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1 The Voice Characterisation Checklist:
2 Psychometric Properties of a Brief Clinical
3 Assessment of Voices as Social Agents
4

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28 1. Abstract

29 **Aim:** There is growing interest in tailoring psychological interventions for distressing voices and
30 a need for reliable tools to assess phenomenological features which might influence treatment
31 response. This study examines the reliability and internal consistency of the Voice
32 Characterisation Checklist (VoCC), a novel 10-item tool which assesses degree of voice
33 characterisation, identified as relevant to a new wave of relational approaches.

34 **Method:** The sample comprised participants experiencing distressing voices, recruited at
35 baseline on the AVATAR2 trial between January 2021 and July 2022 (n=170). Inter-rater
36 reliability (IRR) and internal consistency analyses (Cronbach's alpha) were conducted.

37 **Results:** The majority of participants reported some degree of voice personification (94%) with
38 high endorsement of voices as distinct auditory experiences (87%) with basic attributes of
39 gender and age (82%). While most identified a voice intention (75%) and personality (76%),
40 attribution of mental states (35%) to the voice ("What are they thinking?") and a known
41 historical relationship (36%) were less common. The internal consistency of the VoCC was
42 acceptable (10 items; $\alpha = .71$). IRR analysis indicated acceptable to excellent reliability at the
43 item-level for 9/10 items and moderate agreement between raters' global (binary) classification
44 of more vs. less highly characterised voices, $\kappa = .549$ (95% CI, .240 to .859), $p < .05$.

45 **Conclusion:** The VoCC is a reliable and internally consistent tool for assessing voice
46 characterisation and will be used to test whether voice characterisation moderates treatment
47 outcome to AVATAR therapy. There is potential wider utility within clinical trials of other
48 relational therapies as well as routine clinical practice.
49

50 2. Background

51 Voice-hearing, or auditory verbal hallucinations (AVH), are a common experience among those
52 diagnosed with psychotic disorders (1) and there is growing interest in voice-hearing across diagnoses as
53 well (2). While voices can occur in the general population without associated distress (Linscott and van
54 Os, 2013; Peters et al 2016), for a significant number of voice-hearers, the experiences become
55 persecutory, debilitating and persist despite interventions (3).

56 Voices are often described in terms of an experience of communication with a personified other (4,5),
57 and there has been longstanding interest in this aspect of voice phenomenology (6,7). Personification or
58 characterisation of voices (terms we view as essentially equivalent) is common, and around 70% of
59 voice-hearers associate their voice(s) with "characterful qualities" (8); that is, people or person-like
60 entities with distinct characteristics, such as gender, age, patterned emotional responses, or intentions.
61 In a study involving people accessing early intervention in psychosis services 40% of participants
62 described complex voice personification (4). This was defined as the voice having more than one kind of
63 person-like quality, including elaborate descriptions of intentional states (the voice wants/thinks/feels),
64 agency (the voice will "make something happen"), or identity (the voice "comes" from somewhere or
65 has a specific and idiosyncratic ontological status). The increased recognition of the communicative and
66 relational aspects of voice-hearing demonstrated by such studies, reflects an important evolution from
67 early information processing accounts which centred on the misattribution of an "auditory stimulus" to
68 an external source (see (9) for a discussion). While existing tools adopt a multidimensional approach to

69 voices, including assessment of coping strategies, rating of beliefs and acceptance or mindfulness, there
70 are currently no validated measures assessing voice characterisation (10).

71 There is growing interest in developing treatments, which are tailored to diverse
72 phenomenological features of voice-hearing (11). This includes a new wave of psychological
73 interventions which target the relationship between the person and their voice, specifically Relating
74 Therapy (12), Talking with Voices (Longden et al., 2021) and AVATAR therapy (14). In AVATAR therapy, a
75 novel therapeutic context allows 'face-to-face' dialogue between the person and a computerised
76 representation of their persecutory voice. Using voice-transformation software, the therapist facilitates
77 a dialogue between the person and the avatar in which the person develops an increased sense of
78 power, control, and confidence within the relationship. This approach has been shown, in a fully
79 powered trial, to reduce voice frequency and voice-related distress when compared with an active
80 control at the end of therapy (primary endpoint) although group differences did not persist at follow-up
81 (15). A large multi-site randomized controlled trial focused on optimization and implementation is
82 underway (16). While there is promising evidence of effectiveness, including emerging replication by
83 independent research teams (17) there is a need for research into factors which might influence
84 AVATAR therapy outcomes that are likely to be relevant to other relational approaches.

