The Role of Internalised Stigma in Clinical and Non-clinical Voice-Hearers

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Systematic Literature Review

Empirical Research Project

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Overview

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Chapter One: Systematic Literature Review

Digitally Enhanced Psychological Assessment and Treatment of Paranoia: A Systematic Review

Supervised by Dr Simon Riches

Abstract

Background: Paranoia is relatively common but can lead to significant distress, impairment and need for care. Digital technologies offer a valuable extension to service provision and are increasingly being integrated into healthcare. This systematic review evaluated feasibility, acceptability, and effectiveness of digitally enhanced psychological assessments and treatments for paranoia across the paranoia continuum (PROSPERO: CRD42023393257).

Methods: Databases PsychINFO, EMBASE, MEDLINE and Web of Science were searched until 12th June 2023; the Effective Public Health Practice Project (EPHPP) quality assessment tool evaluated studies; and a narrative synthesis was conducted.

Results: Twenty-seven studies met inclusion criteria (n=3,457, twenty-three assessment and four treatment, 2005-2023, most in Europe). Technologies included virtual reality (VR, n=23), experience sampling methodology (ESM, n=2), an app (n=1) and a combination of VR and ESM (n=1). Assessments involved monitoring paranoia under various virtual conditions or in everyday life. Treatments were generally integrated into Cognitive Behaviour Therapy (CBT), which involved using VR to test out threat beliefs and drop safety behaviours or using an app to support slowing down paranoid thinking. EPHPP ratings were strong (n=8), moderate (n=12), and weak (n=7).

Conclusions: Digitally enhanced assessments and treatments showed promising acceptability, feasibility, and treatment effectiveness. Limitations of studies include small sample sizes, lack of comparison groups and long-term data and limited randomised controlled trials. Results support the potential future integration of VR in the assessment of paranoia and show promise for treatments such as CBT, although further clinical trials are required. Investigation of other technologies is limited.

Contents

Introduction

1.1 Paranoia and psychological support

Paranoia, or fears of harm from others, can have a large impact on a person's wellbeing including difficulties with anxiety, low mood, sleep disturbances and quality of life (Freeman & Garety., 2014; Freeman et al., 2014; Bow-Thomas et al., 1999). The experience of paranoia is associated with psychosis spectrum disorders including schizophrenia (Freeman., 2007a). However, paranoia is also experienced across various other mental health disorders (Fanti et al., 2023; Na et al., 2019). Experiences of paranoia are relatively common in those with dementia, delirium, and are often experienced as a side effect of medication, especially for patients on intensive care units in general hospitals (Harrington & Vardi., 2014; Ashton., 2004). A 'hierarchy of paranoia' has been reported within the general population, with a greater proportion of people experiencing slight mistrust and suspicious thoughts at the bottom of the hierarchy, to smaller numbers experiencing persecutory beliefs at the top (Bebbington et al., 2013; Freeman et al., 2005; Freeman et al., 2011). A continuum view of paranoia across the general population has therefore been proposed (Freeman et al., 2005b).

People who experience paranoia in general hospitals can be offered assessment during consultation (Harrington & Vardi., 2014). Assessment of paranoia in mental health contexts often involves retrospective self-report during a psychological assessment with a trained psychiatrist or psychologist (NICE., 2014). Cognitive behaviour therapy for psychosis (CBTp) is a first line psychological treatment for psychosis (NICE., 2014). However, research has found modest effectiveness of CBTp, with one study finding that changes in delusions were not sustained beyond the end of therapy (Thomas et al., 2014; Mehl et al., 2015). More recently, a symptom-focused approach to treatment has gained momentum, enabling hypothesis testing of specific mechanisms underlying symptoms (Freeman., 2007a; Freeman, Taylor, Molodynski & Waite., 2019). This approach has shown promising results compared to generic CBTp (Lincoln & Peters., 2019). Technologies have begun to be harnessed within a symptom-focused approach, offering innovative approaches for treatment, although further exploration and development is required (Garety et al., 2020).

1.2 Digital mental health approaches for paranoia

Use of digital health technologies in mental health care has rapidly increased over recent years to improve service access, delivery, and monitoring (Hollis et al., 2015; Philippe et al., 2022). As such, opportunities for researching innovative technologies in mental health care has gained momentum (Ennis et al., 2012; Ben-Zeev et al., 2019; Freeman & Garety., 2014). Within the field of psychosis, researchers have developed and investigated the use of virtual reality (VR), smartphone apps, and computer assisted therapies (Mongalesh, Samad-Soltani & Farhang., 2022; Jameel et al., 2022; Clarke et al., 2019; Riches et al., 2021). For example, research has investigated digital experience sampling methodology (ESM) for symptom monitoring and integration of mobile apps and VR into psychological therapy such as CBT (Torous et al., 2021; Garety et al., 2021; Mongalesh, Samad-Soltani & Farhang., 2021). Several advantages to using digital technologies in psychosis and bipolar have been reported by experts by experience and staff, including greater accessibility, more immediate support and enhanced communication (Aref-Adib et al., 2019). However, despite the growth of digital mental health research in psychosis, this population have received less attention than other areas of mental health (Philippe et al., 2022).

Technologies have been proposed to either 'enhance' assessment and treatments or 'enable' them (Graham et al., 2020; Bond et al., 2023). Technologies that enhance tend to be used in addition, or act as an adjunct, to in-person care (Bond et al., 2023). Examples of enhancing technologies include the use of VR as an adjunct to CBT, or digital ESM as an adjunct to the retrospective self-reporting of symptoms. Enhancing digital technologies also have a more active role, where a person might be required to interact with the technology (Graham et al., 2020). In contrast, technologies that enable have been described as an alternative to in-person services, such as psychological therapy delivered by video call or on a computerised platform (Graham et al., 2020). A focus on technologies that enhance could be particularly helpful to assess how technology can extend and improve current treatment. For example, the use of assessing people's perceptions of pre-programmed, neutral digital characters (avatars) within a VR environment has been highlighted as a useful tool in extending non-digital therapy, as beliefs held about virtual characters can be understood as unfounded (Fornells-Ambrojo et al., 2008). The active engagement in enhancing digital

technologies therefore can extend testing threat beliefs beyond that of the physical environment.

It is advantageous to systematically review the role of technology in targeting discrete symptoms such as paranoia, in line with a symptom-focused treatment approach (Freeman et al., 2019). Despite this, there has been a limited focus on technologies used specifically within the paranoia continuum. One systematic review investigating VR interventions for paranoia in psychosis included eight studies, finding that VR was effective in reducing paranoia (Mongalesh, Samad-Soltani & Farhang., 2022). However, focusing on VR only may exclude other innovative technologies. Additionally, Mongalesh and colleagues (2022) focused on a clinical population and therefore might miss learning opportunities from studies and technologies conducted with participants experiencing paranoia beyond clinical contexts. Indeed, researchers in the field of paranoia have called for the continued investigation of persecutory beliefs and paranoid ideation (PI) across both clinical and non-clinical populations, for comparisons to be drawn (Freeman., 2007; Freeman et al., 2011). The present review focused on digitally enhanced assessments and treatments in clinical and non-clinical populations. Further, by focusing on paranoia exclusively, the review attempts to answer calls to investigate technologies targeting specific clinical characteristics of psychosis (Clarke et al., 2019; Mongalesh, Samad-Soltani and Farhang., 2022).

1.3 Aims of the review

This systematic review aimed to investigate the feasibility, acceptability, and effectiveness of digitally enhanced assessments and treatments for paranoia across the paranoia continuum. We also aimed to review potential barriers and adverse effects.

1. Methods

2.1 Search strategy

The search was carried out in line with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRIMSA) guidelines (Page et al., 2021). The review protocol was pre-registered on PROSPERO (CRD42023393257).

Database searches were conducted on 12th June 2023 using PsychINFO, EMBASE, MEDLINE and Web of Science. Searches were completed separately for each database, using truncations and using the abstract, keyword, and title search fields for the following terms: Paranoi* OR persecut* OR deluded OR delusion* OR suspicio* AND technol* OR internet OR web* OR computer* OR online OR digital OR app OR smartphone OR virtual real* OR VR OR virtual character* OR VCs OR virtual environ* OR augmented reality OR avatar* OR ehealth OR e-health OR mhealth OR m-health OR wearable* OR artificial intelligence OR AI AND psychotherap* OR psycholog* OR therap* OR "psychological assess*" OR "psychological treat*" OR intervent* OR self-help.

Results were limited to articles in English language and human participants. The 'explode' function was used for the following subject headings: 'digital technology', 'paranoia' and 'clinical psychology' across the OVID databases (PsychINFO, MEDLINE and EMBASE), to search for more specific terms within the broader headings. Two raters (MB, EO) independently ran all searches on each database, to check for consistency in results. Reference lists of previous systematic reviews in the area were reviewed and additional papers meeting inclusion criteria were included in the final review.

2.2 Inclusion and exclusion criteria

One of the key inclusion criteria was that studies involved the use of a digitally enhanced assessment and/or treatment for paranoia, or at least in part (i.e. blended digital and non-digital assessment or treatment). Inclusion criteria were 1) paranoia was the main aim or related to the hypothesis of the study (and studies included a measure of paranoia); 2) the digital technology was enhancing; 3) studies report on feasibility, acceptability or effectiveness; 4) clinical and/or general population participants; 5) any study design; 6) published in a peer reviewed academic journal; 7) sample size of at least 5 participants; 8) included quantitative data; 9) written in English.

Exclusion criteria included any studies that involved an enabling technology, i.e. a technology that is used in place of an in-person assessment or treatment (i.e. video-based CBT, computerised surveys/games). Purely qualitative studies and grey literature were also excluded.

2.3 Data extraction

Data from the searches was extracted and downloaded onto EndNote and into an excel spreadsheet for screening purposes.

All abstracts and titles of search results were reviewed against the above inclusion and exclusion criteria by one rater (MB). A second rater (EO) provided independent screening of study titles and abstracts in 20% of the search results, with any disagreements (1%) being discussed and resolved in meetings with a senior author (SR) and the research team.

The same procedure was completed during the full-text screening, whereby all included full text papers were reviewed against the inclusion and exclusion criteria by one independent rater (MB). 20% of the full text paper screening was completed by an independent rater (EO) and any disagreements (28%) were discussed until a consensus was reached.

Data on the following information was extracted for each included study: study title, year of study, country of study, sample size (including sub-group size/s if relevant), population details (clinical/non-clinical sample, any diagnoses if clinical group), how paranoia is measured in the sample, demographic details including mean age, study design, information on the technology used, overview of the study procedure related to the technology use and key findings. These study characteristics were populated into a table to provide an overview of the included studies (Table 1).

2.3 Quality assessment

The Effective Public Health Practice Project (EPHPP) quality assessment tool (Ciliska, Miccouci, & Dobbins., 1998) was used to assess the methodological quality of studies. The EPHPP tool (Appendix 2) was chosen due to it being applicable to use across several study methodologies (Ciliska, Miccouci, & Dobbins., 1998). Ratings of ‘strong’, ‘moderate’ and ‘weak’ for each domain were given, which were then assessed to produce a global quality rating. Some domains were rated as ‘N/A’ for studies where the specific items were not applicable. For example, the confounder domain requires two groups, so N/A was given for studies where there was only one group. A global rating of ‘strong’ was given when all domains were rated as either ‘moderate’ or ‘strong.’ Studies given a global score of ‘moderate’ contained one domain rated as ‘weak’ and studies with a global rating of ‘weak’ contained studies with two or more domains rated as ‘weak’. All papers were independently

quality rated by two raters (MB, EO) and disagreements were resolved through discussion with a senior author in the research team (SR).

2.4 Narrative synthesis

A narrative synthesis of the included studies was conducted, considering the Synthesis Without Meta-Analysis (SWiM) reporting guidelines for systematic reviews (Campbell et al., 2020). Studies were organised and grouped according to whether they were an assessment or treatment study. Within these two main categories, studies were grouped according to the technology used. In cases where studies used more than one technology in their design, results relating to the various technologies were separated to accurately report on each technology within the relevant subsections.

Feasibility of the digitally enhanced assessments and treatments was assessed by reviewing rates of withdrawals/dropouts, recruitment rates, retention data, whether delivery of the assessment/treatment went as planned and if there were any technological issues. Practical implementation barriers were also assessed. Acceptability was assessed by investigating technology-specific acceptability measures (i.e. cybersickness in VR) and qualitative feedback including reasons for withdrawals. Adverse effects or events related to the technologies were assessed as part of acceptability and are reported in the acceptability section. The effectiveness of technologies within treatment studies was assessed by reviewing the study aims and hypotheses against results.

2. Results

The initial database search yielded a total of 6,088 papers. The full screening process and reasons for study exclusions are detailed in Figure 1.

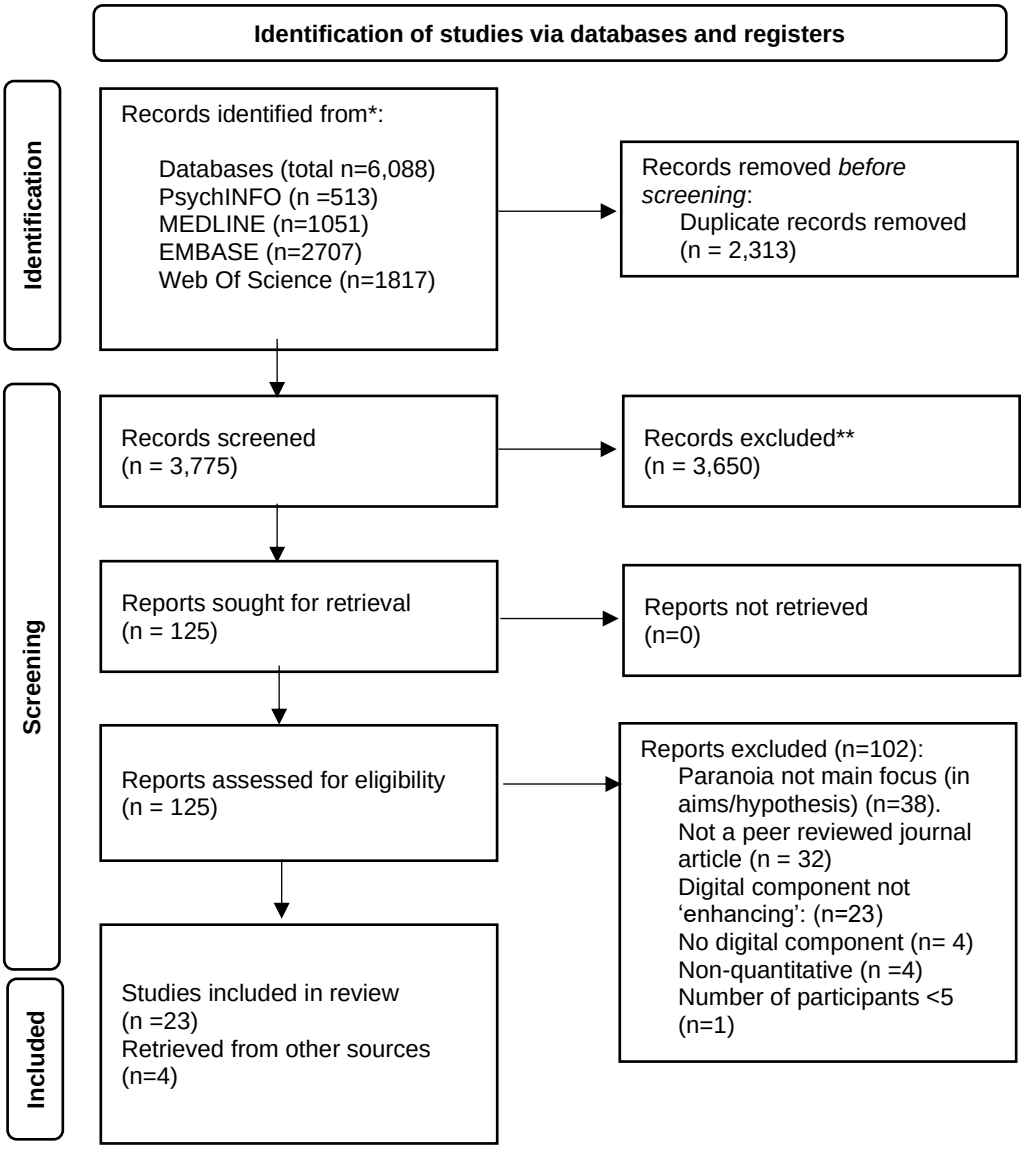

Figure 1: PRISMA 2020 flow diagram

3.1 Study characteristics

In total, twenty-seven studies were included in the review, including twenty-three assessment studies and four treatment studies. Study characteristics are displayed in Table 1. Almost all the included studies were conducted in Europe (n=26); fifteen studies were conducted in the UK, six studies in The Netherlands, two studies in Romania, and one study in Spain, Germany and Belgium. One study was conducted in the USA. Studies were published between 2005 and 2023, with thirteen published since 2018. Studies used cross-sectional cohort designs (n=11), case-control designs (n=7), RCTs (n=6), controlled clinical trials (n=2) and a prospective cohort study design (n=1; Freeman et al., 2014).

Thirteen studies sampled non-clinical participants, seven sampled clinical participants and seven sampled both clinical and non-clinical populations. Clinical populations tended to be participants with schizophrenia spectrum diagnoses as determined by the Diagnostic and Statistical Manual of Mental Disorders (DSM, American Psychiatric Association., 2013) or the International Classification of Diseases (ICD, World Health Organisation., 2019) and reporting persecutory delusions. Some clinical studies included participants with a first episode of psychosis (FEP) and participants at ultra high-risk of psychosis (UHR). The non-clinical samples were either stratified into high and low paranoia or sampled to include a full range of scores along the paranoia continuum. Non-clinical studies contained samples of university students, staff, and siblings of clinical groups in studies using matched controls.

A total of 3,457 participants took part in the included studies, with sample sizes ranging from 21 to 361 participants. All studies sampled participants aged 16 years and over, with a mean age of 31.2 years. Most studies included data on gender, although only female and male categories. Most studies had a higher proportion of male participants or similar proportions of male and female participants. Just over half of the included studies did not report on participant ethnic background (n=14), including seven studies that reported participant nationality only. Of the thirteen studies that recorded participant ethnicity, most included White participants. Only one study had a sample where there was a higher percentage of participants identifying from an Asian or Black ethnic background compared to a White ethnic background, across both clinical and non-clinical groups (Fornells-Ambrojo et al., 2008). Non-clinical groups tended to include a higher percentage of White participants than clinical participants, excluding the Fornells-Ambrojo study (2008).

Most studies investigated paranoia using VR only (n=23), one study utilised both VR and ESM (Pot Kolder et al., 2018b), two studies investigated ESM (Ben-Zeev et al., 2011; Geraets et al., 2020) and one study investigated a blended digital therapy and mobile app (Garety et al., 2021). One of the studies included in the assessment section of this review was a compassion treatment study, however the utilisation of VR was to assess paranoia, therefore is discussed in the assessment section of the review (Brown et al., 2020). Further, two assessment studies (Jongeneel et al., 2018; Pot-Kolder et al., 2018a) conducted secondary analyses from Veling and colleagues' study (2016).

Table 1: Characteristics of studies on digitally enhanced psychological assessments and treatments for paranoid thoughts

Study (Country)	Study design	Sample (N, population information)	Demographics (age, gender, ethnicity)	Technology	Procedure	Paranoia measure	Findings
Assessment studies							
Atherton et al., 2016 (UK)	Cross sectional cohort design	26 Non-clinical population from the general population who scored 17 and over on the GPTS-B (screened from a sample of 242 participants).	Mean age 43.4, 100% Male, No ethnicity data.	**VR:** HMD (NVIS SX111), with dual presenting images to both eyes. Audio sounds were played using headphones within the VR headset. Head orientation and positioning were tracked using an Intersense IS900 tracker and data was read using a VRPN IS900. Of note, this was replaced part way through due to technical difficulties with a VR1280 HMD (researchers recorded no change in levels of paranoia across these two VR	All participants completed two conditions (high and low self-confidence induction) before entering a neutral 6-minute journey on a London underground tube, including three stops at platforms.	GPTS-B; SSPS	Low self-confidence induction was associated with greater paranoia during the VR environment. Researchers did not report adverse events.

				conditions). Maya was used to program the VR environment. Rocket Box avatars were used in the VR environment.			
Ben-Zeev et al., 2011 (USA)	Cross-sectional cohort study	145 Clinical (DSM-IV diagnoses of Schizophrenia or schizoaffective disorder recruited from a larger intervention study).	Mean age 46.5, 61% Male, 60% White, 15% African American, 14% Hispanic, 11% 'other ethnicities'.	**ESM**: Computerised ESM (PMAT V2.1.2.) on a PDA carried by participants. Data was time stamped and responses were permitted within a 15-minute window of the ESM alert.	Completed ESM sampling 4 times a day over a 7-day period. ESM items contained 8 items from a larger questionnaire (Granholm et al, 2008), covering occurrence of persecutory ideation, belief conviction and distress, anxiety, sadness, internal anomalous experiences, recent external events and substance use.	PI item: ''Since the last questionnaire, have you had the impression that someone was spying on you or plotting against you?''.	49% participants experienced PI at least once. Prior anxiety and sadness had significant positive relationships with the log-odds of subsequent PI (controlling for prior PI). Substance use at a previous time point was significantly associated with reporting PI at the subsequent timepoint. Anomalous experiences did not significantly predict subsequent reports of PI.
Broome et al., 2013 (UK)	Cross-sectional cohort study	32 Non-clinical (university students)	Mean age 25.9, 72% male, 34.4% UK nationality (no ethnicity data reported)	**VR:** HMD (NVIS nVisor SX) and motion tracking system (Polhemus PATRIOT 6DOF). The VR environment was built using a C++ and OGRE game engine.	Participants were immersed into sitting at a bus stop. The scenario ran for 4 minutes and included people (avatars), cars, young men arriving at a scene, young men standing at a bus stop, a bus arriving and the men leaving at the same time.	G-PTS, SSPS	65.6% participants experienced PI during the VR scenario.

Della Libera et al., 2023 (Belgium)	Cross-sectional, cohort study	158 Non-clinical general population (recruited through adverts on social network platforms)	Mean age 30.5, 37.9% male, no data on ethnicity.	**VR:** Wireless Oculus Go headset using the Darius Café 360IV filmed using a Vuze+3D-360 VR camera.	Participants were immersed in The Darius Café bar containing 21 actors for 2.5 minutes and were instructed to behave as they usually would in a similar situation. Some actors were instructed to behave in line with eliciting specific symptoms. For eliciting paranoia, actors were instructed to either gaze or smile directly at the camera.	French version of the GPTS-B and French translation of the SSPS (Della Libera et al. 2021).	A small significant correlation was found between state and trait measures of paranoia. Place illusion negatively predicted state paranoia and social pressure positively predicted state paranoia. Low levels of cyber-sickness were found.
Fornells-Ambrojo, et al., 2008 (UK)	Cross sectional, case-control study	40 Clinical and non-clinical: the clinical group had F20-29; F31 ICD-10 diagnoses recruited from EI services in London. The non-clinical sample were 20 aged-matched controls from participant panels at IoPPN	Clinical group (n=20): Mean age 23.5, 85% Male, 35% Black, 45% Asian, 20% White. Non-clinical group (n=20): Mean age 25.5, 95% Male, 25% Black, 40% Asian, 35% White	**VR:** CAVE system using a Trimension ReaCTor. Participants carried a joystick and their head orientation and position was tracked.	The VR environment consisted of being in a virtual underground train carriage with 20 neutrally programmed avatars lasting 4 minutes. Participants were instructed to form impressions of the people in the environment and what they thought of the participants. Participants then completed post-VR assessments and were phoned a week later to check for adverse effects.	G-PTS; SSPS	The were no significant differences between the two groups in the reported levels of PI in the VR environment. A significant positive relationship was found between paranoia in VR and paranoia in the real world in the clinical participants. 65% of clinical participants and 57% of non-clinical participants endorsed paranoia about the avatars. No participants reported intrusive negative thoughts nor any unpleasant emotions or a change in behaviour related to the VR.

		at King's College London and University College London					
Freeman et al., 2014 (UK)	Prospective cohort study	106 Non-clinical: Participants who had experienced a distressing assault within the previous month and attended A&E as a result.	Mean age 34.4, 75% Male, 51% White, 13% Black Caribbean, 14% Black African, 5% Black Other, 16% Other ethnicity.	**VR:** HMD (VR1280) using the Intersense IS900 tracking system. The VR environment was created using DIVE software.	The VR session consisted of a 4-minute underground train ride between 2 stops and included neutral avatars, some who were programmed to respond to participants during the immersion such as smile.	GPTS, 4 VAS paranoia items related to the assault (*"Since the assault, I feel suspicious of other people"; "Since the assault, I feel fearful of all males";*	Paranoia in VR was positively associated with self-report and interviewer paranoia measures at 4 weeks after the assault. Paranoia in VR at 4 weeks predicted paranoia scores 6 months later. Paranoia in VR explained more of the variance than interviewer or self-report measures of paranoia.

