing voices can also occur in normal individuals outside of the diagnosis of PTSD. This study does, however, have the clear benefit of being able to target individuals with ‘real-world’ clinically challenging cases.

Clinical implications

This research supports the proposal that trauma-intrusive voices are mediated by symptoms of dissociation. It builds on other studies to encourage exploration of symptoms of loss of awareness, derealisation and depersonalisation in patients when trauma-intrusive hallucinations are considered.

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