85 A study published as part of the first AVATAR therapy trial investigated whether the experience
86 of a person's dominant voice as a highly characterised social agent was associated with differences in
87 voice engagement in both daily life and during AVATAR therapy (18). In line with study hypotheses,
88 more highly characterised voices were associated with increased behavioural engagement with voices in
89 daily life and, crucially, increased dialogic engagement during AVATAR dialogues. While this suggested
90 that voice characterisation may be an important factor in engagement with AVATAR therapy, the study
91 was not designed to test the key question as to whether this phenomenological aspect of voices might
92 moderate treatment outcomes. To date, studies exploring voice characterisation or personification have
93 utilised coding of phenomenology based on detailed clinical assessments (18) or qualitative interviews
94 (4). This approach is well suited to exploration of what can be complex and nuanced voice
95 phenomenology but presents challenges in a large clinical trial with the requirement for a
96 comprehensive assessment battery of validated measures.

97 A tool capable of assessing voice characterisation in an efficient but robust manner is therefore
98 required to examine the impact of voice characterisation on outcomes following intervention. Such a
99 tool would also have wider utility beyond the research context, for example, as an aid to comprehensive
100 clinical assessment of this hitherto neglected aspect of the voice hearing experience. The AVATAR2 trial
101 is a multi-site randomised controlled trial of AVATAR therapy in comparison to treatment as usual (16).
102 As part of the trial design, we have developed the Voice Characterisation Checklist (VoCC) based on the
103 framework developed in AVATAR1 (18) and aim to examine its reliability with the large sample of voice-
104 hearers taking part in AVATAR2. This group of voice-hearers report current voice-related distress and
105 include a wide range of pathways to care and voice-hearing experiences.

106 Aims

- 107 • To examine the reliability and factor structure of the Voice Characterisation Checklist (VoCC) in a
108 sample of people who hear distressing voices.
- 109 • To report a preliminary description of the characterisation of the voice-hearing experiences in
110 participants in the AVATAR2 clinical trial.

111 3. Method

112 Recruitment

113 AVATAR2 is a multi-site parallel group randomised controlled trial which is due to be completed in
114 October 2023 (16). Randomisation to AVATAR-brief (6 sessions), AVATAR-extended (12 sessions) therapy
115 or Treatment as Usual was performed on a 1:1:1 allocation basis and was stratified by voice
116 characterisation (more vs. less highly characterised). Four UK research sites took part in the trial: King's
117 College London, University College London, The University of Manchester and the University of Glasgow.
118 Each research site was linked to two National Health Service (NHS) Trusts/Health Boards, where
119 potential participants were identified and referred to the trial by their treating clinician. Self-referrals
120 were considered too, and recruitment databases and consent for contact (C4C) initiatives were also
121 utilised where available to maximise the participant pool.

122 The full inclusion and exclusion criteria can be found in the published protocol (16), in brief, participants
123 were adults who had been hearing a distressing voice(/s) within the context of psychosis for at least six
124 months at the time of the baseline assessment.

125 Procedure

126 The Voice Characterisation Checklist (VoCC) was administered as a semi-structured interview by
127 research assistants as part of the baseline assessment which took place face-to-face or online. To
128 prevent rater drift across the trial, research assistants received training, passed an observed assessment,
129 and attended weekly group supervision from clinicians in administration of this and other measures.

130 Measures

131 Voice Characterisation Checklist (VoCC)

132 The voice characterisation checklist was devised from a qualitative coding framework employed by
133 Ward et al. (2021) in their study of voice characterisation and avatar engagement, which was itself
134 informed by previous phenomenological work e.g., (8). The VoCC is administered as an interview and
135 scored by the interviewer, the language used to refer to the voices is flexible to enhance communication
136 and understanding and interviewers may use a variety of terms; singular, plural, voices and others. In
137 the VoCC there are 10 items, scored 'Yes', 'No' or 'Don't Know' which assess key areas highlighted in the
138 qualitative coding framework: identity, physical and psychosocial characteristics. Items are scored 'Yes'
139 where participants can provide information in response to the question, a 'No' where they have no
140 information to provide, and 'Don't Know' if they are unsure if it applies to their voice. Anecdotally
141 reported time to administer the VoCC ranged from 5-30 minutes. The range of scores is 0-10 and a score
142 of 7+ is the threshold for a more highly characterised voice as this ensures the voice has traits in all
143 three categories. The VoCC is free to use and available in Figure 1.