						"Since the assault, I feel fearful of all females"; "Since the assault, I feel more fearful of other people than I should").	
Freeman et al., 2005 (UK)	Cross-sectional cohort study	30 Non-clinical respondents to a previous survey study, participants were selected to include a full range of responses on the paranoia scale.	Mean age 22, 50% male, 70% White, 17% Asian, 3% African, 10% Other ethnicity.	**VR:** CAVE system using a Trimension ReaCTor. Participants were given a joystick. Head orientation and positioning was tracked using IS900 VET system.	Participants were immersed in a virtual library room environment for 4 minutes with 5 avatars who were programmed to show ambiguous behaviours. Participants were asked to form an impression of these characters.	PS; 15 items on PI in VR (modified from Freeman, 2003)	Higher levels of paranoia predicted paranoia during the VR immersion. A sense of presence, timidity, hallucinatory experiences and anxiety all predicted paranoia in VR.
Freeman et al., 2008a (UK)	Cross sectional cohort study	200 Nonclinical (respondents to study adverts sent to all	Mean age 37.5, 50% Male, 68% White, 9% Black Caribbean, 5%	**VR:** HMD using a VR1280 and a Intersense VRPN IS900 tracking system. The DIVE platform was used to	Participants were immersed into a 5-minute underground train journey between 2 stops, with computer characters that were programmed to	SSPS	Participants with paranoia scored higher on the VAS perceived hostility of the computer characters than participants without paranoia. Participants with paranoia had increased odds of experiencing internal

		households in the local area)	Black African, 3% Black Other, 0.5% Indian, 0.5% Pakistani, 13% Other ethnicity.	programme the VR scenario.	occasionally interact with the participant.		anomalous experiences, while those with social anxiety did not.
Freeman et al., 2008b (UK)	Cross-sectional cohort study	200 Non-clinical (same as above)	Same as above	**VR:** As above	As above	GPTS Part B, SSPS, VAS of avatars	A significant association was found between trait paranoia and PI during VR. Participants were twice as likely to experience PI during VR if they reported day-to-day paranoia than those without day-to-day paranoia. Playing computer games, higher anxiety, worry, negative beliefs about the self and other, cognitive inflexibility, perceptual anomalies and loneliness all strongly predicted paranoia. No negative side effects of VR were reported, and symptoms were all lower and the end of testing than prior to entering the VR environment.
Freeman et al., 2010 (UK)	Cross-sectional case-control study	90 Clinical and non-clinical sample: 30 nonclinical participants with low paranoia, 30 nonclinical participants with high paranoia and 30 clinical	Nonclinical low paranoia group (n=30): Mean age 44.2, 60% Male, 83% White, 6.6% Black Caribbean, 6.6% Black African, 3.3%	**VR:** HMD using a VR1280 and a Intersense IS900 tracking system. The DIVE software platform was used to create the overall VR environment and Studio Max was used	Participants were immersed into a 4-minute train journey on an underground, with computer avatars also in the carriage, several were programmed to respond to a participant's behaviour such as gazing when looked at or smiling.	GPTS, SSPS, VAS of perceived hostility of the computer avatars and ratings of paranoia.	The clinical group were 12 times more likely to report paranoia in VR compared to the low paranoia group and the nonclinical, high paranoia group had a 2.86 times greater likelihood to report PI during VR than the low paranoia group. Higher paranoia was associated with number of traumatic events, increased anxiety, interpersonal sensitivity, depression and anomalous experiences across all groups. There were no pre-post VR changes in

		participants with a diagnosis of Schizophrenia, Schizoaffective disorder or delusional disorder experiencing at least 1 current persecutory delusion	Black other. Nonclinical high paranoia group (n=30): Mean age 36, 60% Male, 77% White, 10% Black Caribbean, 3.3% Black African, 3.3% Indian, 6.6% Other ethnicity. Persecutory delusions group (n=30): Mean age 44.2, 60% Male, 53.3% White, 10% Black Caribbean, 16.6% Black African, 10% Black Other, 3.3% Indian, 6.6% Other ethnicity	to create the avatars and train shell.			simulator sickness scores across the three groups.

Hundal et al., 2018 (UK)	RCT	32 Non-clinical high paranoia group (established using threshold scores of >21 on the GPS and recruited via adverts to local postcodes).	Placebo group (n=16): Mean age 25, 50% male, no ethnicity data. CBD group (n=16): Mean age 26, 50% male, no ethnicity data.	**VR:** HMD using a VR1280 and a Intersense VRPN IS900 tracking system. The DIVE platform was used to programme the VR scenario.	Participants were immersed in a 4-minute train journey between stations with avatars and completed measures following the VR exposure. The CBD group were given a single 600mg oral dose 130 min before entering the VR paradigm.	SSPS	Higher paranoia scores during VR were found in the CBD group compared to placebo but this did not reach statistical significance. Adverse events: 4 participants in the placebo group and 5 participants in the CBD group reported tiredness/sedation. In the CBD group, 2 participants reported nausea, and increased appetite/hunger, and 1 participant reported abdominal discomfort.
McDonnell et al., 2018 (UK)	Cross-sectional cohort study	64 Clinical (Recruited from At risk of Psychosis population recruited from an OASIS Service.	Mean age 22.5, 59.4% Male, 29.7% Black, 35.9% White British, 17.2% White other, 17.2% Other.	**VR:** a HMD using VR1280 with in-built headphones was utilised.	Participants were immersed into a virtual underground train journey for 4 minutes and were asked to form impressions of the avatars.	SSPS	Interpersonal sensitivity significantly predicted PI during VR. Interpersonal sensitivity mediated the relationship between severe childhood bullying and state paranoia during VR.
Riches et al., 2019 (UK)	Cross-sectional cohort study	77 Non-clinical (high and low paranoia subsample from initial larger sample in the general population).	High paranoia group (n=39), Mean age 28.86, 36.1% Male, 80.6% White, 19.4% Black and minority ethnic group. Low paranoia	**VR:** HMD using Oculus Rift Developer V2. Participants were given an Xbox control pad to move around in the VR environment.	Participants were immersed into a party located in a bar for 5 minutes and were instructed to follow marks on the virtual ground. Avatars were also within the virtual bar and ambiguous social stimuli played in the background. Participants were instructed to form an	GPTS, Pre-VR SPM, post-VR SSPS	Those in the high trait paranoia group scored significantly higher on state paranoia towards the avatars and the social scenario in VR compared with the low trait paranoia group. No adverse events or effects of being in the VR scenario were reported. A small proportion of participants reported mild cybersickness. VR scenario was found to be acceptable and feasible.

			group (n=40): Mean age 33.78, 35% Male, 90% White, 10% Black and minority ethnic group.		impression of the avatars in the bar.		
Şoflău and David 2019a (Romania)	Control-led Clinical Trial	81 Non-clinical (university students recruited from online study advertisement)	Mean age 21.21 years, 17% Male, No data on ethnicity.	**VR:** HMD using eMagin Z800 3D Visor device with an inbuilt head tracker device. The VR scenario was created using Virtually Better Inc.	Participants were allocated to an irrational beliefs group (n=41) or rational beliefs group (n=40) before being immersed into a social indoor space with 22 avatars programmed to behave neutrally. Participants were instructed to hold onto the beliefs during the VR environment, which lasted 4 minutes.	RIBS; GPTS; SSPS; Paranoid thoughts VAS,	The irrational beliefs group scored significantly higher on state paranoia following VR. The irrational beliefs group perceived the avatars as more hostile and less friendly and neutral compared to the rational beliefs group. There were no reported participant complaints on cybersickness or concerns abouts VR.

Şoflău and David, 2019b (Romania)	Controlled clinical trial	126 Non-clinical (Undergraduate students split into 'low trait paranoia' (scores <16 on the GPTS, n=31) and 'high trait paranoia' scores =/>21 on the GPTS, n=41).	Mean age 21.42, 19% Male, No data on ethnicity.	**VR condition**: HMD using eMagin Z800 3D Visor device with a head tracking device. The virtual environment was developed by Virtually Better Inc. **Desktop condition**: A computer desktop condition was implemented using a screen resolution of 1600 × 900.	Participants were randomised to either the VR or desktop condition and exposed to the same virtual environment of an indoor setting with human avatars programmed to behave neutrally. The task ran for 4 minutes.	GPTS; RIBS; SSPS; Paranoid Thoughts VAS	The VR environment was found to elicit higher paranoia in those with high trait paranoia compared with low paranoia. The VR environment was found to be more consistent with priming participants' trait paranoia than the desktop condition.
Veling et al., 2014 (The Netherlands)	Cross-sectional case-control pilot study	41 Clinical and nonclinical groups: the clinical group were participants with a FEP (diagnosed using DSM IV), recruited from specialist EI service. The non-clinical group were university	Clinical group (n=17), Mean age 27.3, 82.4% Male, 35.3%, Dutch ethnicity. Nonclinical group (n=24): Mean age 29, 83.3% male, and 100% Dutch ethnicity.	**VR**: Emagin Z800 with a built in head tracker. Logitech Chillstream Gamepad utilised and the virtual environment was created by CleVR.	Participants were immersed into a virtual café with avatars and café noises. The avatars were programmed to behave neutrally. Participants were tasked with finding certain avatars with numbers on them and to memorise these numbers. The task lasted 3.5 minutes for the clinical group and 4 minutes for the nonclinical group.	GPTS; SSPS	Baseline trait paranoia, social anxiety and cognitive biases were strongly associated with state paranoia during VR. The VR task was found to be acceptable and feasible method for participants with a FEP. There were low levels of reported cyber sickness.

		staff and students.					
Valmaggia et al., 2007 (UK)	Cross-sectional, cohort pilot study	21 Clinical: High risk of psychosis participants recruited from an OASIS service in South London.	Mean age 25, 62% Male, 57% White British, 24% Black Caribbean, 10% Black British, 5% Black African, 5% Asian.	**VR:** Participants used a ReaCTor (Trimension) system and IS900 Intersense VET tracking system that monitored head movements. Participants used a Intersense joystick.	Participants were immersed in an underground train ride that lasted 4 minutes and included 3 stops. Participants were requested to form an impression of the 20 neutrally programmed avatars.	PS, G-PTS	57% of participants experienced paranoia related to the VR avatars. Higher scores of trait paranoia predicted state PI in VR. Anxiety, stress, immersion in VR, perseveration and 'ideas of a fragile self' all predicted greater state paranoia scores during VR. No adverse reactions to the VR were reported. The study reported demonstrating the safety and feasibility of using VR in a clinical HR population.
Veling et al., 2016 (The Netherlands)	Cross sectional case-control study	177 Clinical and non-clinical: the clinical group were patients with a psychotic disorder, their siblings and UHR patients were recruited from psychiatric institutes in The Netherlands. The non-clinical group were recruited via adverts at	Controls (n=53): Mean age 24.6, 47.2% Male, 30.2% Non-Dutch origin. Siblings (n=42) Mean age 26.4, 54.8% Male, 26.2% Non-Dutch origin. UHR (n=20) Mean age 24, 35% Male, 25% Non-Dutch origin.	**VR:** Participants wore a HMD with Sony HMZ-T1 with a head tacker and built in headphones. The virtual scenario was created by CleVR using Vizard software.	Participants were tasked with exploring a bar environment and finding avatars with certain numbers on them to then feedback the number and gender of the avatar with the highest number. Participants completed 5 tasks with increasing social stress (i.e. from neutral to more hostile programmed avatars and number of avatars), all lasting 4 minutes.	GPTS, SSPS	Participants with a higher psychosis liability were found to elicit more paranoia and subjective distress in VR. Trait paranoia, social anxiety, negative symptoms, and depression were strongly associated with paranoia and distress during VR. A regression model found that only depressive symptoms significantly predicted paranoia in VR.

		local schools and higher education, dentist offices and staff at psychiatric institutes.	Psychosis group (n=55), Mean age 26, 76.4% Male, 47% Non-Dutch origin				
Jongeneel et al., 2018 (The Netherlands)	Cross-sectional case-control study	169 Secondary data analysis from Veling et al., (2016) Clinical and nonclinical groups: the non-clinical group were 94 participants with lower psychosis liability including 41 siblings and 53 controls. The clinical group were 75 participants with higher psychosis liability made up of 55 FEP and 20	Non-clinical group n= 94: Mean age 25.4, 51.1% Male, 71.3% Dutch, 3.2% Surinamese, 2.1% Moroccan, 2.1% Turkish, 2.1% Antillean/Aruban, 19.1% Other. Clinical group (n=75): Mean age 25.4, 65.3% Male, 58.7% Dutch, 10.7% Surinamese, 4% Turkish, 2.7%	**VR:** Participants wore an Emagin Z800 3D visor with an in-built head tracker and used a Logitech Chillstream Gamepad to navigate the virtual environment. The virtual environment was created by CleVR BV.	As above (secondary analysis).	SSPS	The higher psychosis liability group reported higher paranoia, distress, and stress reactivity during VR than the lower psychosis liability group. There was a significant negative association between positive self-esteem and the number of social stressors on paranoia scores during VR. Number of social stressors and negative self-esteem showed a positive significant association with paranoia and distress during VR.

		at UHR participants.	Antillean/Aruan, 24% Other.				
Hesse et al., 2017 (Germany)	Cross sectional case control study	47 Clinical and nonclinical sample: clinical group were patients with psychotic disorders (diagnosed using DSM-IV for schizophrenia or schizoaffective disorder). The non-clinical participants were matched healthy controls from study advert postings	Clinical group (N=26): Mean age 34.52, 71% Male, No ethnicity data. Non-clinical group (N=20): Mean age 32.30, 65% Male, No ethnicity data.	**VR:** Participants wore a HMD with inbuilt headphones and headtracking software.	Participants entered a virtual office room scenario and were asked to complete two social interaction tasks including asking a colleague for help and to collect money for a present for the virtual boss. Social feedback in the VR task was either neutral or negative. Participants were exposed to both conditions.	SSPS	There was a significant difference in paranoia scores across the different conditions for the clinical group, with higher paranoia scores found following the negative interaction condition. There were no differences in paranoia scores across the conditions in the nonclinical group. Two clinical participants did not complete the VR task due to reporting cybersickness and two clinical participants were supported after the VR task to manage associated distress. All nonclinical participants completed the VR task.
Pot-Kolder et al., 2018a (The Netherlands)	Cross-sectional case-control study	170 Secondary data analysis from Veling et al., (2016) Clinical and nonclinical	Clinical group recent onset: (n=55): Mean age 26, 76.4% Male, 47.3% non-Dutch origin. Clinical group: UHR	**VR:** Participants wore a Sony HMZ-T1 HMD with inbuild headphone and 3DOF head tracking software. The virtual environment was	Same as Veling et al (2016).	GPTS, SSPS	Higher paranoia during the VR was significantly associated with cognitive biases. A significant interaction effect was found between the number of social stressors and cognitive biases on paranoia. An interaction effect was found between the number of social stressors and attention to threat bias on paranoia.

		sample: The clinical high liability of psychosis group consisted of 55 participants with a recent onset psychosis and 20 participants at UHR for psychosis, recruited from mental health services. The nonclinical low liability of psychosis consisted of 42 siblings of psychotic patients and 53 controls recruited from the general population.	(n=20): Mean age 24, 35% Male, 25% Non-Dutch origin. Nonclinical group: Siblings (n=42): Mean age 26, 54.8% Male, 26.2% Non-Dutch origin. Non clinical group: Controls (n=53): Mean age 25, 47.2% Male, 30.2% Non-Dutch origin.	created by Logitech F310 Gamepad.			
Geraets et al., 2020	RCT	91 Clinical sample (participants with a DSM-IV diagnosis of a	VR-CBT group (n=43): Mean age 38.1, 67.4% Male, 74.4% Dutch origin. TAU	**ESM:** PsyMate digital ESM was given to participants to complete 10 times a day at semi-random time intervals	Secondary analysis of ESM data from the Pot-Kolder 2018b study (detailed under the 'intervention' section below)	ESM paranoia related items: "I feel suspicious" , "I feel	Feeling suspicious decreased significantly in the VR-CBT group at post treatment compared with TAU. Feeling suspicious was associated with feeling lonely, unsafe, and anxious at the same time point across both groups. There was a positive relationship between feeling down and feeling

(The Netherlands)		psychotic disorder and scoring >40 on GPTS, recruited from 7 Dutch mental health centres)	group (n=48): Mean age 40.9, 70.8% Male, 60.4% Dutch origin	(between 7:30am to 10:30pm). A minimum completion threshold was set to completing 20 questionnaires within six consecutive days.		that others might hurt me," and "I feel that others dislike me"	suspicious in the TAU group over time but not in the VR-CBT group. A positive relationship between feeling down and feeling suspicious was found at the post treatment timepoint. The response rates for completing the ESM diary were high, 47.5/70 ESM assessments were completed at baseline, 43/70 at post treatment and 43.1/70 completed at follow up.
Brown et al., 2020 (UK)	**Study 1:** RCT to either self-compassion or control condition **Study 2:** RCT to either compassion towards others or control condition	Study 1: 100 Study 2: 100 Non-clinical (recruited via social media and radio adverts and potential participants were screened for scoring 22 or above on the GPTS-part B to capture participants in the upper quartile of paranoia in the general population).	**Study 1:** Compassion group (n=50): Mean age 28.7, 66% Male, 62% White British/Irish, 32% Non-White British/Irish**.** Control group (n=50): Mean age 29.4, 60% male, 70% White British/Irish, 30% Non-White British/Irish**.** **Study 2:**	**VR:** Participants used a HMD with HTC Vive PRO and an inbuilt audio system, powered by an Intel i7 CPU.	Participants were immersed into two VR environments of being in a lift and an underground train journey for 3 minutes. Both scenarios were experienced twice, with increased numbers of avatars populating the scenarios (a total of 4 VR immersions). Participants completed 4 compassionate coach imagery training sessions in between the VR immersions.	GPTS-B	Study 1: At both the mid and final time points, the self-compassion group showed significantly lower paranoia scores than the control group. Changes in paranoia explained 24% of the change of scores in self-compassion at the final time point. Study 2: The compassion towards others group had significantly lower paranoia scores than the control group at all time points. At the mid and final time points, changes in scores of compassion towards others explained 34% and 67% of the treatment effect on paranoia at the final time point, and changes in positive affect explained 47% of the change in paranoia at the final timepoint. At the final time point, changes in paranoia explained 4% of changes in compassion towards others and 24% of the change in positive affect.

			Compassion group (n=50): Mean age 26.9, 53.8% Male, 62% White British/Irish, 38% Non-White British/Irish**,** Control group (n=50): Mean age 28.5, 64% Male, 68% White British/Irish, 32% Non-White British/Irish				
Treatment studies							
Freeman et al., 2016 (UK)	RCT	30 Clinical (participants recruited from adult mental health services in Oxford with a current persecutory	Threat belief group (n=15): Mean age 42.1, 67% Male, 93% White, 6% Mixed ethnicity. Exposure group (n=15):	**VR:** A HMD with a nVisor SX11 was used. This included a Intersense IS-900 SimTracker for tracking head movements. .	Participants were randomised to either the VR cognitive therapy ('threat belief group') or VR exposure study group. Both groups were immersed into an underground carriage or lift, with number of avatars in the scenarios increased with each immersion. The VR cognitive therapy group were	SBQ-PB	Conviction ratings in the threat belief group significantly reduced by 22% across the VR sessions compared to the exposure group. VR cognitive therapy reduced real-world distress by 19.6% when compared with the exposure group.

		delusion held with at least 50% conviction)	Mean age 40.6, 40% Male, 100% White.		encouraged to explore the virtual environment and drop their safety behaviours. In the exposure group, participants were encouraged to complete a graded exposure and encouraged to continue to use their safety behaviours during the VR exposure. Both groups completed the VR immersion 7 times, each time lasting 5 minutes.		
Pot Kolder et al., 2018b (The Netherlands)	RCT	116 Clinical sample (participants with a DSM-IV diagnosis of a psychotic disorder and scoring >40 on GPTS, recruited from 7 Dutch mental health centres)	VR-CBT group (n=58): Mean age 36.5, 68% Male, 74% Dutch Origin, 26% non-Dutch origin. Waiting list control (n=58): Mean age 39.5, 72% Male, 57% Dutch origin, 43% Non-Dutch origin	**VR:** Participants wore a HMD with a Sony HMZ-T1/T2/T3 with head tracker software included. They were also given a Logitech F310 Gamepad to move around. VR scenarios were created using Vizard software. **ESM:** PsyMate ESM digital software was given to all participants to use.	**VR:** VR-CBT included 16 sessions of 1-hour sessions with 40 minutes within the VR scenarios. VR scenarios included being immersed in a bus, a café, on the street or at the supermarket. Study therapists could manipulate number of avatars and what the avatars said and their responses to participants. **ESM:** All participants completed 6 days of ESM programmed to send alerts 10 times a day. Participants could respond to the alert within a 15-minute window. ESM measures	GPTS, SBQ-PD 3 ESM items on paranoia: "I feel that others might hurt me", "I feel that others dislike me", and "I feel suspicious"	**VR:** Levels of persecution were significantly lower in the VR-CBT group compared to waitlist control at both post treatment and follow up. Safety behaviour changes and social cognitive problems mediated the treatment effect on paranoia by 33.7% and 19.2%, respectively. **ESM:** There was a large reduction in momentary paranoia scores from baseline to post-treatment in the VR-CBT group compared with the waitlist control. The effect sizes for momentary paranoia were still significant at 6 month follow up. No adverse events related to VR-CBT or study assessments were reported.1 participant dropped out of the study due to nausea. 19% of participants dropped out of the VR-CBT (11 participants, including 4 who did not ever start the VR-CBT treatment). 7 participants dropped out after beginning treatment. Of the drops outs related to the

					included affect, paranoia, and social threat.		digital technology, 1 was too afraid after the first session, 1 had nausea after 2 sessions and 2 participants reported not finding the HMD tolerable. All participants completed the baseline ESM diary, 96 completed the ESM diary at the end of treatment and 87 completed the follow up ESM diary.
Garety et al., 2021 (UK)	RCT	361 Clinical group (ICD-10 diagnosis of Schizophrenia spectrum psychosis (F20-29) and persistent distressing paranoia for over 3 months, scoring greater than 29 on the GPTS-B. Participants were recruited from community mental health services.	SlowMo group (N=181): Mean age 43.1, 72.9% male, 66.3% White, 5% Black Caribbean, 6.6% Black African, 8.8% Black other, 2.2% Pakistani and 10.5% other ethnicity. TAU group (N=181): Mean age 42.2, 66.7% Male, 71.7% White, 5% Black Caribbean, 5.6% Black	**App:** The SlowMo app was developed by Evolyst Lts and uses a Azure-based WCF web service proprietary software platform. A Xamarin android phone application was also used.	Participants randomised to the SlowMo study arm completed 8 sessions of CBTp blended with using the SlowMo web page and app. Digital components to the therapy included interactive and individualised videos, games and tasks surrounding noticing thinking patterns and slowing paranoid thoughts down, using thought bubbles spinning to visualise this. The web app was synchronised to an Android phone app, to allow participants to update their thinking pattens in their daily life, outside of sessions. The option to program the app to send a notification to check in with participants was also offered.	GPTS-B, GPTS-A	SlowMo + TAU was not associated with significant reductions in the GPTS total score compared to TAU at 24 weeks, although there was a significant reduction in GPTS-B scores compared to TAU (but not GPTS-A scores). SlowMo +TAU was associated with a significant reduction in paranoia total score, part B and Part A on the GPTS at 12 weeks. Worry and the possibility of being mistaken mediated the relationship between treatment effects and paranoia measures by 40% at 12 weeks and 56% at 24 weeks. 80.1% of participants in the SlowMo study arm completed all therapy sessions. 94.6% of participants met web-based therapy fidelity criteria and 71.4% met the adherence criteria for using the mobile phone app. Similar numbers of adverse events were reported across the 2 groups. There was no evidence of harm using the SlowMo treatment.