144 **[Figure 1]**

145 **Statistical Tests**

146 The descriptive statistics of the included sample as well as the frequency of VoCC responses were
147 reported, to provide a general overview of the data. The scale's reliability was assessed through inter-
148 rater reliability and internal consistency analysis (Cronbach's alpha). Inter-rater reliability was assessed
149 in a sample of 33 AVATAR2 participants, who were randomly selected from the pool of participants' IDs
150 across four sites: South London ($n=8$), North London ($n=8$), Manchester ($n=9$), Glasgow ($n=8$). A total of
151 13 research assistants from the four sites are represented in the scores used. The lead author (CE), acted

152 as the expert scorer and blind rated the VoCC from audio recordings. Internal consistency, on the other
153 hand, was determined by assessing the correlation between items within the scale.

154 To determine the underlying construct or factors and assess the validity of the conceptual model, an
155 exploratory factor analysis (EFA) was conducted on the 10 VoCC items (19). For this analysis, the
156 iterated principal axis method, also known as principal factors, was used as the factoring estimation
157 method. This method is a robust and efficient way of finding the few factors that account for the
158 common variance of several variables. Oblique rotation (promax) was used to better interpret the factor
159 loading (20). Promax allows for correlated factors, which is more realistic in many psychological studies
160 (21)

161 Before conducting the factor analysis, the Bartlett test of sphericity was conducted. A *p*-value less than
162 0.05 indicates that the correlation matrix of the observed variables is not an identity matrix, and that the
163 variables are correlated enough, therefore suitable for factor analysis. Additionally, the Kaiser-Meyer-
164 Olkin (KMO) measure of sampling adequacy was calculated to provide an overall measure of the overlap
165 (shared variance) between the variables. A KMO value of more than 0.6 is generally considered
166 acceptable, indicating that the sample is suitable for factor analysis (22)(Statistical analyses were
167 conducted using Stata Statistical Software: Release 17. College Station, TX: StataCorp LLC, and R
168 statistical program (2022) (23).

169 4. Results

170 **Sample**

171 The sample comprised participants who had completed their baseline assessment as part of the
172 AVATAR2 trial between January 2021 and July 2022, the cut-off date for uploading the database for this
173 study (n=170). All participants, demographic characteristics are presented in **Table 1**.

174

175 **[Table 1]**

176 Frequency of Responses

177 The "Unclear/Don't Know" response choice is recoded as "Absent" to create a dichotomised variable.

178 The frequency of dichotomised response choices for each item is presented in **Table 2** and **Figure 2**.

179 Overall, there are 561 Absent (33%) and 1139 Present responses (67%). Bases on the overall cut-off
180 score 7 or higher, from the 170 participants, 71 (41.8%) were classified as less highly characterised and
181 99 (58.2%) were classified as more highly characterised, with the ratio of 1.4 (more/less).

182 **[Table 2]**

183 **[Figure 2]**

184 An example of responses to the VoCC for more versus less highly characterised voices can be seen in
185 **Table 3**. These responses were given by two participants of the AVATAR2 trial when administered the
186 VoCC at baseline assessment, details have been altered to protect patient identity.

187 **[Table 3]**

188 Statistical analysis

189 To evaluate the item-to-item relationship of the VoCC, a pairwise correlation analysis was conducted on
190 the 10 binary variables (indicating the presence or absence of each characteristic). The results of this
191 analysis are presented in **Table 4**. Subsequently, an exploratory factor analysis was performed on this
192 matrix to identify underlying latent factors and patterns of association among the variables. The highest
193 correlation observed was between the presence of Q2 and Q9 ($r = 0.49$), while the lowest correlation
194 was found between the presence Q2 and Q6 ($r = -0.002$).

195 **[Table 4]**

196 Factor analysis

197 The Bartlett sphericity test findings were acceptable ($Chi^2 = 238.9$, $df = 45$, $p < 0.0001$) and KMO = 0.772
198 (>0.60 is desirable). Two factors had an eigenvalue of more than one and cumulatively explained about
199 29% of the data variance. The correlation between the two factors was 0.63 and the factor loading for
200 each item is presented in **(Table 5)**.