			African, 6.7% Black other, 1.7% Indian, 2.2% Pakistani 6.7% Other ethnicity.				
Goriss e et al., 2021 (Spain)	Cross-sectional cohort study	30 Non-clinical (Recruited University of Barcelona students)	Random condition (n=15): Mean age 22.5, 46.6% male, 80% Spanish. Targeted group (n=15): Mean age 23.6, 20% Male, 60% Spanish, No data on ethnicity	**VR:** Participants wore a HMD using HTC Vive Pro and used body and head trackers. A Nvidia GeForce RTX 2070 computer was used. The virtual environment was created using Unity 2018.4 3D engine.	Participants were immersed into a public square populated by 5 small groups of avatars each with 2-3 avatars. Participants were given a 'virtual body double' 3D image of themselves portrayed as an avatar in the VR and could see the virtual environment from within the virtual double's perspective or from an observer perspective ("observing their virtual double"). Participants were asked to find the group they belonged to, by interacting with the avatars to find this out. In the virtual double group, participants first observed their virtual double complete this task and in the random group, participants observed the virtual double wander around the space not completing the task. Both groups then	GPTS, SSPS	There was a significant reduction in paranoia scores at 1 week follow up in the targeted group compared with the random group.

					completed the social task themselves.		

KEY: Accident and Emergency (A&E), Number (N), Virtual Reality Peripheral Network (VRPN), Head Mounted Display (HMD), Purdue Momentary Assessment Tool (PMAT), Personal Digital Assistant (PDA), Persecutory Ideation (PI), The Paranoia Scale (PS), Visual Analogue Scale (VAS), Distributed Immersive Virtual Environment (DIVE), the Safety Behaviour Questionnaire-Persecutory Delusions (SBQ-PD),State Paranoia Measure (SPM), Paranoia Rational and Irrational Beliefs Scale (RIBS), Windows Communication Foundation (WCF), Cognitive Behaviour Therapy (CBT), Cognitive Behaviour Therapy for Psychosis (CBTp), Experience Sampling Methodology (ESM), Virtual Reality (VR), Treatment as Usual (TAU), Ultra High Risk (UHR), First Episode Psychosis (FEP), Early Intervention (EI), Cannabinoid (CBD), Green Paranoid Thoughts Scale (GPTS), Green Paranoid Thoughts Scale (GPTS), Green Paranoid Thoughts Scale- Social Reference (GPTS-SR), Paranoid University College London (UCL), Institiute of Psychiatry, Psychology and Neuroscience (IoPPN), International Classification of Diseases (ICD), Diagnostic and Statistical Manual of Mental Disorders (DSM), Cave Automatic Virtual Environment (CAVE), Outreach and Support in South London (OASIS).

3.2 Assessment studies (n=23)

The twenty-one VR assessment studies all contained virtual characters, either computerised avatars or human actors. Over half of the studies did not report on the demographic characteristics of the avatars in the VR scenarios (n=11). Some studies reported on the gender of the VR avatars only (n=3). Other studies reported that a range of demographic characteristics were chosen to be representative, including age, gender and ethnicity (n=3). Four studies manipulated avatar characteristics including ethnicity, to either match or differ from participants' ethnicity.

Several virtual environments were utilised including a London underground journey (n=8), virtual café (n=4), a social situation in a bar room (n=2), a social indoor space (n=3), an office social task scenario, a bus stop, and a library. Only one study had multiple virtual environments, using both an underground journey and lift condition (Brown et al., 2020).

Most studies used one VR immersion (n=15), while several had between two to five conditions (Pot Kolder et al., 2018a; Hesse et al., 2017; Jongeneel et al., 2018; Veling et al., 2016; Veling et al., 2014; Brown et al., 2020). During the VR exposure, participants were tasked with exploring the virtual environments with specific prompts varying from following marks on the ground, finding avatars with the highest number on them, forming an impression of the avatars or socially interacting with the avatars. Time in the VR conditions ranged from 2.5-6 minutes.

Of the three ESM assessment studies, one study sampled 145 participants in the USA diagnosed with schizophrenia or schizo-affective disorder to prospectively assess paranoid thoughts and associated variables including mood and external events (Ben-Zeev et al., 2011). Participants completed seven days of ESM using the Purdue Momentary Assessment Tool (PMAT) and were sent assessments at four timepoints, using eight items including items on mood, anomalous experiences, paranoia, distress, substance use and recent external events.

Another ESM study conducted an RCT in The Netherlands investigating VR-CBT compared with treatment as usual (TAU) in 116 clinical participants with diagnoses of a psychotic disorder and high rates of paranoia (as described below, Pot Kolder et al., 2018b). The ESM procedures involved both study arms completing six days of ESM, responding to ten

assessments at a set period during the day to assess paranoia and associated variables. Participants rated different mental states including three items on paranoia, using the PsyMate digital platform.

Geraets and colleagues (2020) conducted secondary analyses using a subsample of 91 participants from the Pot Kolder study (2018b) to assess mental states associated with paranoia using ESM. Their subsample was selected in cases where there were full ESM datasets at baseline, post-treatment, and those in the VR-CBT group had completed at least three sessions.

3.2.1 Feasibility

Of the twenty-one VR studies, seventeen did not report dropouts or withdrawals and four studies reported high study retention rates of 80-100% across both clinical and non-clinical groups at the end of study or follow up (Fornells-Ambrojo et al., 2008; Hesse et al., 2017; Freeman et al., 2014; Riches et al., 2019).

ESM was shown to be feasible in the two primary data studies assessing clinical groups. In one study, all participants completed assessments to a sufficient level at baseline (defined as completing at least one third of the assessments), 82% at the end of treatment and 75% at follow up (Pot-Kolder et al., 2018b). In another study, small numbers of participants were unable to complete the study tasks due to technical problems (n=13; 6%) or due to not meeting the study minimum criteria of completing two full days of ESM (n=25; 12%) (Ben-Zeev et al., 2011).

Of note, twelve of the assessment studies received a 'weak' quality rating for the 'withdrawal and drop-outs' section.

3.2.2 Acceptability

Only two VR studies collected participant feedback. Comments from participants included that the experience felt "kind of weird" and "surreal" and enjoyment levels ranged between moderate to high (Fornells-Ambrojo et al., 2008; Riches et al., 2019). Several studies assessing simulator/cyber sickness either reported no cybersickness (Freeman et al., 2010; Soflau & David., 2019a; Fornells-Ambrojo et al., 2008) or low/mild levels of cybersickness (Della Libera et al., 2023; Riches et al., 2019; Veling et al., 2014; Freeman et al., 2008b) across both clinical and non-clinical groups. One study reported two clinical participants

discontinued the VR task due to a range of simulator sickness symptoms (Hesse et al., 2017). Fifteen studies did not report on adverse effects. Four studies reported no adverse effects of VR (Valmaggia et al., 2007; Soflau & David., 2019a; Riches et al., 2019; Freeman et al., 2008b). A minority of studies reported distress and mild adverse events. In one study, two clinical participants required support to manage distress following the VR session (Hesse et al., 2017). Further, one participant from the same study experienced an increase in distressing thoughts, which led to discontinuing the VR task. Another study investigating the role of Cannabidiol (CBD) versus placebo found nine participants reported tiredness/sedation across the two study conditions (Hundal et al., 2018). Within the CBD condition only, two participants reported nausea, two reported light-headedness/dizziness and one reported abdominal discomfort. However, it is unclear whether the reported adverse events related to VR or the study conditions.

Pot Kolder and colleagues (2018b) found no adverse effects related to using ESM and the no adverse events were reported on in the other two ESM studies (Ben-Zeev et al., 2011; Gereats et al., 2020).

3.2.3 Overview of results

Of the VR studies, several studies investigating non-clinical groups found state paranoia during VR immersion was associated with trait paranoia outside of VR (Della Libera et al., 2023; Freeman et al.,2014; Freeman et al., 2005, Freeman et al., 2008a; Freeman et al., 2008b; Riches et al., 2019; Soflau & David., 2019b). This was also found across studies investigating both clinical and non-clinical groups (Valmaggia et al., 2007; Veling et al., 2014; Veling et al., 2016), although one study found that only the clinical group had a significant association between trait and state paranoia in VR (Fornells-Ambrojo et al., 2008). Three studies found between 57-65.6% of participants experienced paranoid thoughts during VR, across both clinical and non-clinical populations (Broome et al., 2013; Fornells-Ambrojo et al., 2008; Valmaggia et al., 2007). Of the ESM assessment studies, one found that 49% of clinical participants experienced PI at least once over the study period (Ben-Zeev et al., 2011).

One study investigating three groups (clinical, non-clinical low paranoia and non-clinical high paranoia) found that the clinical group were twelve times more likely to experience

paranoia during VR compared to the non-clinical low paranoia group (Freeman et al., 2010). The non-clinical high paranoia group in this study were nearly three times more likely to experience paranoia than the non-clinical low paranoia group (Freeman et al., 2010). In addition, two studies found that VR elicited more paranoia and subjective distress in those with a higher psychosis liability when compared to those with a low psychosis liability (Veling et al., 2016; Jongeneel et al., 2018). Four studies found that those with higher trait paranoia were more likely to experience paranoia during VR than those with low or no paranoia in their day to day lives (Riches et al., 2019; Freeman et al., 2005; Freeman et al., 2008a; Freeman et al., 2008b). Further, one study found that participants with high paranoia were twice as likely to experience PI during VR than those without paranoia (Freeman et al., 2008b).

One study investigating VR compared with a desktop-based task in a group of non-clinical participants with high and low trait paranoia found that VR was more consistent in priming trait paranoia than the desktop condition (Soflau & David., 2019b). Specifically, the authors found that the VR condition elicited higher paranoia in those with high trait paranoia compared to low trait paranoia. Another study found that paranoia in VR predicted paranoia scores six months later, explaining more variance than interviewer or self-report measures of paranoia (Freeman et al., 2014).

Several variables were associated with greater paranoia during VR in studies across clinical and non-clinical groups including anxiety (Freeman et al., 2005; Freeman et al., 2008b; Freeman et al., 2010; Valmaggia et al., 2007), social anxiety (Veling et al., 2014; Veling et al., 2016) and anomalous experiences (Freeman et al., 2005; Freeman et al., 2008a; Freeman et al., 2008b; Freeman et al., 2010). One study found that worry, negative beliefs about the self and other, cognitive inflexibility, experience of playing computer games and loneliness all strongly predicted paranoia during VR in non-clinical participants (Freeman et al., 2008b). Only depressive symptoms significantly predicted paranoia in VR when multiple variables were entered into a regression model in one study (Veling et al., 2016). An ESM study found that anxiety, sadness, and substance use at a previous ESM timepoint were associated with greater odds of experiencing PI at a later timepoint (Ben-Zeev et al., 2011). However, the study did not find evidence of an association between anomalous experiences preceding experiences of PI (Ben-Zeev et al., 2011). In another ESM study, reports of paranoia were

significantly associated with feeling anxious, unsafe and lonely at the baseline timepoint for both groups and no significant association was found between VR-CBT and paranoia related mental states (Geraets et al., 2020).

Cognitive biases were associated with higher state paranoia during VR in two studies (Veling et al., 2014; Pot Kolder et al., 2018a), with one finding an interaction effect between cognitive biases and the number of social stressors on paranoia scores (Pot-Kolder et al., 2018a). Another study found that place illusion negatively predicted state paranoia in VR, while social pressure positively predicted state paranoia (Della Libera et al., 2023).

Negative self-esteem and the number of social stressors during VR were found to have a positive significant association with paranoia and distress across clinical and non-clinical groups (Jongeneel et al., 2018). Similarly, a fragile sense of self predicted greater paranoia during VR in clinical participants (Valmaggia et al., 2007). In one study, only the clinical group showed a significant difference in paranoia scores during the negative social interaction condition compared to non-clinical participants (Hesse et al., 2017). Higher paranoia was also associated with interpersonal sensitivity and number of traumatic events across both clinical and non-clinical groups (Freeman et al., 2010; McDonnell et al., 2018). Further, interpersonal sensitivity mediated the relationship between severe childhood bullying and state paranoia during VR in one study (McDonnell et al., 2018).

Brown and colleagues (2020) conducted two studies assessing the role of a VR-blended compassion treatment for paranoia compared to a control condition in non-clinical participants and found a significant reduction in paranoia in both studies. Pot Kolder and colleagues (2018b) found a reduction in baseline-post treatment and baseline-follow up momentary ESM paranoia scores in the VR-CBT group compared to TAU.

Three studies used a priming condition prior to non-clinical participants entering VR scenarios (Atherton et al., 2016; Soflau & David, 2019a; Hundal et al., 2018). Conditions included high and low self-confidence induction (Atherton et al., 2016), rational and irrational belief induction (Soflau & David., 2019a) and CBD versus placebo (Hundal et al., 2018). Those in the low self-confidence and irrational belief groups were found to experience greater paranoia following VR than the comparison groups (Atherton et al., 2016; Soflau & David, 2019a). A trend towards higher paranoia scores in the CBD group

compared to the placebo group was found in one study, although this did not reach significance (Hundal et al., 2018).

3.3 Treatment studies (n=4)

Two of the three VR treatment studies involved exposure and dropping safety seeking behaviours during brief VR testing (Gorisse et al., 2021; Freeman et al., 2016). One study used a modelling treatment approach, whereby university students with high paranoia scores witnessed a body double of themselves complete a social task before completing the task themselves (Gorisse et al., 2021). In the target condition, the 'body double' successfully interacted with five groups of avatars while the control condition observed their body double wonder around the virtual space without engaging with the avatars. In the other study, clinical participants with persecutory delusions were randomised to a VR-CBT condition or VR exposure only (Freeman et al., 2016). VR scenarios involved seven immersions into both an underground and lift scenario with increasing numbers of avatars, the overall testing period lasted between 60-90 minutes. Participants were instructed to drop their safety behaviours surrounding their threat beliefs in the CBT condition, while participants in the control condition were instructed just to interact with the virtual environment (Freeman et al., 2016).

In the other VR treatment study, clinical participants with paranoid thoughts received sixteen sessions of VR-CBT, integrating 40 minutes of VR immersion within an hour CBT session, compared with waitlist controls (Pot Kolder et al., 2018b). Participants were immersed into four different social environments to drop their safety behaviours and test out threat beliefs. Therapists could manipulate several variables to tailor the environment to the participant's beliefs. For example, the number of avatars, avatar characteristics (i.e. gender, ethnicity) and avatar responses (i.e. neutral or hostile eye contact and create pre-recorded verbal responses).

One study investigated the use of a digital therapy and an app for the treatment for paranoia. Garety and colleagues (2021) investigated the use of a 12 week digitally integrated CBTp treatment targeting paranoia ('SlowMo'), compared with TAU in a sample of 361 participants with a diagnosis of schizophrenia and persistent, distressing paranoia in the UK. The digital elements of SlowMo consisted of an interactive website during therapy

sessions and an app for participants to use independently. The app included animated vignettes, games, and interactive thought bubbles tailored to the participant's specific fast thinking (i.e. participants could touch the screen to pop the bubble). The thought bubbles aimed to raise awareness of reasoning styles and slow down thinking habits to promote feeling safer (Garety et al., 2021).

3.3.1 Feasibility

No withdrawals or dropouts were reported in two of the VR treatment studies, one that recruited university students with high paranoia and another that recruited clinical participants with persecutory delusions (Gorisse et al., 2021; Freeman et al., 2016). One study found similar rates of study dropout across the VR treatment and waitlist conditions in clinical participants with psychosis and PI (Pot-Kolder et al., 2018b). Technical difficulties or barriers to engaging in VR were not reported on.

In the SlowMo study, therapy adherence was high, with 80.1% of participants randomised into the SlowMo study arm completing all study sessions, while 12.7% discontinued therapy between sessions one and seven (Garety et al., 2021). The majority (94.6%) of participants were shown to have high fidelity related to the web app delivery and 71.4% were deemed to meet study adherence for the mobile app. Additionally, similar numbers of participants withdrew across the two study arms.

Two of the treatment studies received a 'weak' quality rating for the 'withdrawals and drop-out' section.

3.3.2 Acceptability

In a VR study, one participant withdrew due to being afraid to continue with the VR, another due to experiencing nausea and two participants withdrew as they found the head mounted display (HMD) intolerable (Pot Kolder et al., 2018b). The other two VR studies did not report on adverse effects (Freeman et al., 2016; Gorisse et al., 2021).

The SlowMo trial did not find any adverse effects related to the digitally blended treatment (Garety et al., 2021).

3.3.3 Effectiveness

Of the three VR studies, one study found a significant reduction in paranoia scores at one week follow up in participants who observed an avatar 'body double' of themselves model a successful interaction compared to the control group (Gorisse et al., 2021). Another study found a 22% reduction in paranoia conviction and a 19.6% reduction in distress ratings in the VR-CBT group compared to VR exposure only (Freeman et al., 2016). In a study investigating 16 sessions of VR-CBT, a significant reduction in levels of persecution was found in the VR-CBT group compared to the waitlist control group at both post treatment and follow-up time points (Pot-Kolder et al., 2018b). Specifically, safety behaviour changes and social cognitive problems appeared to mediate the treatment effects on paranoia (Pot Kolder et al., 2018b).

In the SlowMo trial, no significant differences were found in paranoia scores as measured by the Green Paranoid Thoughts Scale (GPTS, Green et al., 2008) between the two groups at twenty-four weeks, although SlowMo was associated with greater reductions in paranoia scores at twelve weeks compared to TAU (Garety et al., 2021). Additionally, cognitive biases including belief flexibility and fast thinking showed improvements in the SlowMo group at both 12- and 24-week timepoints, while slow thinking showed improvements at the 24-week timepoint only. The jumping to conclusions and alternative thinking styles did not show improvements. Significant changes across multiple variables in the SlowMo group included worry, self-esteem, self-concept, wellbeing and quality of life at 24 weeks (Garety et al., 2021).

3.4 Quality assessment

EPHHP global ratings were 'strong' (n=8), 'moderate' (n=12), and 'weak' (n=7) (see Appendix 1, Table 2). Within the subsections of the quality rating assessment, 'data collection methods' contained the largest numbers of studies rated as 'strong' (n=25). The category that contained the highest number of studies rated as 'weak' was 'withdrawals and dropouts' (n=14). Of the assessment studies, most scored 'moderate' (n=11), six scored 'strong' and six scored 'weak'. For the treatment studies, two were given a global rating of 'strong', one scored 'moderate' and one scored 'weak'.

3. Discussion

This systematic review aimed to investigate digitally enhanced psychological assessments and treatments for paranoia across the continuum. Around half of the twenty-seven included papers were published since 2018, highlighting the recent acceleration of research in the field of digital technology (Bond et al., 2023; Torous et al., 2021). Studies were almost exclusively researched in Europe, particularly in the UK and The Netherlands. Most studies used VR in the assessment of paranoia, reflecting the dominance of this assessment tool in digital paranoia research. Across different virtual environments, VR consistently elicited paranoia that corresponded to everyday paranoia in both clinical and non-clinical groups (Della Libera et al., 2023; Freeman et al., 2014; Freeman et al., 2005; Freeman et al., 2008a; Freeman et al., 2008b; Riches et al., 2019; Soflau & David., 2019b; Valmaggia et al., 2007; Veling et al., 2014; Veling et al., 2016). This is consistent with literature proposing VR as a promising tool that might enhance care, by providing real-time assessment of paranoia in controlled environments as opposed to relying on retrospective self-report (Geraets, Wallinius & Sygel., 2022). Conversely, a recent assessment study of paranoia using VR in a forensic population found that paranoia during VR did not correspond well with paranoia outside of VR (Hedström et al., 2023). The study did however find positive acceptability of using VR to measure paranoia in a forensic context (Hedström et al., 2023).

Overall, the technologies showed promising feasibility and acceptability across clinical and non-clinical groups. Studies reported minimal dropouts and withdrawals, no or minimal adverse events and nearly all participants engaged and used the technologies successfully. These findings build on research finding that VR, ESM, and mobile apps are safe tools for assessment and treatment within psychosis populations (Garety et al., 2020; Rus-Calafell et al., 2018; Firth & Torous., 2015; Bell et al., 2017). It is important to note however, that the review contained many papers focused on non-clinical samples only, so inferences to clinical populations are therefore limited. VR offers a particularly advantageous paradigm for extending treatment, as it allows for threat beliefs to be tested and safety behaviours dropped within controlled, virtual environments (Rus-Calafell et al., 2018). While there were only three treatment studies using VR, all found benefits in reducing paranoia (Pot Kolder et al., 2018b; Freeman et al., 2016; Gorisse et al., 2021). Future research should investigate the effectiveness of VR-CBT using active controls, to provide further findings on the specific role

of VR in the treatment of paranoia. In the wider literature, VR has been found a promising paradigm for the assessment and treatment of paranoia and shows great potential for future use in clinical settings (Valmaggia, Day & Rus-Calafell., 2016; Riches et al., 2021). Interestingly, only one paper in the review investigated a mobile app in the treatment of paranoia in a clinical population, which found promising results (Garety et al., 2021).

Findings from the assessment studies support a continuum view, as similar rates of paranoia were found across clinical and non-clinical groups (Broome et al., 2013; Fornells-Ambrojo et al., 2008; Valmaggia et al., 2007). In addition, several VR studies found greater paranoia in those with higher trait paranoia, consistent with the hierarchy of paranoia (Riches et al., 2019; Freeman et al., 2005; Freeman et al., 2008a; Freeman et al., 2008b; Bebbington et al., 2013). Notably, there is overlap between social anxiety and paranoia, with research highlighting social anxiety tends to occur at the bottom of the paranoia hierarchy (Freeman et al., 2008; Freeman et al., 2005; Bebbington et al., 2013). The recent revision to the GPTS has focused specifically on PI and raises the importance of defining severity cut offs, especially within non-clinical samples experiencing paranoia (Freeman et al., 2021; Ellett et al., 2023). The use of the GPST-R in future research across the paranoia continuum might therefore be advantageous, to provide a more precise measure of PI, as opposed to alternative measures that might also be capturing broader social anxiety difficulties (Freeman et al., 2021). Results also support the cognitive theory of persecutory delusions, which posits that a multifaceted interaction between an individual's internal and external experiences, social stressors, beliefs systems and cognitive biases lead to a 'search for meaning' and subsequent threat beliefs (Freeman et al., 2002). In the present review, studies found paranoia was associated with mood difficulties such as anxiety and low mood, cognitive biases, anomalous experiences, and life events across the continuum (Freeman et al., 2002; Freeman et al., 2005; Freeman et al., 2008b; Freeman et al., 2010; Valmaggia et al., 2007).

Given the breadth of digital technologies, it is of interest that VR appears to dominate paranoia research. Only four of the included studies investigated other technologies aside from or as well as VR, including ESM and a digitally blended treatment and mobile app. This is interesting given the range of innovative technologies used in psychosis research more widely (i.e. Actissist, Bucci et al., 2018; EMPOWER, Gumley et al., 2022; Bell et al., 2017).

This might be due to other technologies being used for a broader assessment and treatment programme. For example, previous studies have used technologies to assess cognitive and social functioning, activity monitoring, supporting with psychosis symptoms and relapse prevention (Rus-Calafell & Schneider., 2019; Bell & Alvarez-Jimenez., 2019; Bucci, Schwannauer & Berry., 2019; Torous et al., 2021). Further investigation into the use of other technologies focused on paranoia is therefore warranted, in line with a symptom-focused approach (Freeman et al., 2019; Garety et al., 2020).

The current review did not find evidence that paranoid thoughts specifically prevented any participants from engaging in the technologies. However, there was a lack of investigation into potential barriers to engagement, albeit this might in part be due to the present review's inclusion criteria. Several barriers to digital integration highlighted in the literature include limited technological skills, not having an optimum digital set up at home, lack of a strong internet connection, complexity of interventions incorporating technologies and negative staff attitudes towards technologies (Aref-Adib et al., 2019; Watson et al., 2022). Importantly, the digital divide has been found to particularly impact upon minoritised groups (Aref-Adib et al., 2019). Lack of diversity in the included samples highlights possible barriers to accessing technologies both in research and in services adopting digitally integrated care in the future (Rauschenberg et al., 2021). As part of the SlowMo trial, researchers explored the digital divide related to participant demographic characteristics and found that technology-related inequalities encouragingly did not affect engagement with the app (Hardy et al., 2022). Many studies in this review did not report on participant ethnicity and many VR studies did not report on avatar demographic characteristics. This is of note as participants might not experience avatars and virtual spaces to be as 'neutral' as the studies claim if there are key differences in terms of a participant's characteristics (i.e. race, ethnicity, gender, age) and the avatars. In the wider literature, participants have been found to keep a closer distance to avatars presenting with the same ethnic background during VR compared to avatars from different ethnic backgrounds (Ya et al., 2018). Ya and colleagues' study (2018) therefore highlights behaviour changes due to differences between person-avatar characteristics. Several studies in the review manipulated avatar demographic variables to either match or differ from a participant's (Veling et al., 2014; Veling et al., 2016; Jongeneel et al., 2018; Pot-Kolder et al., 2018a; Pot Kolder et al., 2018b).