201 **[Table 5]**

202 Internal consistency

203 The α coefficient (Cronbach's α) for the 10 items of the VoCC was 0.71, which is considered acceptable
204 within the range of 0.7 to 0.8. An examination of item-level correlations and Cronbach's α after
205 removing each item revealed no significant impact on the overall α coefficient, as none of the
206 coefficients exceeded the all-items coefficient **(Table 6)**.

207 **[Table 6]**

208 Inter-rater reliability

209 The agreement among reviewers was measured using three coefficients: percentage agreement,
210 Cohen's Kappa, and Krippendorff's Alpha. The levels of agreement were categorized as follows: poor (0),
211 slight (0.1-0.2), fair (0.21-0.4), moderate (0.41-0.6), substantial (0.61-0.8), or near perfect (0.81-0.99)
212 (24). The inter-rater coefficients were measured first for each of the items **(Table 7)** and then for the
213 overall categorization (more vs less highly characterised) **(Table 8)**. At the item-level, inter-rater
214 reliability showed acceptable to excellent reliability for Q1, Q2, Q3, Q4, Q5, Q6, Q8, Q9, and Q10 with
215 coefficients ranging from (Cohen's Kappa = 0.61 to 1.0) and poor reliability for Q7 (Cohen's Kappa =
216 0.40). The inter-rater reliability for overall categorisation was in the moderate range.

217 **[Table 7]**

218 **[Table 8]**

219 Discussion

220 This study aimed to present the VoCC as a novel brief (10 item) tool for assessing the extent to which a
221 distressing voice is experienced as a characterised social agent. The study has demonstrated its
222 reliability and internal consistency within a large sample of people who experience distressing voices,
223 recruited as part of the AVATAR2 trial. The findings therefore establish the VoCC as a useful research
224 tool, capable of reliably (and quickly) assessing voice characterisation, which we hypothesise to be a
225 potential moderator of treatment outcome in AVATAR therapy. In addition to use in a research context,
226 where the VoCC's brevity means it is easily integrated as part of an assessment battery, the tool has also

227 been designed with wider utility in mind as a means of facilitating assessment of voice characterisation
228 in routine clinical practice.

229 The descriptive data indicate that most people in the AVATAR2 sample report voices which are
230 personified to some degree (94%) with high endorsement of voices as distinct auditory experiences
231 (from one another and other sounds) (87%) and with associated basic attributes of gender and age
232 (82%). Endorsement of psychosocial aspects was more varied. For example, while most people identified
233 a basic voice intention (75%) and personality (76%), only around a third (35%) endorsed the item
234 assessing attribution of mental states to the voice (“What are they thinking?”). A similar minority of
235 people identified a known historical relationship with the voice (36%) although the nature of these
236 autobiographical relationships was not possible to determine from the checklist- context which is likely
237 to be crucial within the nuance of a relational intervention, where developmental trauma often plays a
238 pivotal role. This descriptive pattern of endorsement across items was supported by the factor analysis
239 which confirmed two factors, one incorporating physical and identity characteristics, and the other the
240 psychosocial characteristics. The two items focused on relationships between the voice and others (Q9
241 and 10), originally conceptualised as psychosocial characteristics, loaded onto Factor I. The stronger
242 association between these relational items and the identity and physical characteristics of the voice
243 rather than the psychological items in Factor II should be examined in further validation of this scale.
244 Overall, the findings are consistent with the proposition that characterisation (or personification) is a
245 common feature of voice-hearing but also suggest the relevance of potential “levels of agency” (25).
246 While not designed to explore the granular complexity of voice agency, the data from the VoCC appear
247 broadly consistent with earlier phenomenological work (4) suggesting that most voices recurred over
248 time, had a distinct character, but could not be related to a known person (termed “internally
249 individuated agency” (25)) and reported by 75% of people in the study by Alderson-Day et al (4).

250 In summary, the findings presented here therefore confirm, in a large empirical/quantitative study, that
251 voice characterisation is a common phenomenon among distressed voice hearers, with most of this sub-
252 sample endorsing the items regarding physical characteristics and identity. Fewer people (although still
253 a significant minority of 30-40%) endorsed the psychosocial items around the intention and thoughts of
254 the voice, which may reflect more general difficulties in mental state attribution (26). The threshold for
255 more highly characterised voices in the VoCC (a score of 7 or above) requires someone to endorse items
256 across both the physical and psychosocial categories. This does not account for the complexity of the
257 characteristics, but only that an awareness of both physical and psychosocial components are part of
258 the person’s experience of the voice; this therefore is a low threshold for considering a voice to be more
259 highly characterised when compared with the thresholds devised utilising qualitative frameworks. In line
260 with this, we found 58.2% people reached the threshold for more highly characterised voices in this sub-
261 sample compared to earlier work (27) in which 33% per cent reported high voice characterisation, 42%
262 medium and 25% low. Previous work (4,27) highlight differences in voice engagement between high
263 characterisation versus low/medium characterisation meaning that the current VoCC threshold will
264 require further validation in future work. Nonetheless, from a clinical utility standpoint, the VoCC
265 presented in this paper appears a useful tool to facilitate clinical assessment around this potentially
266 important feature of voice-hearing (see clinical implications).