Indeed, one study found a significant difference in galvanic skin response in the FEP group (but not in the healthy control group) when avatars' ethnicity was different to a participant's, compared to avatars from the same ethnic background (Veling et al., 2014). The impact of social and environmental stressors on threat beliefs are acknowledged within the cognitive model of persecutory delusions (Freeman et al., 2002), highlighting the importance of investigating and reporting these stressors when assessing and treating paranoia using digital technologies.

The use of digitally enhanced assessments and treatments is of great interest to improve tailoring cognitive theory to an individual, using time sensitive technologies beyond clinical contexts (Seiferth et al., 2023; Geraets, Wallinius & Sygel., 2022; Rauschenberg et al., 2021; Bell et al., 2017; Riches et al., 2020). Digital ESM could be a particularly useful assessment tool for identifying individual-level symptoms, social or external risk factors associated with distress alongside establishing resilience factors (Kimhy & Vakhrusheva., 2019; Rauschenberg et al., 2021). In addition, tailoring apps to a person's specific threat beliefs can capture real time cognitive processes, responses and potentially improve access to support (Garety et al., 2021; Rauschenberg et al., 2021).

4.1 Strengths and limitations of the literature

A strength of the included studies includes the innovation involved in integrating technologies into assessment and treatments for paranoia. Most studies were scored as 'moderate' using the EPHPP quality rating, although studies tended to score 'weak' on the drop out and withdrawal section. There were several limitations of the included literature such as a lack of incorporation of other technologies, studies mostly containing small sample sizes, limited comparison groups and cross-sectional designs, with only one study using a prospective design (Freeman et al., 2014). Thirteen of the included studies investigated non-clinical samples only, limiting the generalisability to clinical populations. In addition, many studies did not report on participant ethnicity, reducing the ability to draw conclusive and generalisable findings across different ethnic groups. In VR studies, the lack of reporting on avatar characteristics including ethnicity, prevents a more nuanced understanding of the experiences of diverse groups across virtual environments. Another limitation was a lack of participant feedback present in the included studies. It is possible however, that feedback data is lacking in the studies due to the review excluding purely qualitative designs.

4.2 Strengths and limitations of the review

This review is the first to investigate digitally enhanced psychological assessments and treatments of paranoia across the continuum. Including studies sampling both clinical and non-clinical groups provides insights in technology use from non-clinical groups that might be beneficial clinically. Including both groups also allows for further learning about the continuum of paranoia (Freeman et al., 2005a). We included a range of study designs, to allow for a comprehensive review of innovative studies and interactive environments to be evaluated. The review's focus on paranoia answers calls for research investigating causal-interventionist mechanisms underpinning symptomology, and the role of technology in targeting these (Freeman et al., 2002; Bucci., Schwannauer., & Berry., 2019; Bell & Alvarez-Jimenez., 2019). The review focused on digitally enhancing technologies, that is, technologies that are in addition to face-to-face care and that people actively interact with (Graham et al., 2020; Bond et al., 2023). However, there is subjectivity and potential borderline cases within this distinction and some studies might have been excluded that other researchers might feel include digitally enhancing technologies. Further, enhancing technologies have different challenges and benefits in the assessment and treatment of paranoia, therefore generalisations across technologies cannot be made.

We only included peer reviewed research with the justification that this would ensure the inclusion of high-quality research. However, it is likely that there is further innovative research within the grey literature that has been excluded as a result. Furthermore, the use of the quality rating scale is subjective and introduces bias, although two members of the research team rated the studies independently in attempt to mitigate this bias. Forwards and backwards citation searching were not completed, which might have identified further papers suitable for inclusion in the present review. Due to the review covering a range of different assessments using various measures of paranoia and only including a small number of treatment studies, comparison and generalisations are difficult.

4.3 Clinical implications

The present provisional findings suggest that people can engage with technologies that enhance psychological assessments and treatments of paranoia. VR has the potential to extend current assessments of paranoia, by manipulating virtual environments that can be tailored to the individual (Valmaggia, Day & Rus-Calafell., 2016). ESM technology also has

great potential in the assessment of paranoia. ESM can provide greater time sensitivity and more ecologically valid investigation of potential associations between paranoia and other clinical variables than retrospective self-report (Lüdtke, Hedelt, & Westermann., 2023). Indeed, improving and developing psychological assessments of paranoia has been raised as important, especially for the development of targeted treatment (Freeman., 2024a; Freeman., 2024b).

For treatments, developing mobile apps for integrating into psychological therapy is gaining research attention (Garety et al., 2021; Hsu et al., 2023). Further, VR treatments can provide opportunities for extending exposure work during CBT, such as manipulating virtual environments to test out specific threat beliefs (Mongalesh, Samad-Soltani & Farhang., 2022). There might also be future scope for the development of self-help assessments and treatments of paranoia, in settings where psychological provision is limited, or where an individual might not otherwise access or regard themselves as needing substantive psychological support. In general hospital contexts, digital technologies like apps or VR could provide an intervention whilst a patient awaits further consultation, as has been carried out in psychiatric hospitals (Riches et al., 2023). Indeed, digital technologies have been proposed as a potential 'stepping-stone' to services, that might promote further engagement with psychology (Bond et al., 2023). Future self-directed assessments and treatments might reduce clinician workloads and provide further opportunities for broadening client choice. Research has begun to investigate digital assessments and treatments within low intensity treatments (Thomas et al., 2016).

Future training and development of technologies in the workforce is warranted, especially considering staff attitudes have been cited as a potential barrier to implementation (Aref-Adib et al., 2019). Training needs, funding for equipment, equipment choice (i.e. own phone or separate tablet in the context of integrating mobile apps) and costings are all important considerations for integrating digital technologies into future service provision. This is especially pertinent given the likely expansion of digital technologies including AI into mental healthcare in the future.

4.4 Future directions

Future research should continue to study digitally enhanced assessments and treatments for paranoia, using RCTs with large sample sizes and active control conditions. Several larger scale treatment studies are also being developed. For example, Freeman and colleagues (2023) recent RCT compared a 4 session VR-CBT with VR mental relaxation in participants with persecutory delusions. Researchers found no significant differences in conviction of paranoia between the groups, although beneficial effects of treatment were found in both conditions (Freeman et al., 2023). Further, several trials are ongoing in the field. Berhof and colleagues (2021) are investigating VR-CBTp versus CBTp with incorporated ESM in participants with a psychotic disorder experiencing paranoia. Similarly, the Face your Fears trial is investigating VR-CBT compared to standard CBT and TAU study arms in individuals diagnosed with Schizophrenia spectrum disorder (Jeppesen et al., 2022). Research investigating other technologies would be helpful, given the field is currently dominated by VR. There are interesting examples of digitally enhanced assessments and treatments investigating specific symptoms in psychosis research, such as AVATAR therapy for distressing voices (Leff et al., 2014; Craig et al., 2018), +Connect digital app targeting loneliness (Lim et al., 2020) and a digitally integrated cognitive and motivation training using the PRIME smartphone app (Fisher et al., 2023). SlowMo appears the only digitally blended treatment study for paranoid thoughts (Garety et al., 2021), although another exciting trial led by Professor Yiend evaluating a mobile app for the treatment of cognitive biases in paranoia (STOP Trial; https://www.stoptrial.co.uk/) is ongoing (Hsu et al., 2023).

Further research should focus on improving paradigms to increase the ecological validity of technologies, such as developing more complex virtual social environments and interactions (Riches et al., 2021). Additionally, future research should evaluate whether learning during treatment using VR is generalised beyond the virtual environment (Rus-Calafell et al., 2018). The simultaneous use of multiple digitally enhanced assessments and treatments may be beneficial. For example, there have been proposals of a 'poly-digital' approach, that is, the integration of several technologies targeting various needs simultaneously, reflecting how many people use technology in everyday life (Bond et al., 2023). With the recent increase and interest in technology use in mental healthcare, a need for guidelines on technology has been proposed, to improve research, clinical assessment and treatment through knowledge

sharing and consensus (Seiferth et al., 2023). Further, several key principles for psychological treatment development in psychosis have been proposed (Freeman., 2024a).

A greater consideration of participant characteristics and manipulating virtual spaces would be beneficial, to explore how different social stressors interact and contribute to threat beliefs in line with cognitive theory of persecutory delusions (Freeman et al., 2002). It is also paramount to ensure technologies are not excluding those who would otherwise wish to participate or access digitally integrated care (Hardy et al., 2022). Importantly, future research should prioritise stakeholder collaboration and coproduction in this exciting field, to ensure a human centred design, increased acceptability, and digital inclusion (Bucci, Schwannauer, & Berry., 2019; Bond et al., 2023; Hsu et al., 2023).

4.5 Conclusions

Digitally enhanced psychological assessments and treatments for paranoia show promising feasibility and acceptability. VR has the potential to elicit paranoia across the continuum using multiple virtual environments. Treatment studies show promise in integrating VR with CBT approaches to reduce paranoia, although larger clinical trials with active control groups are required. Other technologies including ESM and apps have begun to be developed and show promise in the assessment and treatment of paranoid thoughts, although more research is needed. These provisional findings show great promise for the potential future integration of technologies in healthcare, to improve support for those experiencing distressing paranoia.

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Appendices

Appendix 1: Quality ratings table

Appendix 2: EPHPP Quality ratings tool

Appendix 1: Quality ratings table

Table 2: Summary of Effective Public Health Practice Project quality ratings of the included studies

Study	A) Selection bias	B) Study design	C) Confounders	D) Blinding	E) Data collection methods	F) Withdrawals and drop-outs	Global rating
ASSESSMENT STUDIES							
Atherton et al., 2016	MODERATE	MODERATE	N/A	MODERATE	STRONG	STRONG	**STRONG**
Ben-Zeev et al., 2011	MODERATE	MODERATE	N/A	MODERATE	WEAK	MODERATE	**MODERATE**
Broome et al., 2013	WEAK	MODERATE	N/A	MODERATE	STRONG	WEAK	**WEAK**
Della Libera et al., 2023	WEAK	MODERATE	N/A	MODERATE	STRONG	WEAK	**WEAK**
Fornells-Ambrojo et al., 2008	MODERATE	MODERATE	WEAK	MODERATE	STRONG	STRONG	**MODERATE**
Freeman et al., 2014	MODERATE	MODERATE	N/A	MODERATE	STRONG	STRONG	**STRONG**
Freeman et al., 2005	MODERATE	MODERATE	N/A	MODERATE	STRONG	N/A	**STRONG**
Freeman et al., 2008a	WEAK	MODERATE	N/A	MODERATE	STRONG	WEAK	**WEAK**
Freeman et al., 2008b	MODERATE	MODERATE	STRONG	MODERATE	STRONG	WEAK	**MODERATE**

Freeman et al., 2010	WEAK	MODERATE	WEAK	MODERATE	STRONG	WEAK	**WEAK**
Hundal et al., 2018	WEAK	STRONG	STRONG	MODERATE	STRONG	WEAK	**WEAK**
McDonnell et al., 2018	MODERATE	MODERATE	N/A	MODERATE	STRONG	WEAK	**MODERATE**
Riches et al., 2019	MODERATE	MODERATE	MODERATE	STRONG	STRONG	STRONG	**STRONG**
Soflau and David, 2019a	MODERATE	STRONG	STRONG	STRONG	STRONG	STRONG	**STRONG**
Soflau and David., 2019b	MODERATE	STRONG	STRONG	MODERATE	STRONG	N/A	**STRONG**
Veling et al., 2014	MODERATE	MODERATE	WEAK	MODERATE	STRONG	WEAK	**WEAK**
Valmaggia et al., 2007	MODERATE	MODERATE	N/A	MODERATE	STRONG	WEAK	**MODERATE**
Veling et al., 2016	MODERATE	MODERATE	STRONG	MODERATE	STRONG	WEAK	**MODERATE**
Jongeneel et al., 2018	MODERATE	MODERATE	STRONG	MODERATE	STRONG	WEAK	**MODERATE**
Hesse et al., 2017	MODERATE	STRONG	WEAK	MODERATE	STRONG	STRONG	**MODERATE**
Pot-Kolder et al., 2018a	MODERATE	MODERATE	MODERATE	MODERATE	STRONG	WEAK	**MODERATE**

Geraets et al., 2020	MODERATE	STRONG	STRONG	MODERATE	WEAK	MODERATE	**MODERATE**
Brown et al., 2020	WEAK	STRONG	STRONG	MODERATE	STRONG	N/A	**MODERATE**
INTERVENTION STUDIES							
Freeman et al., 2016	MODERATE	STRONG	STRONG	MODERATE	STRONG	WEAK	**MODERATE**
Pot Kolder et al., 2018b	MODERATE	STRONG	STRONG	MODERATE	STRONG	MODERATE	**STRONG**
Garety et al., 2021	MODERATE	STRONG	STRONG	MODERATE	STRONG	STRONG	**STRONG**
Gorisse et al., 2021	WEAK	MODERATE	WEAK	MODERATE	STRONG	WEAK	**WEAK**

Appendix 2: EPHPP Quality ratings tool

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

EPHPP
Effective Public Health Practice Project

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify _____
8 Can't tell

Was the study described as randomized? If NO, go to Component C.

No Yes

If Yes, was the method of randomization described? (See dictionary)

No Yes

If Yes, was the method appropriate? (See dictionary)

No Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

1 Yes
2 No
3 Can't tell

The following are examples of confounders:

1 Race
2 Sex
3 Marital status/family
4 Age
5 SES (income or class)
6 Education
7 Health status
8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

1 80 – 100% (most)
2 60 – 79% (some)
3 Less than 60% (few or none)
4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

1 Yes
2 No
3 Can't tell

(Q2) Were the study participants aware of the research question?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

1 Yes
2 No
3 Can't tell

(Q2) Were data collection tools shown to be reliable?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group?

1 Yes
2 No
3 Can't tell
4 Not Applicable (i.e. one time surveys or interviews)

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell
5 Not Applicable (i.e. Retrospective case-control)

RATE THIS SECTION	STRONG	MODERATE	WEAK	
See dictionary	1	2	3	Not Applicable

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes
2 No
3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

4 Yes
5 No
6 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office individual

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office individual

(Q3) Are the statistical methods appropriate for the study design?

1 Yes
2 No
3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

1 Yes
2 No
3 Can't tell

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 1-4 onto this page. See dictionary on how to rate this section.

A	**SELECTION BIAS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
B	**STUDY DESIGN**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
C	**CONFOUNDERS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
D	**BLINDING**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
E	**DATA COLLECTION METHOD**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	
F	**WITHDRAWALS AND DROPOUTS**	**STRONG**	**MODERATE**	**WEAK**	
		1	2	3	Not Applicable

GLOBAL RATING FOR THIS PAPER (circle one):

1	STRONG	(no WEAK ratings)
2	MODERATE	(one WEAK rating)
3	WEAK	(two or more WEAK ratings)

With both reviewers discussing the ratings:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

No Yes

If yes, indicate the reason for the discrepancy

1	Oversight
2	Differences in interpretation of criteria
3	Differences in interpretation of study

Final decision of both reviewers (circle one):

1	**STRONG**
2	**MODERATE**
3	**WEAK**

Chapter Two: Empirical Research Project

The Role of Internalised Stigma in Clinical and Non-clinical Voice-Hearers

Supervised by Professor Emmanuelle Peters

Abstract

Background: Hearing voices that others cannot hear is a relatively common experience in the general population. For some, these experiences can lead to a need for care and investigating differences across the voice hearing continuum can be useful to identify treatment targets for those with a need for care. Internalised stigma is prevalent in psychosis but research investigating associations between internalised stigma and specific voice hearing phenomenology is limited. This study investigated internalised stigma in clinical (N=32) and non-clinical (N= 31) voice hearers. It also aimed to investigate associations between internalised stigma, negative voice content and submissive and powerlessness appraisals.

Methods: Thirty-two clinical voice hearers and thirty-one non-clinical voice hearers completed the Varieties Of Individual voiCe-Experiences (VOICES) scale. Constructs of internalised stigma, negative voice content and submissive and powerlessness appraisals were developed from items within the VOICES scale, with collaboration from experts by experience and experts by profession. Clinical voice hearers were hypothesized to score higher than non-clinical voice hearers on internalised stigma. Internalised stigma was also hypothesized to be associated with more negative voice content and submissive and powerlessness appraisals of voice hearing experiences.

Results: As expected, clinical voice hearers scored significantly higher than non-clinical voice hearers on internalised stigma. An adjusted regression model showed an association between internalised stigma and negative voice content, with the model explaining 67% of the variance in internalised stigma scores after controlling for group status. Submissive and powerlessness appraisals were associated with internalised stigma across the sample, but the relationship did not remain significant after controlling for group in the regression model.

Conclusions: Internalised stigma may be implicated in a need for care status and is associated with specific voice hearing experiences of negative voice content. The role of internalised stigma should be assessed in clinical voice hearers and considered during treatment for distressing voices.

Contents

1. Introduction

Auditory hallucinations or hearing voices in the absence of an external source, are a core component of psychosis (Rethink Mental Illness., 2014). However, hearing voices is relatively common in the general population; for example, a large online survey found that 29.5% of participants experienced hearing voices in the past month (Linszen et al., 2022). These findings are in line with a continuum view of psychosis, which posits that anomalous experiences sit on a continuum with everyday experiences and emphasises that the presence of these experiences does not necessarily indicate a pathological disorder or need for care (DeRosse & Karlsgodt., 2015; Baumeister et al., 2017). Researching voice hearers across the continuum can therefore provide useful insights into key aspects of voice hearing experiences that are associated with distress and reduced functioning, to identify underlying mechanisms and improve treatments for voice hearers with a need for care (Johns et al., 2014).

Previous research has found several differences related to voice content, responses, appraisals, and distress across clinical and non-clinical voice hearers. Non-clinical voice hearers report more positive or neutral voices, have greater perceived control over their voices and less maladaptive coping in response to voices (Johns et al., 2014; Moseley et al., 2022b). Additionally, non-clinical voice hearers with spiritualist group membership have been found to endorse more multisensory experiences than psychosis groups (Moseley et al., 2022b). In contrast, clinical voice hearers are more likely to negatively appraise their voices as omnipotent, dangerous, and as external entities (Johns et al., 2014; Baumeister et al., 2017; Connell et al., 2019; Chadwick & Birchwood., 1994; Garety, Fowler & Kuipers., 2000). Differences in attentional control and inhibition have also been found between clinical and non-clinical voice hearers (Moseley et al., 2022a).

Social and relational factors beyond the individual are also important to consider and have been associated with psychological responses to voices. For example, differences in social responses to the disclosure of hearing voices have been found between clinical and non-clinical groups and are implicated in the formation of negative self-schemas (Powers III, Kelley & Corlett., 2017; Heriot-Maitland, Wykes & Peters., 2022). Research has also found differences in how voice hearers relate interpersonally to their voices, such as clinical voice hearers being more distant and appraising voices as more powerful than non-clinical groups (Sorrell,

Hayward & Shawyer., 2010). These relational dynamics often mirror wider interpretations of a person's social rank and marginalisation in society, highlighting the relationship between inter and intra-personal processes (Birchwood et al., 2000; Hayward., 2003; Hayward, Berry & Ashton., 2011). These findings are consistent with evidence that voice hearing experiences are largely characterised as social agents or representations, similar to external social interactions (Bell., 2013; Wilkinson & Bell., 2016; Alderson-Day & Fernyhough., 2016). Further, inner speech related to other people has been associated with voice hearing experiences (de Sousa et al., 2016). Relational life events such as interpersonal trauma and attachment difficulties have also been implicated in the formation of voice-self beliefs (Newman-Taylor & Bentall., 2024; Hardy et al., 2024). The Hearing Voices Movement has advocated for a greater consideration of a person's interpersonal context, highlighting emphasis from those with lived experience on the importance of this area (Corstens et al., 2014). However, associations between social relating, negative self-schemas and clinical outcomes are less researched (Loizou, Fowler & Hayward., 2022).

Normalising approaches to working with distressing voices are a key part of psychological therapies, particularly important given the wider social context of severe mental illness (SMI) being highly stigmatised in the general population (Sivec & Montesano., 2012; Brohan et al., 2010b). Brohan and colleagues (2010b) have conceptualised stigma as containing three sub-categories including perceived stigma, experienced stigma, and self-stigma (otherwise known as internalised stigma). Internalised stigma has been defined as an individual absorbing negative stereotypes directed towards them, subsequently having an adverse impact on self-esteem and self-identity (Corrigan & Watson., 2002). Not surprisingly, internalised stigma is prevalent within SMI, with one study finding 41.7% of people with SMI across fourteen European countries reported moderate to high levels of internalised stigma (Brohan et al., 2010a). Internalised stigma has been found to have strong associations with negative outcomes, wellbeing, and functioning, above perceived and experienced stigma, perhaps due to the impact on a person's sense of self (Eliasson et al., 2021). For example, internalised stigma has been found to be associated with a range of difficulties including depression, low motivation, and suicidality (DeLuca et al., 2021; Pyle & Morrison., 2017). Additionally, internalised stigma is associated with low personal recovery, low quality of life and has been

identified as a barrier to accessing support in those with SMI, implicating the negative impact on clinical outcomes (Del Rosal et al., 2021; Yanos et al., 2008; Hall, Terry & Hayward., 2023).

Watson and colleagues (2007) proposed that internalised stigma involves three distinct stages. First, a person becomes aware of stigma in their surrounding culture and society (stigma awareness), second, they endorse stigmatising views (stigma agreement), and third they apply these stigmatising views to themselves (self-concurrence). The authors argue that internalising societal stigma of mental illness has a negative impact on a person's self-efficacy and self-esteem (Watson et al., 2007). Internalised stigma has been found to mediate the impact of perceived public stigma on psychosocial outcomes, highlighting the importance of internal processes such as appraisals and emotional responses (Kao et al., 2016). Pathway models have also found evidence of internalised stigma impacting on behavioural responses such as avoidant coping and avoidance of social interactions in those with Schizophrenia spectrum diagnoses (Yanos et al., 2008).

Schrank and colleagues (2014) developed and tested a model of internalised stigma, depression, and hope in a sample with Schizophrenia spectrum disorders, finding strong evidence for an interconnected, mutual role of these factors. These results extend previous studies of internalised stigma, in identifying evidence-based clinical targets for intervention (Schrank et al., 2014). More recently, an integrative cognitive model of internalised stigma in psychosis has been proposed (Wood et al., 2017; Figure 1). Wood and colleagues' model (2017) builds on theory and evidence as summarised above and extends this by integrating cognitive behavioural theory. Specifically, the model highlights the importance of stigmatising core beliefs and appraisals at a cognitive level, emotional responses (such as shame), and behavioural responses (such as avoidance), that all contribute to the development and maintenance of internalised stigma (Wood et al., 2017). The model is consistent with evidence that having a normalising response to voice hearing experiences has been found to reduce negative appraisals of anomalous experiences (French et al., 2011).