267 **Limitations**

268 While we have demonstrated reliability and internal consistency, validity of the VoCC was not examined
269 because, to our knowledge, there are no validated quantitative measures which assess this specific
270 construct. Future studies could explore convergent validity of the VoCC with coding of voice
271 personification based on qualitative analysis e.g. (4). It should be noted that the purpose of the VoCC is
272 not to supplant the valuable insights delivered through qualitative work but rather to connect this
273 important phenomenological work with the exigencies of a clinical trial and routine clinical practice.
274 With respect to constructs which are plausibly linked to characterisation, the DAIMON measure (28) has
275 been developed to assess the dialogical and emotional aspects of the relationship(s) between the voice-
276 hearer and their voices and relationships with the VoCC could be explored in future research.

277 While reliability of the categorisation of voices as more versus less highly characterised was acceptable
278 overall, the least reliable question from the item-level analysis was “does the voice have its own
279 personality?”. While this might be viewed as a central question, assessing a sense of personality or
280 character is arguably a more complex task compared to other items. It may therefore be that this item is
281 less suited to a briefer “checklist” with evidence that rater disagreement related to times where
282 researchers were rating based on contextual information emerging at other stages of the assessment. It
283 was notable that the overall reliability of the measure was improved with removal of this item.
284 Therefore, one suggested option is to streamline the VoCC to include 9 items but retain this question at
285 the end as an optional (but suggested) aid to clinical assessment.

286 Finally, it is important to note that participants in this study (n=170) were recruited as part of a trial for a
287 relational intervention for voices (AVATAR therapy), so we are not able to generalise these findings to
288 people who hear voices more generally, both in clinical groups and people who experience voices
289 without an associated need for care.

290 **Future directions**

291 The VoCC was developed as part of the AVATAR2 trial, to enable voice characterisation to be included as
292 a moderator of treatment outcome following AVATAR therapy. The VoCC has been used to stratify
293 randomisations according to degree of voice characterisation (adopting a binary classification of “more
294 highly” vs “less highly” characterised). The tool has been suitable for integration within a comprehensive
295 trial baseline assessment and the findings are positive with respect to establishing reliability and internal
296 consistency. However, linked to its use as a stratification variable, a further key test of utility of the VoCC
297 will come in the planned analysis of moderation of treatment outcome by degree of characterisation. If
298 the VoCC does show utility with respect to these planned moderation analyses, it would suggest
299 opportunities for exploring its use in trials of other relational approaches to working with distressing
300 voices. For example, the Talking with Voices approach adopts an inclusion criterion based on people
301 experiencing voices which are (at least to some degree) dialogic in form, given the nature of the therapy
302 which involves direct (facilitated) dialogues with the voices. This inclusion decision is based on a
303 discussion with participants to establish whether the approach is a “good fit” for the person. Pilot work
304 in the Talking with Voices approach suggests that instances in which people were unable or unwilling to
305 engage in voice dialogue were relatively uncommon (Longden, Personal communication). Nonetheless,
306 if characterization as assessed by VoCC is shown to moderate treatment outcome to AVATAR therapy, it
307 would be of interest to explore whether this is also observed in other dialogical approaches.

308 In addition to use in clinical trials, the questions themselves have been reported as helpful by some
309 participants on the AVATAR2 trial, underscoring the importance of routinely assessing the social and

310 relational elements relevant to the person and their voices. In our view, this relates to an attitude of
311 respectful curiosity to voice phenomenology and developmental context which is central to the AVATAR
312 therapy approach. We recommend potential use of the VoCC in clinical practice as part of a standard
313 voices assessment. Use of the tool delivers an important, early message that the clinician is respectfully
314 open to considering voices as nuanced, social communicative agents within the person's life rather than
315 just a symptom. A richer understanding of voice characterisation, including attribution of thought and
316 intention, can facilitate the process of building understanding and meaning making. It also acts as an
317 invitation to consider possible mirroring of current voice experiences with other relationships,
318 autobiographical context, and the role of trauma (See also (13)). Future work using the VoCC could also
319 benefit from measurement of potentially related constructs such as theory of mind, paranoia and
320 expressivity.