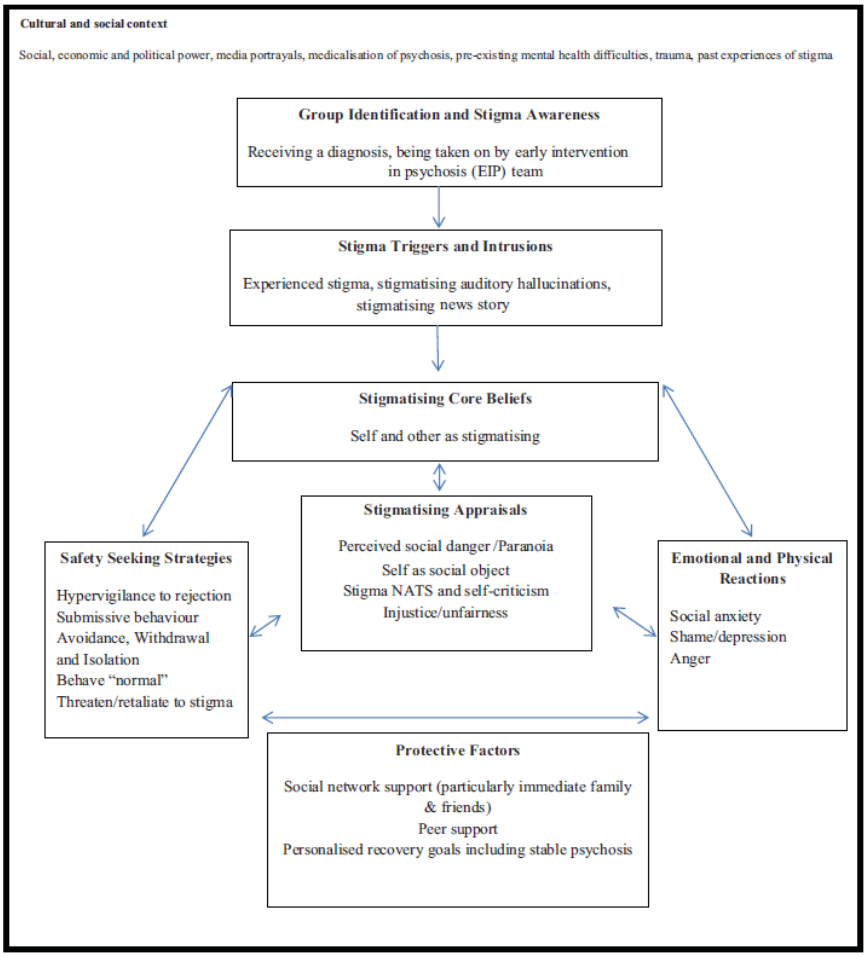


Figure 1. Wood et al.'s Integrative Cognitive model of Internalised Stigma in Psychosis, taken from *'An Integrative Cognitive Model of Internalized Stigma in Psychosis' (2017)*

Despite research highlighting an overlap between how a person views themselves in the social world and relationships with their voices (Hayward et al., 2014), research focused on the role of internalised stigma and voice hearing experiences is limited. However, related phenomena to internalised stigma, such as negative self-schemas and shame, have been associated with distress, negative beliefs, and omnipotent appraisals of voices (Birchwood et al., 2004; Thomas, Farhall & Shawyer., 2015; Carden et al., 2020). Internalised stigma has been associated with positive symptoms of psychosis generally, and specifically with unusual beliefs and distress related to unusual experiences (DeLuca et al., 2021; Pyle et al., 2015; Eliasson et al., 2021). Additionally, within qualitative literature, experts by experience have highlighted the role of internalised stigma in contributing to negative voice content (Burke et al., 2016; Parry, Loren & Varese., 2021). Stigmatising appraisals of hearing voices have been highlighted as contributing to behavioural responses, such as avoiding social interactions or sharing voice

hearing experiences with others (Sheeves et al., 2021). Research looking at differences between clinical and non-clinical groups is also very limited. However, there is some evidence for the potential role of safe and supportive social spaces in the preservation of self-image in non-clinical voices hearers (Harris et al., 2022).

To the authors knowledge, investigating associations between internalised stigma and specific voice hearing phenomenology has yet to be investigated quantitatively across the psychosis continuum. Furthermore, most measures attempting to capture the phenomenology of voices are developed from clinical groups (Luhrmann et al., 2023). As such, measures tend to focus on negative content, with less focus on neutral and positive experiences, or experiences involving both positive and negative voices (Baumeister et al., 2017; Luhrmann et al., 2023). The Varieties Of Individual voiCe-Experiences Scale (VOICES) is a novel scale developed to investigate a broader range of voice hearing experiences, by including neutral and positive items within the scale (Luhrmann et al., 2023). The VOICES scale is therefore particularly advantageous to administer across the psychosis continuum. This study aimed to investigate the role of internalised stigma in clinical and non-clinical voice hearers using this novel measure. Specifically, we aimed to investigate group differences in internalised stigma and its association with voice content and the voice-voice hearer relational appraisals.

1.1. Hypotheses:

Primary hypothesis: Clinical voice hearers will score higher than non-clinical voice hearers on an internalised stigma construct derived from the VOICES scale items.

Secondary hypotheses: Higher scores on the internalised stigma construct will be related to more negative voice content and more submissive and powerlessness appraisals of the relationship with the voices.

2. Methods

2.1 Ethical approval

This study received ethical approval from the London-Dulwich NHS Research Ethics Committee (20/LO/0010; Appendix 7) and from the South London and Maudsley (SLaM) Research and Development Department (R&D2020/043).

2.2 Patient and public involvement

The VOICES questionnaire received consultation feedback from clinical and non-clinical voice hearers during the development stage (Luhmann et al., 2023).

Experts by experience provided paid consultation for the development of the internalised stigma construct as described below.

2.3 Participants

Clinical group (n=32)

Clinical participants were primarily recruited from the Psychological Intervention Clinic for outpatients with Psychosis (PICuP) research register. Participants who had consented to be contacted about SLaM and King's College London research were also recruited from a SLaM Early Intervention (EI) service and from the Study of Trauma and Recovery (STAR) Trial (Peters et al., 2022). Participants were included if (1) they were experiencing/had experienced auditory verbal hallucinations, as determined by self-report (2) were able to provide informed consent (3) were aged over 18 years old and (4) could speak fluent English.

Non-clinical group (n=31)

Non-clinical participants were recruited from the UNIQUE study research register (Peters et al., 2016). The UNIQUE register contains people mainly recruited from spiritualist and psychic groups with enduring anomalous experiences who have never used mental health services for these experiences. An existing dataset of twenty-two non-clinical voice hearers from the UNIQUE register who had completed the VOICES scale were included (Luhrmann et al., 2023).

A further nine non-clinical participants were recruited during this study period, to increase the non-clinical sample size to ensure equal numbers of participants across the two groups. The inclusion criteria for the non-clinical group were the same as the clinical group but with the additional criteria of 1) having had no contact with mental health services in relation to voice hearing and 2) participants were not distressed by the voices.

Of note, broad ethnicity categories are reported in Table 1 due to the previous dataset of non-clinical participants collecting data at this level. More specific ethnicity categories collected during the present study period are displayed in Table 6, Appendix 2.

2.4 Sample characteristics

Sample characteristics are displayed in Table 1. In total, participants ranged in age from 18 to 83 years. The clinical group was significantly younger than the non-clinical group. The groups significantly differed on ethnicity, age, and employment status and there were no significant differences in gender.

Primary diagnoses for the clinical group were extracted from electronic patient notes, with consent from the participant. In cases where participants were either not open on patient notes (n=4) or where no diagnosis was listed in the notes (n=2), participant's self-reported diagnosis were used. Most clinical participants had an International Classification of Diseases (ICD-10) schizophrenia spectrum diagnosis (F20-29; ICD, World Health Organisation., 2019).

Table 1: Sample Characteristics

	Clinical (n=32) m(SD)/n(%)	Non-clinical (n=31) m(SD)/n(%)	Total (n=63) m(SD)/n(%)	X^2	t (df)	p
Age[a]	40.03 (15.48) (range 18-83)	55.39 (10.83) (range 27-75)	47.59 (15.38) (range 18-83)		4.57 (55.6)	<0.001
Gender[b]						0.57
Male	18 (56.3%)	10 (32.3%)	28 (44.4%)			
Female	13 (40.6%)	21(67.7%)	34 (54.0%)			
Other	1 (3.1%)	0 (0%)	1 (1.6%)			
Ethnicity[b]						<0.001
White	12 (37.5%)	29 (93.5%)	41 (65.1%)			
Black	13 (40.6%)	1 (3.2%)	14 (22.2%)			
Other ethnicity	7 (21.9%)	1 (3.2%)	8 (12.7%)			
Employment status				13.51		<0.001
Employed or studying	10 (31.3%)	24 (77.4%)	34 (54%)			
Retired or unemployed	22 (68.8%)	7 (22.6%)	29 (46%)			
Primary diagnosis						n/a
Schizophrenia spectrum (F20-29)	21 (65.6%)	-	-			
Mood disorder	6 (18.8%)	-	-			
Personality Disorder	3 (9.4%)	-	-			
PTSD[c]	2 (6.3%)	-	-			

[a]Welch test reported as Levene's test of equal variances was not met.

[b]Fisher's exact score reported due to small cell counts not meeting assumptions for Chi Square.

[c]Post Traumatic Stress Disorder.

2.5 Measures

The VOICES Scale (Luhmann et al., 2023)

The VOICES scale consists of 50 items rated using multiple choice and Likert scales and includes items on the phenomenology of voices (24 items); beliefs and relationships with voices (16 items); emotional and behavioural impact (9 items) and 1 open-ended question ('*Is there anything else we have not asked you about you feel is important to tell us?*'). It was

developed to extend previous scales in an attempt to capture a broader range of voice hearing experiences, including more positive and neutral experiences (Luhmann et al., 2023, Appendix 1).

Internalised stigma construct

A composite score of items from the VOICES scale related to the construct of internalised stigma was derived. Authors of the current paper first met to discuss potential items for this construct (MB/EP/SR). To establish content validity of the construct, two experts by experience and two experts by profession were then approached for consultation and asked to identify items from the VOICES scale that they felt best tapped into the construct of internalised stigma. The experts by experience were paid £15 per hour for their consultation. Experts were provided with the VOICES scale prior to meeting with researchers (MB/EO). The experts by experience were initially given the whole scale and were then presented with specific items as identified by the experts by profession to check for agreement. Following consultation with all experts, consistency of items was assessed and items with agreement from four out of five raters (i.e three experts and the current authors endorsing an item, or all four experts endorsing an item but not the current authors) were included in the final internalised stigma variable listed below:

- Item 40a- *Do you believe hearing voice(s): is abnormal?*

  Strongly disagree (1) – Disagree (2) – Undecided (3) – Agree (4) - Strongly agree (5)

- Item 40h- *Do you believe hearing voice(s): means you are an outsider (e.g., being on the fringe of society)?*

  Strongly disagree (1) – Disagree (2) – Undecided (3) – Agree (4) -Strongly agree (5)

- Item 47a- *Do(es) the voice(s) make you feel ashamed or bad about yourself?*

  Not at all (1) -A little (2) - Somewhat (3) - A fair bit (4)- A lot (5)

- Item 38- *Do you try to keep the voice(s) a secret from people you know?*

  Not at all (1) -Only a few people (2) -It depends (3) -Most people (4)- Definitely (5)

Negative voice content

The independent variable of negative voice content was derived from specific items within the scale and agreed by three authors (MB, SR, EP):

- Item 18: *Do(es) the voice(s) say(s) positive things?* (reverse scored)
  Never (5) – Rarely (4) - Sometimes (3)- Often (2) – Always (1)

- Item 19: *Do(es) the voice(s) say(s) negative things?*
  Never (1) – Rarely (2) – Sometimes (3) – Often (4) – Always (5)

- Item 24f: *Do(es) the voice(s) insult you or put you down?*
  Never (1) – Rarely (2) – Sometimes (3) – Often (4) – Always (5)

- Item 24g*: Do(es) the voice(s) praise you or say nice things to you?* (reverse scored)
  Never (5) – Rarely (4) - Sometimes (3)- Often (2) – Always (1)

Submissive and powerlessness appraisals

Three items from the VOICES scale were selected by authors (MB, EP, SR) to create the variable of submissive and powerlessness appraisals:

- Item 26: *Can you make the voices stop when you want to?* (reverse scored)
  Never (5) – Rarely (4) – Sometimes (3) – Often (2) – Always (1)

- Item *35: Is/Are the voice(s) powerful (for instance, does it have the means to make things happen)?*
  Not at all (1) - A Little (2) – Somewhat (3) - A fair bit (4) - A lot (5)

- Item *36: Who's in control, you or the voice(s)?*
  Definitely me (1) - Somewhat me (2) - Equal power (3) - Somewhat the voice/s (4) - Definitely the voice/s (5)

Scores on each item were summed to create a total score for each construct. The potential range of scores was from 4-20 for both internalised stigma and negative voice content, and

from 3-15 for submissive and powerlessness appraisals. High scores represented higher internalised stigma, negative voice content and submissive appraisals, respectively. Internal consistency of each construct is reported in the results section.

2.6 Procedure

Participants were screened via telephone call using the study inclusion criteria for each group as detailed above. Eligible participants were sent a study participant information sheet and consent form via post or email and were given a minimum of 24 hours to read through the information sheet before completing consent and study procedures. Participants met with a researcher either remotely on Microsoft Teams, via telephone or face to face to complete the VOICES scale, a demographics form, and a study feedback form (Appendix 6). For those who consented to the option of having the research session recorded, the VOICES scale questionnaire was recorded for future qualitative research. The meeting to obtain informed consent and complete the study measures took approximately one to two hours in total and participants were compensated with a £25 voucher for their time.

2.7 Power calculation

A power calculation was conducted based on an estimated effect size of 0.8 for the internalised stigma composite scores between groups. This was based on the negative self-schema measure used by Peters and colleagues (2016) (mean scores = 2.06 (SD 3.2) for the non-clinical group and 6.06 (SD 6.2) for the clinical group). A sample size of 40 participants (20 per group) was estimated to be able to detect a 0.8 effect size at the 0.05 significance level with 80% power. A slightly larger sample size was recruited to enable the detection of a marginally smaller effect size.

2.8 Analyses

Data analysis was conducted using IBM SPSS (Version 29). Descriptive statistics for scores on the 50 items of the VOICES scale in each group are reported in Table 5, Appendix 1. All subsequent analyses were conducted by extracting specific items from the VOICES scale to develop three constructs (as described above: internalised stigma, negative voice content, and submissive and powerlessness appraisals). Internal consistency of the items within the three constructs was assessed using Cronbach's alpha.

Data imputation was conducted in cases where a participant was missing data in only one item across the total number of items making up each construct (i.e. if one item was missing out of the four items for both internalised stigma and negative voice content, or if one item was missing across the three items for the submissive and powerlessness construct). Data was imputed by calculating and imputing the sub-group mean score for the given item. Data was treated as missing if a participant had missing data on two or more items making up each construct.

Shapiro-Wilk tests, histograms and QQ plots were used to investigate the normality of the data and to assess test assumptions (Appendix 3). Tests of association (independent samples t tests and Chi square tests) were performed to check for differences between the two groups on demographic variables and the main three variables of interest (internalised stigma, negative voice content and submissive and powerlessness appraisals). Fisher's exact test was conducted instead of Chi square for any variables where individual cells had <5 data points (gender and ethnicity). Scatter plots (Appendix 3) were used to visually inspect the relationships between internalised stigma, negative voice content, and submissive and powerlessness appraisals before conducting correlational analyses to test the strength of collinearity (Pearson's correlation or Spearman's rank).

Multiple regression analyses were then conducted to investigate whether internalised stigma was related to negative content and submissive and powerlessness appraisals of the voice/s across the sample, controlling for group status and any variables that were significantly different between the two groups (Table 4). Internalised stigma was entered as the dependent variable, with negative voice content and submissive and powerlessness appraisals as predictor variables in Step One of Model 1 (unadjusted). In Step Two of Model 1, group status was adjusted for along with age, ethnicity, and employment status. A final model (Model 2) was conducted, entering only the predictor variables of interest (negative voice content and submissive and powerlessness appraisals) and any co-variates that were significant in Step Two of Model 1.

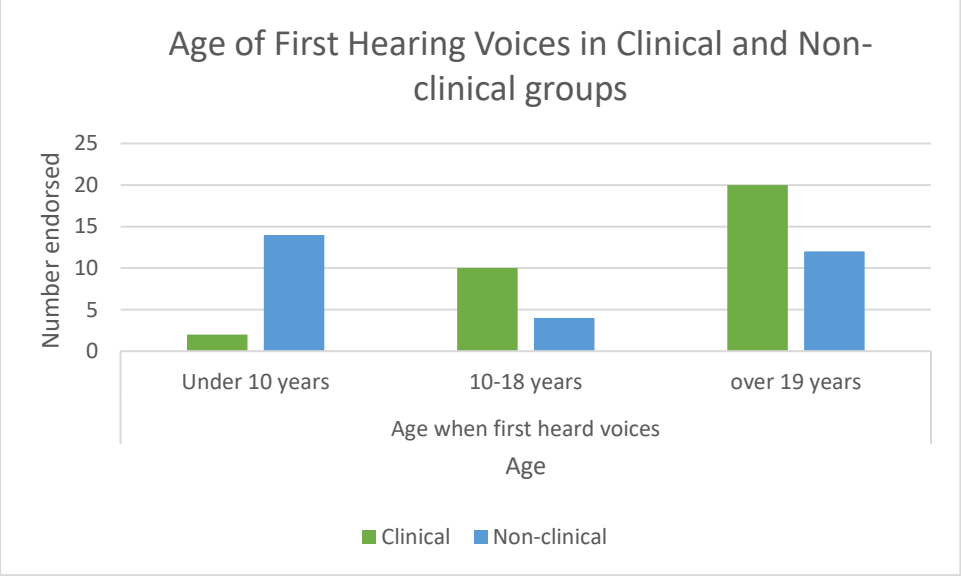
3 Results

3.3 VOICES Scale

Results on all items of the VOICES scale are displayed in Table 5, Appendix 1. A few, selected findings of interest are reported here to contextualise the voice-hearing experiences of the two groups.

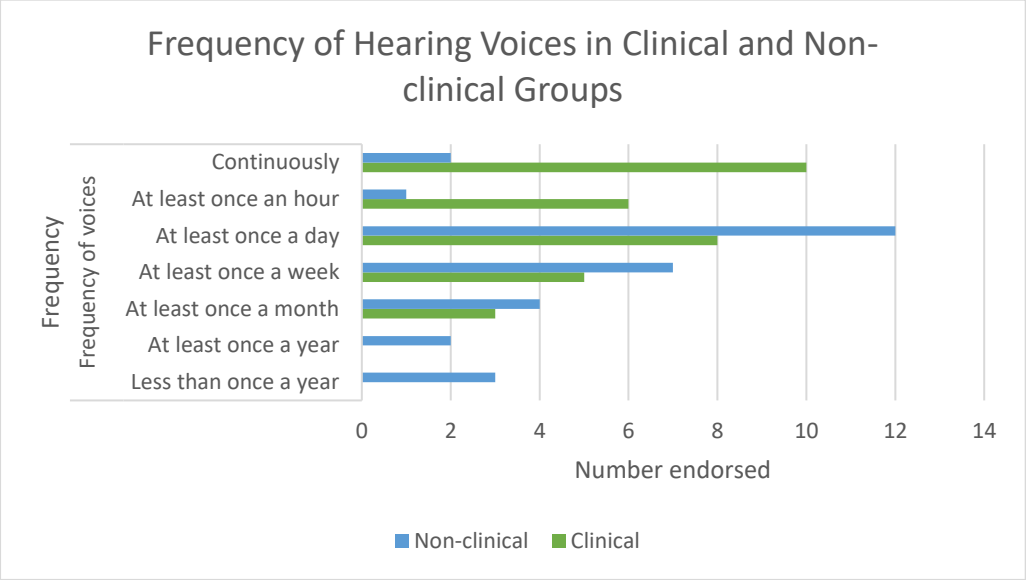
Of the clinical voice hearers, the majority first heard voices aged over nineteen years (see Bar Chart 1; item 2), while nearly half of the non-clinical voice hearers first heard voices aged under ten years old.

Bar Chart 1: Age when first heard voices in clinical and non-clinical voice hearers



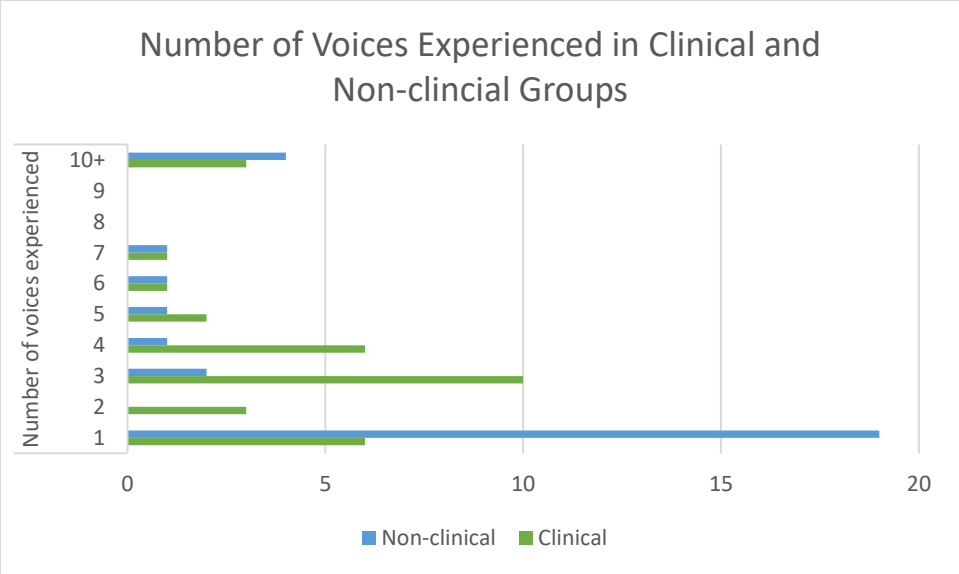
Differences can also be seen in the frequency of voice hearing experiences across groups (see Bar Chart 2; item 4), with the non-clinical group generally experiencing less frequent voices. However, at the time of testing participants scored similarly in when they had last heard a voice (Table 5, Appendix 1, item 3), with roughly half of each group reporting having done so in either the last day or hour.

Bar Chart 2: Frequency of hearing voices in clinical and non-clinical groups



The total number of voices heard across the sample are displayed in Bar Chart 3 (item 5). In the non-clinical group, 65.5% heard only one voice compared with 18.8% of the clinical group. The modal number of voices heard by the clinical group was three (31.3%).

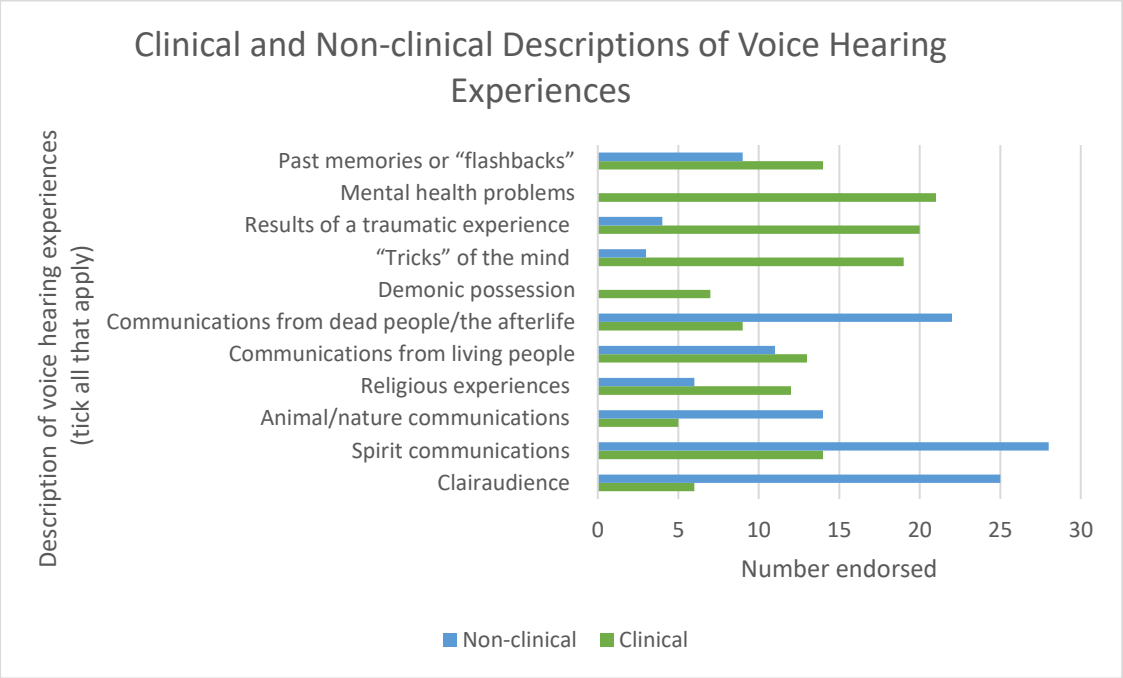
Bar Chart 3: Number of Voices Experienced in Clinical and Non-clinical Groups



Endorsed descriptions of voice hearing experiences across the two groups are displayed in Bar Chart 4 (item 1). Participants could select more than one response for this question. The highest endorsed descriptions of voices for the clinical group were a 'mental health problem' (65.6%), while none of the non-clinical group endorsed this category. 'Results of a traumatic experience' (62.5%) and '"tricks" of the mind' (59.4%) were also highly endorsed in the clinical

group, but much less so in the non-clinical group. The highest endorsed descriptions for non-clinical voice hearers were 'spirit communications' (90.3%), 'clairaudience' (80.6%) and 'communications from dead people or the afterlife' (68.8%). The endorsement of 'communications from living people' was similar across groups.

Bar Chart 4: Clinical and Non-clinical descriptions of voice hearing experiences (NB participants could endorse more than one description)



3.4 Constructs

Across all constructs, one clinical participant was removed from analyses due to missing data. In addition, a further clinical participant was removed from the internalised stigma construct only, due to missing data. Data was imputed for one clinical participant for the internalised stigma construct. Similarly, data was imputed for one clinical participant and one non-clinical participant for the submissive and powerlessness appraisals construct. The total number of participants for Hypothesis One and Two was therefore 61, due to missing data in the main dependent variable (internalised stigma).

The four items included in the internalised stigma construct produced a Cronbach's alpha of 0.57 (relatively low). The four items for negative content had a Cronbach's alpha score of 0.82 (high) and the three items included in the submissive and powerlessness construct produced a Cronbach's alpha of 0.51 (low).

The Shapiro-Wilk test for internalised stigma (p=0.005), negative content (p=0.001) and submissive and powerlessness (p=0.048) were all significant. However, such tests are known to be overly conservative; visual inspection of the data using histograms and QQ plots (see Appendix 3) indicated the data were sufficiently normally distributed for parametric testing. This was further confirmed by comparing the results of parametric and non-parametric tests (Mann-Whitney U and Independent Samples t test) for hypothesis one, which found similar results (i.e. U=892, p=<0.001). The results of parametric analyses are therefore reported below. Spearman's Rank correlation was used to investigate submissive and powerlessness appraisals and internalised stigma, as a scatter plot found the relationship between these two variables to be non-linear (Appendix 3). Descriptive statistics across the sample for each of the three constructs are displayed in Table 2 and correlations between the three variables of interest are presented in Table 3.

3.5 Hypothesis One: Clinical voice hearers will score higher than non-clinical voice hearers on an internalised stigma construct derived from the VOICES scale items.

As predicted, there was a highly significant difference between the two groups on internalised stigma, with the clinical group scoring higher than the non-clinical group (see Table 2).

3.6 Hypothesis Two: Higher scores on internalised stigma items will be related to more negative voice content and more submissive and powerlessness appraisals of the relationship with the voices.

The data met assumptions for parametric linear regression, however, as tests of normality were borderline (as described above), nonparametric tests were also conducted for comparison and data checks. The bootstrapped nonparametric tests found similar results to the parametric tests (Table 6, Appendix 4); therefore, parametric results are presented below. Due to the high collinearity between negative voice content and submissive and powerlessness constructs (see Table 3), another regression model was run with the submissive and powerlessness variable removed to check for stability of the model (Table 7, Appendix 5). Inspection of the model found little difference when submissive and powerlessness appraisals was removed and so the full model with submissive and powerlessness appraisals is reported below.

Table 2: Descriptive statistics for total scores on internalised stigma, negative content, and submissive and powerlessness appraisals constructs

Construct	Clinical Group M (SD; range)	Non-clinical Group M (SD; range)	Total M (SD; range)	t (df)	p
Internalised stigma (n=61)	13.70 (2.77; 6-17)	7.39 (1.94; 4-12)	10.49 (3.96; 4-17)	-10.334 (59)	<0.001
Negative voice content (n=62)	15.06 (3.79; 8-20)	8.06 (2.21; 4-12)	11.56 (4.68; 4-20)	-8.897* (48.26)	<0.001
Submissive and powerlessness appraisals (n=62)	10.29 (2.45; 6-15)	5.87 (2.51; 3-11)	8.08 (3.32; 3-15)	-7.008 (60)	<0.001

**Welch test reported as Levene's test of equal variances was not met.*

Results of the multiple linear regression models are displayed in Table 4. In the unadjusted model, both negative voice content and submissive and powerlessness appraisals were significantly associated with internalised stigma and the model predicted 57% of the variance in internalised stigma scores ($F(2,58)= 38.466$, $p=<0.001$, $R^2=.570$). When group, age, employment, and ethnicity were adjusted for in step two of the first model, only negative content remained statistically significant ($\beta=0.28$, $p<0.024$, CI .032-.437). Submissive and powerlessness appraisals was not significant (p=.71). Covariates age (p=.92), ethnicity (p=.44), and employment (p=.32) were not significant, but there was a significant effect of group. The adjusted model explained 69% of the variance in internalised stigma scores ($F(6, 54)= 19.913$, $p=<0.001$, $R^2=.689$).

Table 3: Correlation Matrix for internalised stigma, negative voice content and submissive appraisals constructs across the sample

Construct	1.	2.	3.
1. Internalised stigma	-		
2. Negative voice content	.710*	-	
3. Submissive and powerlessness appraisals	.574* [a]	.441*	-

***p<.001**

[a]Spearman's rank conducted due to a non-linear relationship between these two variables.

A second regression model (Model 2) was run with only variables that were significantly associated with internalised stigma from and the main variables of interest from adjusted model 1 (negative voice content, submissive and powerlessness appraisals, and group status), to assess risk of model overfitting due to multiple predictor variables. Negative voice content remained significantly associated with internalised stigma and the model explained 67% of the variance in internalised stigma scores ($F(5, 57)= 38.487$; $p<0.001$, $R^2=.669$).

Table 4: Multiple linear regression models testing the associations between negative voice content, submissive and powerlessness appraisals with internalised stigma (n=61)

	R^2	B	SE B	β	95% CI	p
Model 1						
Step 1 (Unadjusted)	.57					
Constant		2.075	1.036		.00-4.15	.05
Negative voice content		.491	.081	.585	.33-.65	<0.001
Submissive and powerlessness appraisals		.341	.115	.285	.11-.57	.004
Step 2 (Adjusted)	.69					
Constant		4.240	2.405		-.58-9.06	.084
Negative voice content		.234	.101	.279	.03-.44	.024
Submissive and powerlessness appraisals		.047	.124	.039	-.20-.29	.708
Group		4.444	1.354	.565	1.73-7.16	.002
Age		-.003	.029	-.011	-.06-.06	.923
Ethnicity		.443	.565	.078	-.69-1.58	.436
Employment		.843	.833	.106	-.83-2.51	.316
Model 2	.67					
Constant		5.40	1.22		2.96-7.85	<.001
Negative voice content		.207	.099	.246	.01-.41	.042
Submissive and powerlessness appraisals		.054	.123	.045	-.19-.30	.663
Group		4.61	1.11	.586	2.38-6.84	<.001

R^2= r squared, B= beta, SE B= standard error beta, β= standardised beta coefficient, CI= confidence interval

4 Discussion

To the author's knowledge, this is the first quantitative study to investigate associations between internalised stigma and voice hearing experiences across the continuum. As hypothesized, the clinical voice hearers scored higher in internalised stigma than the non-clinical voice hearers. In addition, internalised stigma was associated with negative content of the voices, and to a lesser extent, submissive and powerlessness appraisals.

4.1 Internalised stigma

As expected, there was a highly significant difference in internalised stigma scores across the sample, with higher scores found in clinical voice hearers compared to non-clinical voice hearers, supporting hypothesis one. This finding is consistent with the wider literature, which has found high rates of internalised stigma in those experiencing SMI (Brohan et al., 2010; Eliasson et al., 2021). Interestingly, the non-clinical group also experienced some internalised stigma, although to a much smaller degree than the clinical group. The presence of internalised stigma across the sample might suggest that voice hearing itself is associated with experienced and/or perceived stigma and discrimination, which is subsequently internalised (Hill & Linden., 2013; Harris et al., 2022). In a qualitative study investigating a related phenomenon of epistemic injustice (i.e. being discriminated against due to a person's marginalised group status in the context of knowledge sharing), both non-clinical and clinical voice hearers reported experiencing epistemic injustice (Harris et al., 2022). However, like the current study, the non-clinical group experienced epistemic injustice to a lesser degree than the clinical group (Harris et al., 2022). Non-clinical voice hearers may experience more protective factors that reduce or prevent the internalisation of stigma. For example, they might experience positive ingroup identity (i.e. belonging to a spiritualist group) and more validating social responses compared to clinical voice hearers (Harris et al., 2022; Heriot-Maitland, Wykes, & Peters., 2022). Future research should continue to investigate protective factors against internalised stigma. For example, a recent study found religiosity a potential protective factor against reduced quality of life related to internalised stigma (Seet et al., 2023). Further, some of these questions could be investigated using other items on the VOICES scale and a larger sample, such as the role of knowing other people with similar experiences (item 39, Table 5, Appendix 1).

Greater rates of internalised stigma in the clinical group compared to the non-clinical group is likely to be compounded by other factors aside from voice hearing experiences. For example, stigma associated with accessing and receiving support and/or a diagnosis from mental health services has been acknowledged (Hill and Linden., 2013). In one study investigating stigma associated with symptoms and stigma associated with psychiatric labelling in a sample of adolescents at clinical high-risk of psychosis, both stigma types were independently associated with shame (Yang et al., 2015). Importantly, other areas of a person's identity might also

contribute to internalised stigma, such as intersections between mental health stigma, social inequality, and racism (Kapadia, 2023; Wood et al., 2022). This is pertinent within UK mental health care, where Black people are five times more likely to be sectioned compared to their White counterparts (GOV.UK, 2023). This is of note as the clinical group in the present study included a greater prevalence of participants from racially minoritised groups than the non-clinical sample who were mostly White. Investigating the role of systemic and structural stigma as well as racism have been proposed within the field of stigma research, in addition to a focus at the individual level (Tyler & Slater., 2018; Kapadia, 2023). For example, previous literature has raised the need to question where stigma comes from, the history, and oppression of psychiatry towards different groups (Tyler & Slater., 2018). These considerations could be integrated into the cognitive model of internalised stigma, which highlights a focus on 'cultural social context' (Wood, Byne & Morrison., 2017).

4.2 Internalised stigma and negative voice content

As hypothesized, there was a strong positive association between negative voice content and internalised stigma. In the final regression model, negative voice content was significantly associated with internalised stigma and the model explained 67% of the variance in internalised stigma scores. The association between internalised stigma and negative voice content remained after controlling for group status. This suggests that negative voice content is a robust variable that might more strongly predict internalised stigma above that of other variables the groups differed on, such as ethnicity or age that were not significant.

Although research is limited, associations between negative voice content and internalised stigma is consistent with wider research. In one qualitative study investigating social experiences and derogatory voices, fear of stigma from others was identified as a barrier to sharing negative voice hearing experiences (Sheaves et al., 2021). In addition, derogatory voice content was raised as triggering fears of judgment by others (Sheaves et al., 2021). Another study found that voice hearers with less self-critical thoughts and concerns of negative evaluation from others heard greater themes of interpersonal connection (Connor & Birchwood., 2013). In a qualitative study with clinical voice hearers, negative self-worth in response to sharing voice hearing experiences with others (inferring internalised stigma processes) was noted (Mawson et al., 2011). Mawson and colleagues (2011) also found that

voices often corresponded with a negative sense of self. These studies highlight likely bi-directional processes between negative voice content and internalised stigma.

Negative voice content and internalised stigma might be associated due to evidence finding voices are often mood congruent (Baumiester et al., 2017). Internalised stigma has been shown to impact on low self-esteem, self-worth, and low mood (Mashiach–Eizenberg et al., 2013; Burke et al., 2016; Fannon et al., 2009). Further, in one study investigating depression and voice hearing experiences, low self-esteem and beliefs about voices were both independently associated with depression in a sample experiencing persistent voices (Fannon et al., 2009). Emotional responses from the voice hearer (i.e. fear, shame) following disclosure to others was raised as contributing to, and/or exacerbating, negative voice content in a qualitative study with young people (Parry, Loren & Varese., 2021). Anxiety and depression were not controlled for in this study, which have been shown important mediatory factors between core schemas and voice related distress (Kusztrits et al., 2022).

The association between negative life events and negative voice content has been consistently recognised in the literature (Morrison, Frame & Larkin., 2003; Longden, Madill, & Waterman., 2012; Van Den Berg et al., 2023). In addition, social pathways to psychosis have also been theorised, such as the experience of low social rank and social defeat contributing to voice hearing experiences (Heriot-Maitland, Wykes, & Peters., 2022). Experiencing stigma can be a traumatic experience, which might trigger low social rank and social defeat. Further, negative self-beliefs and shame have also been identified as responses to experiencing stigma (Wood, Byrne & Morrison., 2017). Interacting processes between trauma and social processes in psychosis have been previously recognised, particularly implicating the role of shame (Heriot-Maitland, Wykes, & Peters., 2022). In one study investigating shame related trauma memories across the voice hearing continuum, no significant differences in the type of shame memories were found between clinical and non-clinical voice hearers (Brand et al., 2023). However, shame memories were associated with significantly higher levels of self-criticism and external shame in the clinical group only (Brand et al., 2023). Brand and colleague's study (2023) highlights the role of psychological processes implicated in internalised stigma (i.e. external shame and self-criticism) as associated with shame and distressing voices. Indeed, experiences of stigma have been identified as triggering an increase in the intensity and frequency of negative voices in qualitative research (Burke et al., 2016; Parry, Loren & Varese,

2021). Further, research investigating thematic associations between trauma events and voices have found thematic links between negative self-beliefs associated with past trauma and voice phenomenology (Van Den Berg et al., 2023). Considering the role of stigma in victimization and discrimination experiences within a trauma-informed approach for those experiencing psychosis is therefore warranted (Van Den Berg et al., 2023; Hardy et al., 2024).

Associations between negative voice content and internalised stigma also correspond with theoretical models of internalised stigma. Within Wood and colleagues' (2017) integrative model of internalised stigma, internal triggers (such as voice hearing experiences) are hypothesized to activate stigmatising core beliefs and subsequent behavioural and emotional responses (i.e. avoidance and shame, respectively). Interestingly, possible bi-directional processes between internalised stigma and negative voice content have been proposed (Wood, Byrne & Morrison., 2017). For some, stigmatising core beliefs might impact on the appraisal of negative voice content i.e. "I'm mad", leading to shame, withdrawal and avoidance behaviours that maintain internalised stigma. Alternatively, the content of the voices may be stigmatising i.e. "you're an outsider, you don't fit in", triggering stigmatising core beliefs and resulting in similar emotional and behavioural responses as described above (Wood, Byrne & Morrison., 2017). Longitudinal studies would be helpful to further explore the relationship between negative voice content and internalised stigma and possible mediating factors such as shame, anxiety, and depression.

4.3 Internalised stigma and submissive and powerlessness appraisals

There was a significant, moderate correlation between submissive and powerlessness appraisals and internalised stigma across the sample. Submissive and powerlessness appraisals was significantly associated with internalised stigma in the unadjusted model with negative content. However, the association between internalised stigma and submissive and powerlessness appraisals in this study was not significant once group status, age, ethnicity, and employment were controlled for. This suggests submissive and powerlessness appraisals does not have an association with internalised stigma and that the significant association in the unadjusted model was likely spurious. This might also be in part be due to a more limited range of scores and potentially more floor and ceiling effects within groups compared to negative voice content. It is therefore likely that there is not an association between these two variables, and that the positive association in the unadjusted model was driven by other group

differences that were not controlled for. In addition, the sample size might have been too small to detect a relationship in the adjusted model. Further, the construct of submissive and powerlessness appraisals had low reliability and therefore may not be a strong construct. Future research should investigate potential relationships between internalised stigma and submissive and powerlessness appraisals using a more representative sample across the psychosis continuum, larger sample sizes and more robust measures of submissive and powerlessness appraisals.

These findings contrast with the wider literature. For example, in one study, voice hearers who experienced thoughts of self-hatred and inadequacy were more likely to appraise their voices as powerful than those with less self-critical thoughts (Connor & Birchwood., 2013). Connor and Birchwood's study (2013) highlights the role of related self-schemata to internalised stigma and the impact on power appraisals. Further, negative self-schemas have been associated with greater omnipotent appraisals of voices, mirroring that of views of the self within social contexts (Thomas, Farhall & Shawyer., 2013). The role of social rank in appraising voices as omnipotent is theorised within the cognitive model of command hallucinations (Byrne et al., 2003). Further, challenging a dominant-subordinate relationship between the voice and voice-hearer is a key therapeutic target, which has been shown predictive of a reduction in voice hearer compliance with voices (Birchwood et al., 2014; Birchwood et al., 2018).

Interestingly, submissive and powerlessness appraisals was significantly correlated with negative voice content and are likely associated phenomena. This corroborates with theoretical understandings of voice hearing, such as appraisals alongside content being predictive of distress (Van der Gaag, Hageman, & Birchwood, 2003). Negative voice content is associated with past trauma, social experiences, and related appraisals of being subordinate to a powerful other, which is then mirrored in a subordinate relationship with voices (Heriot-Maitland et al., 2019; Mawson et al., 2011). A correlation between negative voice content and appraisals of voices as omnipotent has also been found (Thomas, Farhall & Shawyer., 2013). Future research should investigate potential mediating roles between negative voice content and internalised stigma including submissive appraisals.

4.4 Strengths

A strength of the current study is the inclusion of both clinical and non-clinical voice hearers, building on knowledge of similarities and differences in voice hearing and a need for care status (Johns et al., 2014; Baumeister et al., 2017). The development of the internalised stigma construct involved collaboration with experts by experience and experts by profession, increasing content validity of the construct. Further, investigation of discrete symptomology (i.e. voice hearing phenomenology) is in line with psychosis research and intervention taking a modular approach to treating distressing voices (Thomas et al., 2014).

4.5 Limitations

There were several limitations of the present study. The submissive and powerlessness appraisals construct had low internal consistency and internalised stigma had a relatively low internal consistency as measured by Cronbach's alpha. However, the study was not attempting to create new measures for internalised stigma nor submissive and powerlessness appraisals. Future research should use standardised measures of internalised stigma and submissive and powerlessness appraisals to investigate possible related voice hearing experiences. The study was cross-sectional in design and so cannot ascertain the direction of the associations between internalised stigma, negative voice content, and submissive and powerlessness appraisals. The sample size was relatively small and investigations into potential moderating or mediating factors such as mood states and other voice phenomenology could not be conducted. Last, as the study built on existing data, there was missing data on more specific ethnicity categories for the non-clinical group. Future research should continue to investigate relationships between internalised stigma and specific voice hearing phenomenology using standardised measures, longitudinal designs, more specific ethnicity categories and mediation analyses to investigate possible mechanisms within the relationship.

4.6 Clinical implications

Internalised stigma was prevalent in the clinical group and has previously been linked to several negative outcomes (Del Rosal et al., 2021; Yanos et al., 2008; Hall, Terry & Hayward., 2023). Targeting internalised stigma in treatment might therefore be beneficial. In a recent review of interventions focused on internalised stigma in schizophrenia spectrum populations, interventions have been found effective in reducing internalised stigma compared to treatment as usual or waitlist control (Jagan et al., 2023). Interestingly, the review found a

particular benefit of narrative enhancement cognitive therapy, which involves a group-based intervention approach (Jagan et al., 2023). Further, peer support has been recognised as protective against experiences of internalised stigma (Wood, Bryne & Morrison., 2017). Group and peer-based programmes might be particularly efficacious within the area of internalised stigma, given the stigma and power dynamics associated with clinician-led therapies within mental health services (Pyle et al., 2018). Increasing a person's peer support networks and the peer element of group therapy may both be important treatment approaches to reduce internalised stigma and improve on a person's self-esteem.

The finding of an association between internalised stigma and negative voice content has several clinical implications. For example, recognising and formulating internalised stigma within treatments for distressing voices might be helpful (Hayward et al., 2011; Mawson, Cohen, & Berry., 2010; Thomas, Farhall, & Shawyer., 2013). The relational processes involved in internalised stigma and the present finding of an association with voice content suggest relational treatment approaches might be beneficial. For example, AVATAR therapy and CBT for command hallucinations both consider areas of negative self-schema and associated voice hearing distress (Ward et al., 2020; Birchwood et al., 2018). Wood and colleagues (2017) propose discussions of internalised stigma at various stages of treatment including during formulation, the role of normalising psychoeducation to support with reducing internalised stigma and the use of behavioural experiments to test out beliefs surrounding internalised stigma. The role of shame as an emotional response to internalised stigma highlights the potential usefulness of compassion focused therapy, which outlines the key role of shame as a therapeutic target (Heriot-Maitland., 2024).

4.7 Conclusions

The present study aimed to investigate the role of internalised stigma in clinical and non-clinical voice hearers. We also aimed to investigate associations between internalised stigma, negative voice content and submissive and powerlessness appraisals across the sample. The study found that clinical voice hearers scored significantly higher than non-clinical voice hearers on internalised stigma. Internalised stigma was associated with negative content across the sample, while the relationship between internalised stigma and submissive and powerlessness appraisals did not hold once group status was controlled for. Results indicate the importance of the relationship between internalised stigma with specific

voice hearing phenomenology such as negative voice content. The current results are consistent with the integrative cognitive model of internalised stigma (Wood et al., 2017) and point to internalised stigma as a possible treatment target. Further, targeting internalised stigma could be integrated into treatment approaches such as compassion focused therapy for psychosis and relational interventions such as AVATAR therapy and cognitive therapy for command hallucinations (Birchwood et al., 2014; Ward et al., 2020, Heriot-Maitland., 2024).