321 **Summary**

322 This study has, for the first time, presented a brief tool to assess degree of voice characterisation (the
323 VoCC), which is reliable, internally consistent, and capable of being delivered as part of clinical research
324 and practice. The VoCC meets a need for robust measures to assess constructs relevant to relational
325 therapies. Moving forward, the key test of utility will be whether it is helpful in helping us understand
326 the question of whether certain forms of voice-hearing are more amenable to dialogical interventions
327 such as AVATAR therapy.

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329 Intellectual property

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354 **References**

- 355 1. Waters F, Allen P, Aleman A, Fernyhough C, Woodward TS, Badcock JC, et al. Auditory Hallucinations
356 in Schizophrenia and Nonschizophrenia Populations: A Review and Integrated Model of Cognitive
357 Mechanisms. *Schizophr Bull.* 2012 Jul 1;38(4):683–93.
- 358 2. Schutte MJL, Linszen MMJ, Marschall TM, ffytche DH, Koops S, van Dellen E, et al. Hallucinations and
359 other psychotic experiences across diagnoses: A comparison of phenomenological features.
360 *Psychiatry Res.* 2020 Oct 1;292:113314.
- 361 3. Aleman A, Larøi F. Insights into hallucinations in schizophrenia: novel treatment approaches. *Expert
362 Rev Neurother.* 2011 Jul 1;11(7):1007–15.
- 363 4. Alderson-Day B, Woods A, Moseley P, Common S, Deamer F, Dodgson G, et al. Voice-Hearing and
364 Personification: Characterizing Social Qualities of Auditory Verbal Hallucinations in Early Psychosis.
365 *Schizophr Bull.* 2020 Jul 16;47.
- 366 5. Beavan V. Towards a definition of “hearing voices”: a phenomenological approach. *Psychosis.*
367 2011;3(1):63–73.
- 368 6. Chin JT, Hayward Mark, Drinnan Ange. Relating to voices: Exploring the relevance of this concept to
369 people who hear voices. *Psychol Psychother Theory Res Pract.* 2009;82(1):1–17.
- 370 7. Nayani TH, David AS. The auditory hallucination: a phenomenological survey. *Psychol Med.* 1996
371 Jan;26(1):177–89.
- 372 8. Woods A, Jones N, Alderson-Day B, Callard F, Fernyhough C. Experiences of hearing voices: analysis
373 of a novel phenomenological survey. *Lancet Psychiatry.* 2015;2(4):323–31.
- 374 9. Bell V. A Community of One: Social Cognition and Auditory Verbal Hallucinations. *PLOS Biol.* 2013
375 Dec 3;11(12):e1001723.
- 376 10. Ratcliff K, Farhall J, Shawyer F. Auditory hallucinations: a review of assessment tools. *Clin Psychol
377 Psychother.* 2011;18(6):524–34.
- 378 11. Dodgson G, Alderson-Day B, Smailes D, Ryles F, Mayer C, Glen-Davison J, et al. Tailoring cognitive
379 behavioural therapy to subtypes of voice-hearing using a novel tabletised manual: a feasibility
380 study. *Behav Cogn Psychother.* 2021 May;49(3):287–301.
- 381 12. Hayward M, Jones AM, Bogen-Johnston L, Thomas N, Strauss C. Relating therapy for distressing
382 auditory hallucinations: a pilot randomized controlled trial. *Schizophr Res.* 2017;183:137–42.