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Appendices

- Appendix 1- VOICES scale
- Appendix 2- Ethnicity characteristics for the primary dataset conducted in the present study
- Appendix 3- Histograms, QQ plots and scatter plots
- Appendix 4- Bootstrapped linear regression model
- Appendix 5- Regression model with submissive and powerlessness appraisals removed
- Appendix 6- Study documents
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Appendix 1: VOICES descriptive statistics

Table 5: Varieties of Individual Voice-Experiences Scale (VOICES) Descriptive statistics		
Voice item	**Clinical group (N; %)**	**Non-clinical group (N; %)**
1. **How would you describe your experience of hearing voices? (Tick all that apply)**		
Clairaudience	**6; 18.8%**	**25; 80.6%**
Spirit communications	**14; 43.8%**	**28; 90.3%**
Animal/nature communications	**5; 15.6%**	**14; 45.2%**
Religious experiences	**12; 37.5%**	**6; 19.4%**
Communications from living people	**13; 40.6%**	**11; 37.9%**
Communications from dead people/the afterlife	**9; 28.1%**	**22; 68.8%**
Demonic possession	**7; 21.9%**	**0; 0%**
"Tricks" of the mind	**19; 59.4%**	**3; 9.7%**
Results of a traumatic experience	**20; 62.5%**	**4; 12.9%**
Mental health problems	**21; 65.6%**	**0; 0%**
Past memories or "flashbacks"	**14; 43.8%**	**9; 29%**
2. **How old were you when you first became aware of hearing the voice(s)?**		
<10 years	**2; 6.3%**	**14; 45.2%**
10-18 years	**10; 31.3%**	**4; 12.9%**
19+ years	**20; 62.5%**	**13; 41.9%**
3. **When did you last hear the voice(s)?**		
More than 1 year	**1; 3.1%**	**2; 6.5%**
In last year	**6; 18.8%**	**4; 12.9%**
In last month	**2; 6.3%**	**3; 9.7%**
In last week	**7; 21.9%**	**7; 22.6%**
In last day	**5; 15.6%**	**10; 32.3%**
In last hour	**11; 34.4%**	**5; 16.1%**
4. **On average, how often do you hear the voice(s)?**		
Less than once a year	**0; 0%**	**3; 9.7%**
At least once a year	**0; 0%**	**2; 6.5%**
At least once a month	**3; 9.4%**	**4; 12.9%**
At least once a week	**5; 15.6%**	**7; 22.6%**
At least once a day	**8; 25.0%**	**12; 38.7%**
At least once an hour	**6; 18.8%**	**1; 3.2%**
Continuously	**10; 31.3%**	**2; 6.5%**
5. **How many voices do you hear?**		
1	**6; 18.8%**	**19; 65.5%**
2	**3; 9.4%**	**0; 0%**
3	**10; 31.3%**	**2; 6.9%**

4	**6; 18.8%**	**1; 3.4%**
5	**2; 6.3%**	**1; 3.4%**
6	**1; 3.1%**	**1; 3.4%**
7	**1; 3.1%**	**1; 3.4%**
8	**0; 0%**	**0; 0%**
9	**0; 0%**	**0; 0%**
10+	**3; 9.4%**	**4; 13.8%**
Missing		**2**
6. **If you hear more than one voice, do you have a 'main' one?**		
1 voice only	**6; 18.8%**	**18; 60%**
Not at all	**7; 21.9%**	**4; 13.3%**
A little	**3; 9.4%**	**2; 6.7**
Somewhat	**6; 18.8%**	**1; 3.3%**
A fair bit	**5; 15.6%**	**2; 6.7%**
A lot	**5; 15.6%**	**3; 10%**
Missing		**1**
7. **When you hear the voice(s), how long does the experience typically last?**		
Few seconds	**7; 21.9%**	**13; 43.3%**
Several minutes	**8; 25%**	**10; 33.3%**
Up to an hour	**7; 21.9%**	**4; 13.3%**
Up to several hours	**3; 9.4%**	**2; 6.7%**
Continuously	**7; 21.9%**	**1; 3.3%**
Missing		**1**
8. **Have there been changes in how often and/or for how long you hear the voice(s) over time?**		
Not at all	**6; 18.8%**	**12; 38.7%**
A little	**4; 12.5%**	**3; 9.7%**
Somewhat	**4; 12.5%**	**6; 19.4%**
A fair bit	**8; 25%**	**6; 19.4%**
A lot	**10; 31.3%**	**4; 12.9%**
9. **How loud are the voice(s)?**		
Whispers	**8; 25%**	**7; 23.3%**
Speaking voice	**11; 34.4%**	**20; 66.7%**
Louder than own voice	**8; 25%**	**1; 3.3%**
Shouting	**5; 15.6%**	**2; 6.7%**
Missing	**0**	**1**
10. **How clear are the voice(s)?**		
Muffled or not comprehensible	**2; 6.3%**	**0**
Barely comprehensible	**2; 6.3%**	**1; 3.2%**

Somewhat comprehensible	**8; 25%**	**2; 6.5%**
Mostly comprehensible	**10; 31.3%**	**12; 38.7%**
Always comprehensible	**10; 31.3%**	**16; 51.6%**
11. **When you hear the voice(s), where do they sound like they're coming from?**		
Inside my head	**11; 34.4%**	**9; 29%**
Inside and outside my head	**7; 21.9%**	**12; 38.7%**
Outside head and close to ears	**7; 21.9%**	**6; 19.4%**
Outside head away from ears	**7; 21.9%**	**4; 12.9%**
12. **How complex is what the voice(s) say(s)? (Tick all that apply)**		
Fragmented words	**14; 43.8%**	**11; 35.5%**
Basic sentences	**22; 68.8%**	**25; 80.6%**
Complex dialogue	**13; 40.6%**	**13; 41.9%**
13. **What times of the day do you hear the voice(s)? (Tick all that apply)**		
Fully awake	**25; 78.1%**	**29; 93.5%**
Going to sleep	**26; 81.3%**	**11; 35.5%**
Waking up	**21; 65.6%**	**15; 48.4%**
14. **Do(es) the voice(s) have a personality or specific character?**		
Not at all	**6; 18.8%**	**7; 24.1%**
A little	**2; 6.3%**	**2; 6.9%**
Somewhat	**4; 12.5%**	**4; 13.8%**
A fair bit	**8; 25%**	**2; 6.9%**
A lot	**12; 37.5%**	**14; 48.3%**
Missing	**0**	**2**
15. **Who are the voice(s)? (Tick all that apply)**		
People I know, who are alive	**13; 40.6%**	**8; 25.8%**
People I know, who have passed away	**12; 37.5%**	**22; 71%**
People I know, but not personally	**11; 35.5%**	**14; 45.2%**
Spirits	**13; 40.6%**	**26; 83.9%**
Supernatural entities	**9; 28.1%**	**12; 38.7%**
Higher being or deity	**10; 31.3%**	**19; 61.3%**
I don't know who the voices are, or cannot identify them	**16; 50%**	**12; 38.7%**
16. **Are there some situations where you are more likely to hear the voice(s) or which bring it on? (Tick all that apply)**		
When on my own	**27; 84.4%**	**16; 51.6%**
Bring with strangers	**15; 46.9%**	**21; 67.7%**
Being with people I know	**14; 43.8%**	**22; 71%**
In busy situations like on a bus	**20; 62.5%**	**14; 45.2%**
In nature of peaceful situations	**14; 43.8%**	**19; 61.3%**
When in a trance, praying or meditating	**11; 34.4%**	**24; 77.4%**

17. **When you hear the voice(s), do you also sense them in another way? (Tick all that apply)**		
I can smell them	**6; 18.8%**	**12; 38.7%**
I can see them	**4; 12.5%**	**24; 77.4%**
I can feel them	**4; 12.5%**	**16; 51.6%**
I can feel their presence or aura	**13; 40.6%**	**27; 87.1%**
I can taste them	**0**	**5; 16.1%**
I don't sense them in any other way	**16; 60%**	**3; 9.7%**
18. **Do(es) the voice(s) say(s) positive things?**		
Never	**12; 38.7%**	**2; 6.5%**
Rarely	**4; 12.9%**	**0**
Sometimes	**10; 32.3%**	**4; 12.9%**
Often	**4; 12.9%**	**5; 16.1%**
Always	**1; 3.2%**	**20; 64.5%**
Missing	**1**	**0**
19. **Do(es) the voice(s) say(s) negative things?**		
Never	**1; 3.1%**	**20; 64.5%**
Rarely	**2; 6.3%**	**5; 16.1%**
Sometimes	**5; 15.6%**	**5; 16.1%**
Often	**11; 34.4%**	**0**
Always	**13; 40.6%**	**1; 3.2%**
20. **Do(es) the voice(s) say(s) neutral things (e.g., single words like "listen" or brief sentences)?**		
Never	**9; 29%**	**5; 16.1%**
Rarely	**2; 6.5%**	**2; 6.5%**
Sometimes	**16; 51.6%**	**14; 45.2%**
Often	**3; 9.7%**	**6; 19.4%**
Always	**1; 3.2%**	**4; 12.9%**
Missing	**1**	**0**
21. **Does the voice(s) say(s) similar things to your own thoughts or what you think about?**		
Never	**5; 16.1%**	**9; 29%**
Rarely	**2; 6.5%**	**4; 12.9%**
Sometimes	**12; 38.7%**	**11; 35.5%**
Often	**11; 35.5%**	**6; 19.4%**
Always	**1; 3.2%**	**1; 3.2%**
Missing	**1**	**0**
22. **Does the voice(s) say(s) similar things to specific memories you have?**		
Never	**6; 18.8%**	**11; 35.5%**
Rarely	**5; 15.6%**	**9; 29%**
Sometimes	**12; 37.5%**	**9; 29%**
Often	**6; 18.8%**	**2; 6.5%**
Always	**3; 9.4%**	**0**
23. **Is the content of what the voice(s) say(s) repetitive?**		
Never	**2; 6.5%**	**15; 48.4%**
Rarely	**4; 12.9%**	**4; 12.9%**

Sometimes	**7; 22.6%**	**9; 29%**
Often	**14; 45.2%**	**2; 6.5%**
Always	**4; 12.9%**	**1; 3.2%**
Missing	**1**	**0**
24 Do(es) the voice(s):		
a… give you helpful guidance (e.g., in making decisions)?		
Never	**15; 48.4%**	**4; 12.9%**
Rarely	**3; 9.7%**	**3; 9.7%**
Sometimes	**6; 19.4%**	**6; 19.4%**
Often	**7; 22.6%**	**7; 22.6%**
Always	**0; 0%**	**11; 35.5%**
Missing	**1**	**0**
b…give orders on what to do?		
Never	**9; 29%**	**28; 90.3%**
Rarely	**1; 3.2%**	**1; 3.2%**
Sometimes	**9; 29%**	**0; 0%**
Often	**8; 25.8%**	**0; 0%**
Always	**4; 12.9%**	**2; 6.5%**
Missing	**1**	**0**
c…give you warnings (e.g., of dangerous situations)?		
Never	**9; 29%**	**11; 35.5%**
Rarely	**4; 12.9%**	**6; 19.4%**
Sometimes	**12; 38.7%**	**9; 29%**
Often	**2; 6.5%**	**2; 6.5%**
Always	**4; 12.9%**	**3; 9.7%**
Missing	**1**	**0**
d… make comments about you or on what you do?		
Never	**3; 9.7%**	**15; 48.4%**
Rarely	**1; 3.2%**	**5; 16.1%**
Sometimes	**11; 35.5%**	**6; 19.4%**
Often	**11; 35.5%**	**4; 12.9%**
Always	**5; 16.1%**	**1; 3.2%**
Missing	**1**	**0**
e… motivate you to do good things?		
Never	**14; 45.2%**	**10; 32.3%**
Rarely	**4; 12.9%**	**1; 3.2%**
Sometimes	**7; 22.6%**	**4; 12.9%**
Often	**5; 16.1%**	**7; 22.6%**
Always	**1; 3.2%**	**9; 29%**
Missing	**1**	**0**
f… insult you or put you down?		

Never	**1; 3.2%**	**30; 96.8%**
Rarely	**4; 12.9%**	**1; 3.2%**
Sometimes	**12; 38.7%**	**0; 0%**
Often	**9; 29%**	**0; 0%**
Always	**5; 16.1%**	**0; 0%**
Missing	**1**	**0; 0%**
g… praise you or say nice things to you?		
Never	**16; 53.3%**	**14; 45.2%**
Rarely	**5; 16.7%**	**3; 9.7%**
Sometimes	**6; 20%**	**9; 29%**
Often	**3; 10%**	**2; 6.5%**
Always	**0; 0%**	**3; 9.7%**
Missing	**2**	**0**
h… chat with you (i.e., have a conversation with you)?		
Never	**10; 32.3%**	**14; 45.2%**
Rarely	**3; 9.7%**	**5; 16.1%**
Sometimes	**13; 41.9%**	**7; 22.6%**
Often	**2; 6.5%**	**3; 9.7%**
Always	**3; 9.7%**	**2; 6.5%**
Missing	**1**	**0**
i… try to cause you problems?		
Never	**6; 20%**	**30; 96.8%**
Rarely	**3; 10%**	**1; 3.2%**
Sometimes	**4; 13.3%**	**0; 0%**
Often	**11; 36.7%**	**0; 0%**
Always	**6; 20%**	**0; 0%**
Missing	**2**	**0**
j… talk amongst themselves?		
Not Applicable (1 voice)	**5; 16.1%**	**7; 22.6%**
Never	**7; 22.6%**	**15; 48.4%**
Rarely	**3; 9.7%**	**3; 9.7%**
Sometimes	**5; 16.1%**	**5; 16.1%**
Often	**7; 22.6%**	**0; 0%**
Always	**4; 12.9%**	**1; 3.2%**
Missing	**1**	**0**
Part 2 – Your current relationship with your voice(s)		
25. **Can you bring on the voices when you want to?**		
Never	**17; 54.8%**	**9; 29%**
Rarely	**4; 12.9%**	**2; 6.5%**
Sometimes	**7; 22.6%**	**4; 12.9%**
Often	**3; 9.7%**	**4; 12.9%**
Always	**0%; 0**	**12; 38.7%**
Missing	**1**	**0**

26. **Can you make the voices stop when you want to?**		
Never	**17; 54.8%**	**6; 19.4%**
Rarely	**8; 25.8%**	**1; 3.2%**
Sometimes	**5; 16.1%**	**3; 9.7%**
Often	**0; 0%**	**2; 6.5%**
Always	**1; 3.2%**	**19; 61.3%**
Missing	**1**	**0**
27. **Do you try to ignore the voice(s)?**		
Never	**1; 3.2%**	**23; 74.2%**
Rarely	**1; 3.2%**	**4; 12.9**
Sometimes	**10; 32.3%**	**4; 12.9**
Often	**11; 35.5%**	**0; 0%**
Always	**8; 25.8%**	**0; 0%**
Missing	**1**	**0**
28. **Do you try to make the voice(s) go away, whether or not you succeed?**		
Never	**5; 16.1%**	**27; 87.1%**
Rarely	**1; 3.2%**	**1; 3.2%**
Sometimes	**10; 32.3%**	**2; 6.5%**
Often	**8; 25.8%**	**1; 3.2%**
Always	**7; 22.6%**	**0; 0%**
Missing	**1**	**0**
29. **Do you deliberately get in touch with the voice(s), or try to make the experience last?**		
Never	**18; 58.1%**	**7; 22.6%**
Rarely	**7; 22.6%**	**0; 0%**
Sometimes	**6; 19.4%**	**10; 32.3%**
Often	**0; 0%**	**10; 32.3%**
Always	**0; 0%**	**4; 12.9%**
Missing	**1**	**0**
30. **Do you ask the voice(s)' opinion on things, or ask it for guidance?**		
Never	**18; 58.1%**	**7; 22.6%**
Rarely	**6; 19.4%**	**2; 6.5%**
Sometimes	**4; 12.9%**	**10; 32.3%**
Often	**3; 9.7%**	**7; 22.6%**
Always	**0; 0%**	**5; 16.1%**
Missing	**1**	**0**
31. **Do(es) the voice(s) have good intentions towards you?**		
Not at all	**14; 45.2%**	**1; 3.6%**
Unsure	**3; 9.7%**	**1; 3.6%**
Somewhat	**6; 19.4%**	**1; 3.6%**
Quite a bit	**5; 16.1%**	**0; 0%**
Definitely	**3; 9.7%**	**25; 89.3%**
Missing	**1**	**3**
32. **Do(es) the voice(s) have bad intentions towards you?**		
Not at all	**1; 3.2%**	**27; 93.1%**

Unsure	**7; 22.6%**	**1; 3.4%**
Somewhat	**6; 19.4%**	**1; 3.4%**
Quite a bit	**8; 25.8%**	**0; 0%**
Definitely	**9; 29%**	**0; 0%**
Missing	**1**	**4**
33. **Are the voice(s) unpredictable (e.g., switch from nice to nasty in surprising ways)?**		
Not at all	**10; 32.3%**	**16; 51.6%**
A little	**6; 19.4%**	**4; 12.9%**
Somewhat	**4; 12.9%**	**5; 16.1%**
A far bit	**7; 22.6%**	**1; 3.2%**
A lot	**4; 12.9%**	**5; 16.1%**
Missing	**1**	**0**
34. **Has your relationship to the voice(s) changed over time?**		
Got much worse	**3; 9.7%**	**0; 0%**
Got worse	**5; 16.1%**	**0; 0%**
Stayed the same	**7; 22.6%**	**12; 41.4%**
Got better	**14; 41.9%**	**7; 24.1%**
Got much better	**3; 9.7%**	**10; 34.5%**
Missing	**1**	**2**
35. **Is/Are the voice(s) powerful (for instance, does it have the means to make things happen)?**		
Not at all	**4; 13.3%**	**17; 54.8%**
A Little	**5; 16.7%**	**4; 12.9%**
Somewhat	**5; 16.7%**	**2; 6.5%**
A fair bit	**9; 30%**	**3; 9.7%**
A lot	**7; 23.3%**	**5; 16.1%**
Missing	**2**	**0**
36. **Who's in control, you or the voice(s)?**		
Definitely me	**8; 25.8%**	**22; 73.3%**
Somewhat me	**7; 22.6%**	**2; 6.7%**
Equal power	**5; 16.1%**	**4; 13.3%**
Somewhat the voice/s	**6; 19.4%**	**0; 0%**
Definitely the voice/s	**5; 16.1%**	**2; 6.7%**
Missing	**1**	**1**
37. **Do(es) the voice(s) keep you company?**		
Not at all	**15; 48.4%**	**18; 58.1%**
A little	**5; 16.1%**	**4; 12.9%**
Somewhat	**3; 9.7%**	**4; 12.9%**
A fair bit	**4; 12.9%**	**1; 3.2%**
A lot	**4; 12.9%**	**4; 12.9%**
Missing	**1**	**0**
38. **Do you try to keep the voice(s) a secret from people you know?**		
Not at all	**8; 25.8%**	**13; 41.9%**
Only a few people	**0; 0%**	**2; 6.5%**
It depends	**6; 19.4%**	**9; 29%**

Most people	**11; 35.5%**	**4; 12.9%**
Definitely	**6; 19.4%**	**3; 9.7%**
Missing	**1**	**0**
39. **Do you know other people who have similar experiences of voice(s)?**		
Not at all	**10; 32.3%**	**0; 0%**
I've heard other people do, but don't know anyone	**3; 9.7%**	**2; 6.5**
Not sure	**0; 0%**	**1; 3.2%**
A few people	**16; 51.6%**	**10; 32.3%**
Lots of people	**2; 6.5%**	**18; 58.1%**
Missing	**1**	**0**
40. **Do you believe hearing voice(s):**		
a… is abnormal?		
Strongly disagree	**3; 9.7%**	**25; 80.6%**
Disagree	**5; 16.1%**	**4; 12.9%**
Undecided	**5; 16.1%**	**2; 6.5%**
Agree	**8; 25.8%**	**0; 0%**
Strongly agree	**10; 32.3%**	**0; 0%**
Missing	**1**	**0**
b… is something created by your own mind or brain?		
Strongly disagree	**5; 16.1%**	**18; 58.1%**
Disagree	**5; 16.1%**	**5; 16.1%**
Undecided	**6; 19.4%**	**6; 19.4%**
Agree	**6; 19.4%**	**2; 6.5%**
Strongly agree	**9; 29%**	**0; 0%**
Missing	**1**	**0**
c… has supernatural origins?		
Strongly disagree	**4; 13.3%**	**6; 20%**
Disagree	**4; 13.3%**	**0; 0%**
Undecided	**7; 23.3%**	**8; 26.7%**
Agree	**12; 40%**	**6; 20%**
Strongly agree	**3; 10%**	**10; 33.3%**
Missing	**2**	**1**
d… has been caused by difficult or stressful experiences in your life?		
Strongly disagree	**1; 3.3%**	**16; 53.3%**
Disagree	**1; 3.3%**	**4; 13.3%**
Undecided	**3; 10%**	**3; 10%**
Agree	**10; 33.3%**	**6; 20%**
Strongly agree	**15; 50%**	**1; 3.3%**
Missing	**2**	**1**
e… has been caused by taking drugs?		
Strongly disagree	**10; 33.3%**	**29; 93.5%**
Disagree	**6; 20%**	**2; 6.5%**
Undecided	**7; 23.3%**	**0; 0%**
Agree	**6; 20%**	**0; 0%**

Strongly agree	**1; 3.3%**	**0; 0%**
Missing	**2**	**0**
f… is a rare gift?		
Strongly disagree	**7; 23.3%**	**5; 16.1%**
Disagree	**9; 30%**	**7; 22.6%**
Undecided	**6; 20%**	**4; 12.9%**
Agree	**7; 23.3%**	**4; 12.9%**
Strongly agree	**1; 3.3%**	**11; 35.5%**
Missing	**2**	**0**
g… is part of normal human experience?		
Strongly disagree	**2; 6.7%**	**3; 9.7%**
Disagree	**9; 30%**	**0; 0%**
Undecided	**7; 23.3%**	**4; 12.9%**
Agree	**10; 33.3%**	**9; 29%**
Strongly agree	**2; 6.7%**	**15; 48.4%**
Missing	**2**	**0**
h… means you are an outsider (e.g., being on the fringe of society)?		
Strongly disagree	**3; 10%**	**5; 16.1%**
Disagree	**5; 16.7%**	**12; 38.7%**
Undecided	**3; 10%**	**3; 9.7%**
Agree	**14; 46.7%**	**9; 29%**
Strongly agree	**5; 16.7%**	**2; 6.5%**
Missing	**2**	**0**
i... means you are special?		
Strongly disagree	**7; 23.3%**	**5; 16.1%**
Disagree	**12; 40%**	**13; 41.9%**
Undecided	**6; 20%**	**7; 22.6%**
Agree	**5; 16.7%**	**4; 12.9%**
Strongly agree	**0; 0%**	**2; 6.5%**
Missing	**2**	**0**
Part 3 – How the voices currently make you feel		
41. **How pleasant is the experience of hearing voice(s) for you?**		
Not at all	**17; 56.7%**	**1; 3.3%**
A little	**8; 26.7%**	**0; 0%**
Somewhat	**4; 13.3%**	**5; 16.7%**
A fair bit	**0; 0%**	**7; 23.3%**
A lot	**1; 3.3%**	**17; 56.7%**
Missing	**2**	**1**
42. **How distressing is the experience of hearing voice(s) for you?**		
Not at all	**1; 3.3%**	**25; 80.6%**
A little	**3; 10%**	**5; 16.1%**
Somewhat	**3; 10%**	**1; 3.2%**
A fair bit	**7; 23.3%**	**0; 0%**
A lot	**16; 53.3%**	**0; 0%**

Missing	**2**	**0**
43. **Does the experience of hearing voice(s) have a positive or beneficial impact on your daily life, whether the voices(s) is/are good or bad?**		
Not at all	**16; 53.3%**	**1; 3.2%**
A little	**5; 16.7%**	**0; 0%**
Somewhat	**3; 10%**	**4; 12.9%**
A fair bit	**5; 16.7%**	**5; 16.1%**
A lot	**1; 3.3%**	**21; 67.7%**
Missing	**2**	**0**
44. **Do the voice(s) make your life more difficult, whether the voice(s) is/are good or bad?**		
Not at all	**4; 13.3%**	**24; 77.4%**
A little	**3; 10%**	**3; 9.7%**
Somewhat	**3; 10%**	**2; 6.5%**
A fair bit	**3; 10%**	**0; 0%**
A lot	**17; 56.7%**	**2; 6.5%**
Missing	**2**	**0**
45. **Have/has the voice(s) helped you with difficult or stressful experiences in your life?**		
Not at all	**19; 63.3%**	**6; 19.4%**
A little	**2; 6.7%**	**1; 3.2%**
Somewhat	**3; 10%**	**4; 12.9%**
A fair bit	**4; 13.3%**	**6; 19.4%**
A lot	**2; 6.7%**	**14; 45.2%**
Missing	**2**	**0**
46. **Do(es) the voice(s) affect your concentration?**		
Not at all	**0; 0%**	**21; 67.7%**
A little	**3; 10%**	**4; 12.9%**
Somewhat	**2; 6.7%**	**2; 6.5%**
A fair bit	**11; 36.7%**	**1; 3.2%**
A lot	**14; 46.7%**	**3; 9.7%**
Missing	**2**	**0**
47. **Do(es) the voice(s) make you feel…**		
a…ashamed or bad about yourself?		
Not at all	**4; 13.3%**	**31; 100%**
A little	**6; 20%**	**0; 0%**
Somewhat	**5; 16.7%**	**0; 0%**
A fair bit	**2; 6.7%**	**0; 0%**
A lot	**13; 43.3%**	**0; 0%**
Missing	**2**	**0**
b… stressed or threatened?		
Not at all	**5; 16.7%**	**31; 100%**
A little	**5; 16.7%**	**0; 0%**
Somewhat	**2; 6.7%**	**0; 0%**
A fair bit	**3; 4.9%**	**0; 0%**
A lot	**15; 50%**	**0; 0%**

Missing	**2**	**0**
c… like life has meaning and purpose?		
Not at all	**12; 40%**	**5; 16.1%**
A little	**4; 13.3%**	**2; 6.5%**
Somewhat	**7; 23.3%**	**2; 6.5%**
A fair bit	**4; 13.3%**	**2; 6.5%**
A lot	**3; 10%**	**20; 64.5%**
Missing	**2**	**0**
d… alone or isolated?		
Not at all	**3; 10%**	**25; 80.6%**
A little	**5; 16.7%**	**3; 9.7%**
Somewhat	**7; 23.3%**	**2; 6.5%**
A fair bit	**5; 16.7%**	**0; 0%**
A lot	**10; 33.3%**	**3.2%; 1**
Missing	**2**	**0**
e… angry or annoyed?		
Not at all	**5; 16.7%**	**29; 93.5%**
A little	**6; 20%**	**2; 6.5%**
Somewhat	**5; 16.7%**	**0; 0%**
A fair bit	**4; 13.3%**	**0; 0%**
A lot	**10; 33.3%**	**0; 0%**
Missing	**2**	**0**
f… fearful or sad?		
Not at all	**2; 6.7%**	**28; 90.3%**
A little	**5; 16.7%**	**3; 9.7%**
Somewhat	**6; 20%**	**0; 0%**
A fair bit	**6; 20%**	**0; 0%**
A lot	**11; 36.7%**	**0; 0%**
Missing	**2**	**0**
g… confident or good about yourself?		
Not at all	**18; 60%**	**6; 20%**
A little	**5; 16.7%**	**2; 6.7%**
Somewhat	**5; 16.7%**	**5; 16.7%**
A fair bit	**2; 6.7%**	**8; 26.7%**
A lot	**0; 0%**	**9; 30%**
Missing	**2**	**1**
h… useless or worthless?		
Not at all	**8; 26.7%**	**30; 100%**
A little	**2; 6.7%**	**0; 0%**
Somewhat	**5; 16.7%**	**0; 0%**
A fair bit	**4; 13.3%**	**0; 0%**
A lot	**11; 36.7%**	**0; 0%**
Missing	**2**	**1**
i… supported or connected to others?		