- 383 13. Longden E, Corstens D, Morrison AP, Larkin A, Murphy E, Holden N, et al. A treatment protocol to
384 guide the delivery of dialogical engagement with auditory hallucinations: Experience from the
385 Talking With Voices pilot trial. *Psychol Psychother Theory Res Pract.* 2021;94(3):558–72.
- 386 14. Ward T, Rus-Calafell M, Ramadhan Z, Soumelidou O, Fornells-Ambrojo M, Garety P, et al. AVATAR
387 Therapy for Distressing Voices: A Comprehensive Account of Therapeutic Targets. *Schizophr Bull.*
388 2020 Sep 21;46(5):1038–44.
- 389 15. Craig TK, Rus-Calafell M, Ward T, Leff JP, Huckvale M, Howarth E, et al. AVATAR therapy for auditory
390 verbal hallucinations in people with psychosis: a single-blind, randomised controlled trial. *Lancet*
391 *Psychiatry.* 2018;5(1):31–40.
- 392 16. Garety P, Edwards CJ, Ward T, Emsley R, Huckvale M, McCrone P, et al. Optimising AVATAR therapy
393 for people who hear distressing voices: study protocol for the AVATAR2 multi-centre randomised
394 controlled trial. *Trials.* 2021 May 25;22(1):366.
- 395 17. Dellazizzo L, Giguère S, Léveillé N, Potvin S, Dumais A. A systematic review of relational-based
396 therapies for the treatment of auditory hallucinations in patients with psychotic disorders. *Psychol*
397 *Med.* 2022 Aug;52(11):2001–8.
- 398 18. Ward T, Lister R, Fornells-Ambrojo M, Rus-Calafell M, Edwards CJ, O'Brien C, et al. The role of
399 characterisation in everyday voice engagement and AVATAR therapy dialogue. *Psychol Med.* 2021
400 Apr 8;1–8.
- 401 19. Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ. Evaluating the use of exploratory factor
402 analysis in psychological research. *Psychol Methods.* 1999;4:272–99.
- 403 20. Brown TA. *Confirmatory factor analysis for applied research.* New York, NY, US: The Guilford Press;
404 2006. xiii, 475 p. (Confirmatory factor analysis for applied research).
- 405 21. Finch H. Comparison of the Performance of Varimax and Promax Rotations: Factor Structure
406 Recovery for Dichotomous Items. *J Educ Meas.* 2006;43(1):39–52.
- 407 22. Watkins MW. *Exploratory Factor Analysis: A Guide to Best Practice.* J Black Psychol. 2018 Apr
408 1;44(3):219–46.
- 409 23. R Foundation for Statistical Computing RCT. *R: A language and environment for statistical*
410 *computing.* , Vienna, Austria. URL <https://www.R-project.org/>. [Internet]. Vienna Austria; 2022.
411 Available from: <https://www.R-project.org/>.
- 412 24. Jeyaraman MM, Al-Yousif N, Robson RC, Copstein L, Balijepalli C, Hofer K, et al. Inter-rater reliability
413 and validity of risk of bias instrument for non-randomized studies of exposures: a study protocol.
414 *Syst Rev.* 2020 Feb 12;9(1):32.
- 415 25. Wilkinson S, Bell V. The Representation of Agents in Auditory Verbal Hallucinations. *Mind Lang.*
416 2016;31(1):104–26.

- 417 26. Corcoran R, Rowse G, Moore R, Blackwood N, Kinderman P, Howard R, et al. A transdiagnostic
418 investigation of ‘theory of mind’ and ‘jumping to conclusions’ in patients with persecutory
419 delusions. *Psychol Med*. 2008 Nov;38(11):1577–83.
- 420 27. Ward T, Lister R, Fornells-Ambrojo M, Rus-Calafell M, Edwards C, O’Brien C, et al. The role of
421 characterisation in everyday voice engagement and AVATAR therapy dialogue. *Psychol Med*
422 [Internet]. 2021 Feb 8 [cited 2021 Feb 15]; Available from:
423 [https://kclpure.kcl.ac.uk/portal/en/publications/the-role-of-characterisation-in-everyday-voice-](https://kclpure.kcl.ac.uk/portal/en/publications/the-role-of-characterisation-in-everyday-voice-engagement-and-avatar-therapy-dialogue(25ba194a-e43d-44d3-954a-73c9a5c1999d)/export.html)
424 [engagement-and-avatar-therapy-dialogue\(25ba194a-e43d-44d3-954a-73c9a5c1999d\)/export.html](https://kclpure.kcl.ac.uk/portal/en/publications/the-role-of-characterisation-in-everyday-voice-engagement-and-avatar-therapy-dialogue(25ba194a-e43d-44d3-954a-73c9a5c1999d)/export.html)
- 425 28. Rosen C, Chase K, Perona-Garcelán S, Marvin R, Sharma R. The psychometric properties of the
426 DAIMON Scale, a translation from Spanish to English: An instrument to measure the relationship
427 with and between voices. *Psychosis*. 2019 Sep 2;12:1–12.

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