Not at all	**14; 46.7%**	**4; 12.9%**
A little	**7; 23.3%**	**3; 9.7%**
Somewhat	**7; 23.3%**	**5; 16.1%**
A fair bit	**0; 0%**	**2; 6.5%**
A lot	**2; 6.7%**	**17; 54.8%**
Missing	**2**	**0**
j.... hopeless about the future?		
Not at all	**4; 13.8%**	**30; 96.8%**
A little	**7; 24.1%**	**1; 3.2%**
Somewhat	**7; 24.1%**	**0; 0%**
A fair bit	**3; 10.3%**	**0; 0%**
A lot	**8; 13.3%**	**0; 0%**
Missing	**3**	**0**
k.... safe or comforted?		
Not at all	**16; 53.3%**	**2; 6.5%**
A little	**4; 13.3%**	**4; 12.9%**
Somewhat	**7; 23.3%**	**4; 12.9%**
A fair bit	**1; 3.3%**	**2; 6.5%**
A lot	**2; 6.7%**	**19; 61.3%**
Missing	**2**	**0**
48. **Have your views or feelings about the voice(s) changed over time?**		
Not at all	**5; 16.7%**	**11; 35.5%**
A little	**4; 13.3%**	**2; 6.5%**
Somewhat	**8; 26.7%**	**8; 25.8%**
A fair bit	**8; 26.7%**	**3; 9.7%**
A lot	**5; 16.7%**	**7; 22.6%**
Missing	**2**	**0**
49. **Have you ever sought help, support or treatment because of or for the voice(s)? (Tick all that apply)**		
Others suggested that I seek help	**16; 53.3%**	**2; 6.5%**
I have sought or received spiritual support to help me cope with the voice(s)	**16; 53.3%**	**9; 29%**
I have sought or received spiritual training to help me cope with the voice(s)	**2; 6.7%**	**7; 77.8%**
I have sought or received medical care to help me cope with the voice(s)	**19; 63.3%**	**0; 0**
I have sought or received support for other voices hearers for the voices	**8; 26.7%**	**10; 32.3%**
I have received medical care for the voice(s) against my wishes	**7; 23.3%**	**0; 0%**
I have not needed help for the voice(s)	**2; 6.7%**	**19; 61.3%**
I have sought or received psychological care to help me cope with the voices	**23; 76.7%**	**1; 3.2%**
I have received a diagnosis because of voice(s)	**19; 65.5%**	**0; 0%**
Missing	**2**	**0**

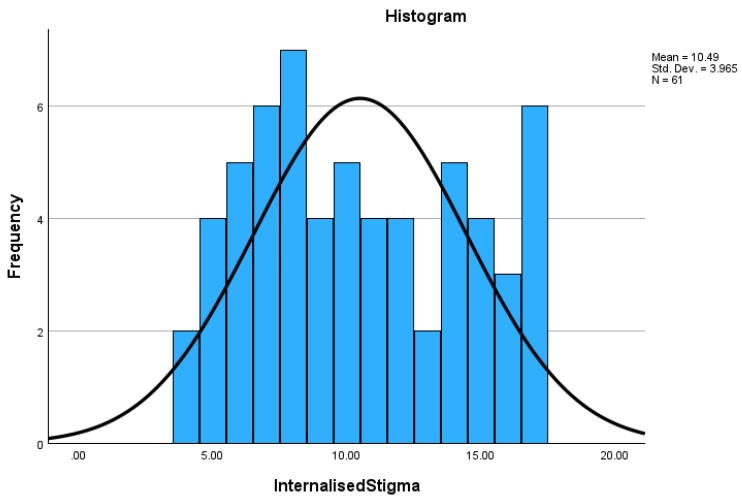
Appendix 2: Table of ethnicity categories for the clinical and non-clinical participants collected during this present current period (n=41)

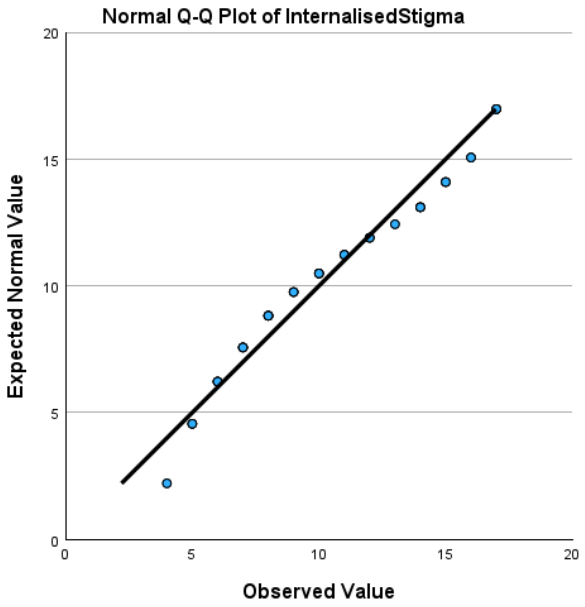
Table 6: Specific ethnicity categories for the clinical and non-clinical dataset collected in this study

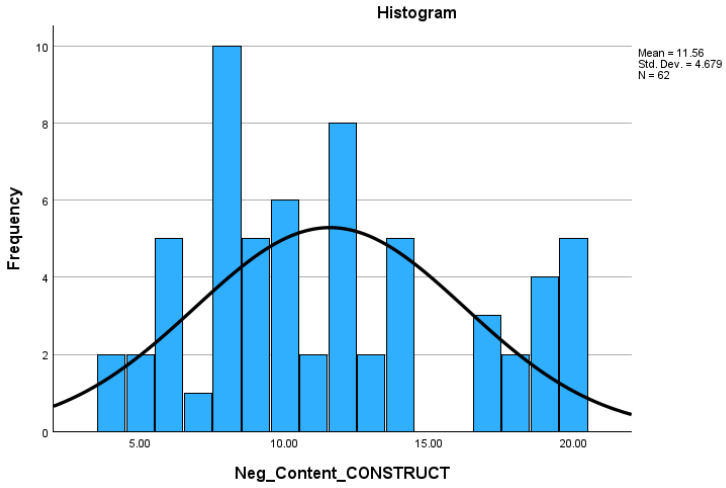
	Clinical (n=32) n(%)	Non-clinical (n=9*) n(%)
Ethnicity		
White British	8 (25%)	9 (100%)
White Other	4 (12.5%)	0
Black British	7 (21.9%)	0
Black Other	6 (18.8%)	0
Asian British	1 (3.1%)	0
Asian Other	2 (6.3%)	0
Mixed ethnicity	4 (12.5%)	0

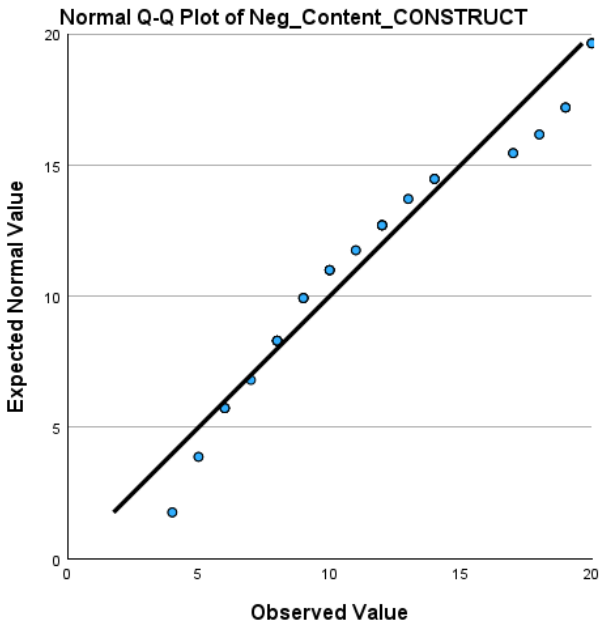
*Data missing for the non-clinical participants from the previous data collection period (n=22).

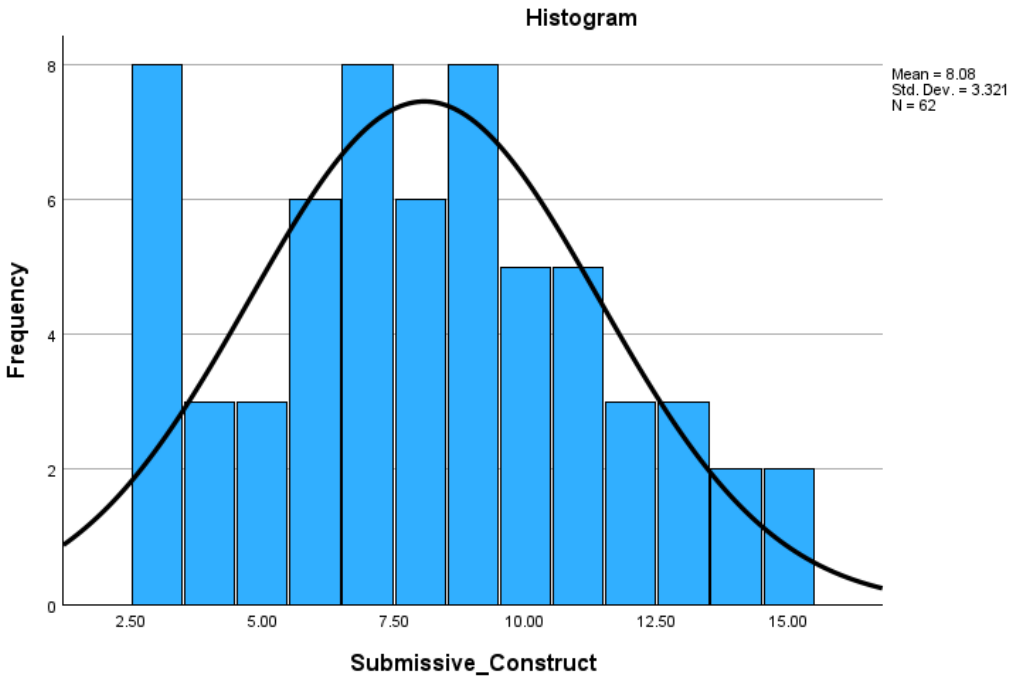
Appendix 3: Histograms, QQ plots and scatter plots

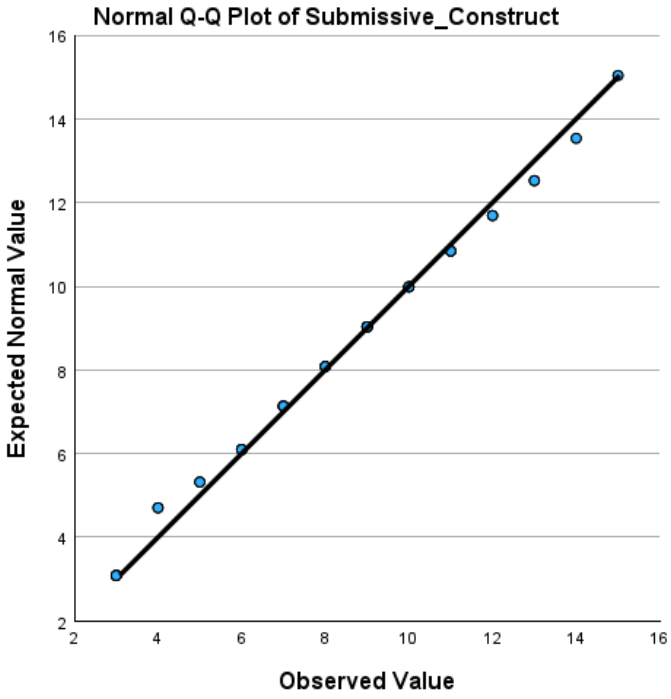


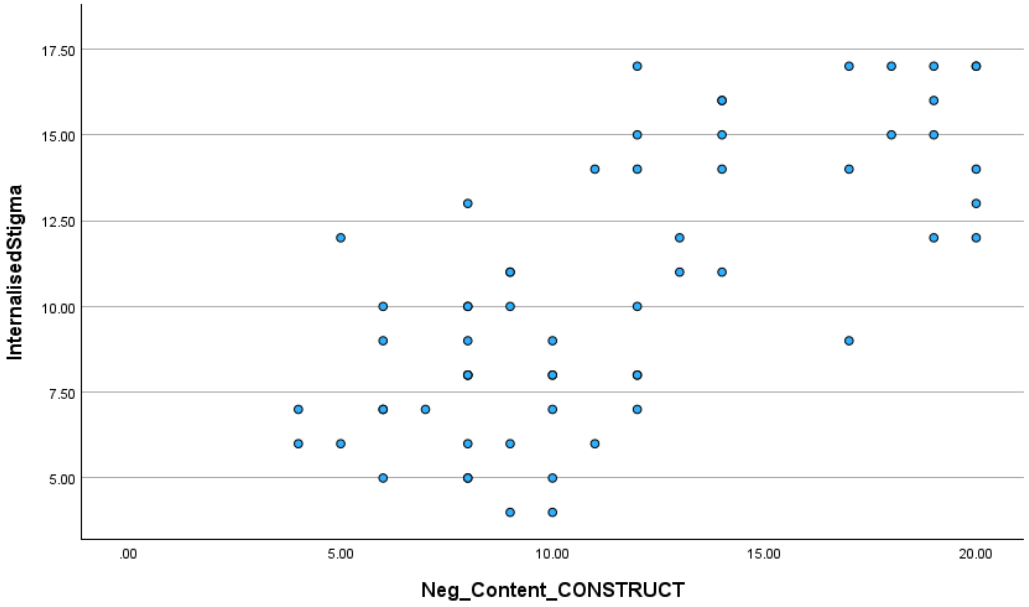

Normal Q-Q Plot of InternalisedStigma
Expected Normal Value
Observed Value
0
5
10
15
20

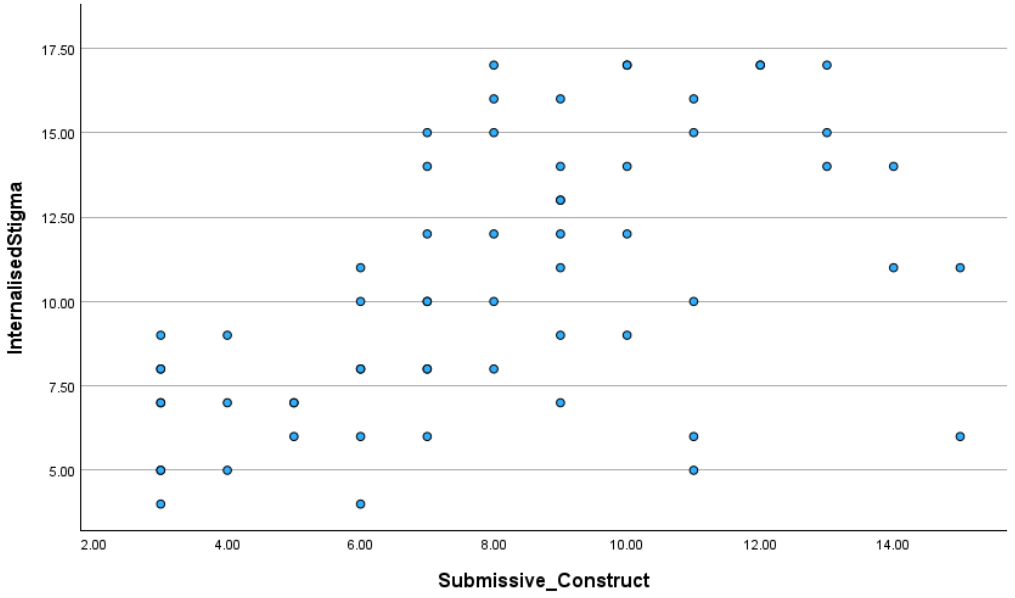

Histogram
Mean = 11.56
Std. Dev. = 4.679
N = 62
Frequency
Neg_Content_CONSTRUCT
0
2
4
6
8
10
5.00
10.00
15.00
20.00

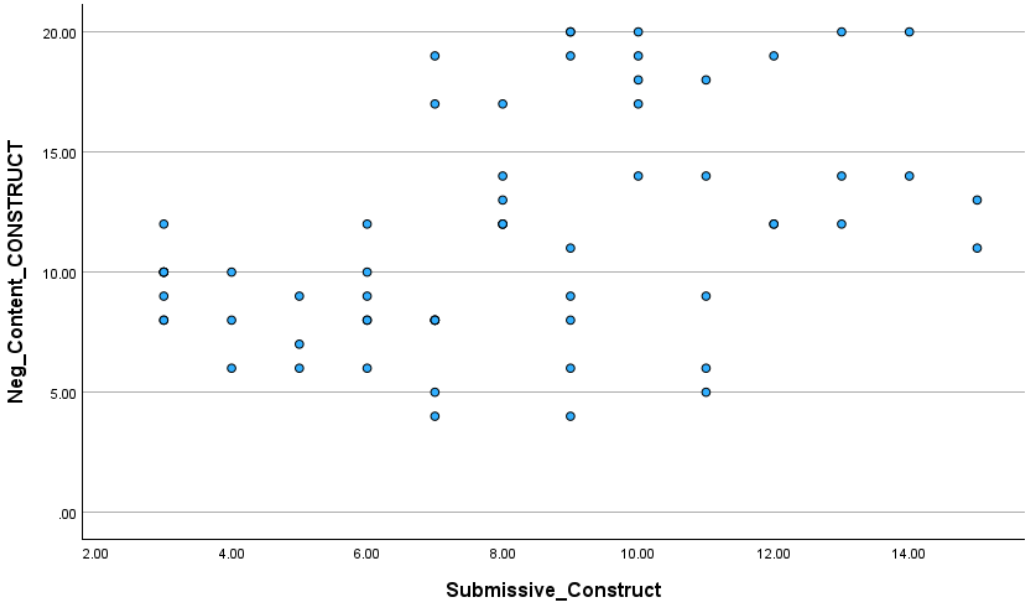

Normal Q-Q Plot of Neg_Content_CONSTRUCT
Expected Normal Value
Observed Value
0
5
10
15
20


Histogram
Mean = 8.08
Std. Dev. = 3.321
N = 62
Frequency
0
2
4
6
8
2.50
5.00
7.50
10.00
12.50
15.00
Submissive_Construct


Normal Q-Q Plot of Submissive_Construct
Expected Normal Value
2
4
6
8
10
12
14
16
Observed Value


InternalisedStigma
17.50
15.00
12.50
10.00
7.50
5.00
.00
5.00
10.00
15.00
20.00
Neg_Content_CONSTRUCT


InternalisedStigma
17.50
15.00
12.50
10.00
7.50
5.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
Submissive_Construct


Neg_Content_CONSTRUCT
20.00
15.00
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Submissive_Construct

Appendix 4: Bootstrapped linear regression model

Table 6: Results of bootstrapped multiple linear regression models testing the association between negative voice content, submissive and powerless appraisals with internalised stigma (n=61)

	Unadjusted						Adjusted for group, age, ethnicity, and employment status					
	b	β	SE	t	BCa 95% CI	p	b	β	SE	t	BCa 95% CI	p
Negative voice content	.491	.585	.080	6.094	.325-.641	<0.001	.234	.279	.098	2.321	.029-.428	.024
Submissive and powerlessness appraisals	.341	.285	.130	2.970	.113-.623	.013	.047	.039	.131	.377	-.208-.309	.708

b= beta, β= standardised beta coefficient, SE= standard error, BCa= bias-corrected and accelerated bootstrap

Appendix 5: Regression model with submissive and powerlessness appraisals removed

Table 7: Multiple linear regression models testing the associations between negative voice content, with internalised stigma (n=61) NB submissive and powerlessness appraisals removed

	R^2	B	SE B	β	95% CI	p
Step 1 (Unadjusted)	.51					
Constant		3.590	.960		1.669-5.511	<0.001
Negative voice content		.597	.077	.710	.443-.751	<0.001
Step 2 (Adjusted)	.69					
Constant		4.517	2.271		-.034-9.069	.052
Negative voice content		.229	.099	.273	.030-.428	.025
Group		4.667	1.208	.593	2.246-7.087	<0.001
Age		-.002	.029	-.009	-.060-.055	.932
Ethnicity		.467	.557	.082	-.649-1.583	.406
Employment		.832	.826	.105	-.824-2.487	.318

R^2= r squared, B= beta, SE B= standard error beta, β= standardised beta coefficient, CI= confidence interval

Appendix 6: Study documents

RESEARCH STUDY PROJECT

The Varieties of Individual voiCe-Experiences Scale (VOICES)

KING'S College LONDON

We are interested in talking to people who have experiences of hearing voices or spirits, or other "clairaudient" experiences (psychic hearing).

WHAT IS THE STUDY ABOUT?

The aim of this study is to evaluate a new questionnaire that looks at the different characteristics of voices or spirits in a wide range of people.

You will be compensated with a £15 voucher for your time, and you will be reimbursed for any travel expenses.

WHAT WILL TAKING PART INVOLVE?

- Provide some basic information about yourself.

- Go through a questionnaire together about your experience of hearing voices or spirits. We can do this in person or remotely.

- Provide feedback of how you found the meeting.

Non-clinical advert (version 1; 19/08/2022) IRAS ID- 255989

If you would like to take part in the study or if you have any questions, please contact us on:

Molly Bird: molly.bird@kcl.ac.uk

Emma O'Neill: emma.1.oneill@kcl.ac.uk

Tel: 0754 656 1044; 0772 034 0339

Institute of Psychiatry, Psychology and Neuroscience,
16 De Crespigny Park, London
SE5 8AB

PARTICIPANT INFORMATION SHEET

The Varieties of Individual voiCe-Experiences Scale (VOICES)

You are being invited to take part in a research study. Before you decide if you would like to take part, we would like you to understand why the research is being done and what it will involve. Please read this information sheet carefully and decide if you would like to take part or not. Taking part is completely your choice. Whether you decide to take part or not, it will not affect your usual care.

What is the study about?

- Many people report experiences of hearing voices. Some people describe them as hearing spirits, communications from objects or animals around them, telepathic messages, or "clairaudient" experiences (i.e., psychic hearing); for others they are seen as tricks their mind plays on them and/or a mental health problem. We are interested in all these experiences – we want to understand the different ways people live with voices, and make no assumption about what they are, where they come from, or what they mean.
- The aim of this study is to evaluate a new questionnaire that looks at the different characteristics of voices or spirits in a wide range of people.
- You may worry that this project might involve negative judgements of people whose experience and beliefs might be considered unconventional or unusual - this is *NOT* the aim of the study. On the contrary, we are interested in gaining a fuller understanding of the different ways in which people interpret and respond to unusual experiences.
- We hope a better psychological understanding of these types of experiences will, in the long term, help other people to accept them more readily. We also hope it will help us improve psychological therapies for people whose voices are distressing.
- Hearing voices has been linked in some people to upsetting events in childhood (e.g. bullying, discrimination, physical assault, abuse) and internalised stigma (believing that negative stereotypes directed towards you are true). This study also aims to explore whether there is a link between these areas and how people make sense of their voice hearing experiences.

Why have I been asked to take part in this study?

You have been invited to take part because you have reported experiences of hearing voices and have signed up to the PICuP research register, or your mental health team have let us know you are interested to take part in this study.

Do I have to take part?

No, you do not have to take part. It is entirely up to you to decide whether or not you would like to take part. You can take your time to think about it. If you decide to take part, you will be asked to sign a study consent form, which just means that you agree to take part. Even after signing this, **you are still free to withdraw at any time,** and you don't need to give a reason. Whether you decide to take part or not, or stop part way through the study, this will not affect your usual care or your rights in any way.

What will happen to me if I take part?

First, we will speak briefly on the telephone to have a chance to ask one another questions and decide together if this study is right for you. If the study is suitable for you, you will be asked to meet for approximately 1-2 hours with a researcher either remotely (over the phone or video call) or face to face (at the Institute of Psychiatry, Psychology & Neuroscience (wearing appropriate PPE where necessary). During the session, you will be asked to:

- Sign a consent form (if you complete the study remotely, we will send you a consent form via email or post for you to sign and return, or you can give audio/video recorded consent to take part over the phone or video call with a researcher). You will be given a copy to keep along with this information sheet.
- We will ask whether you are happy for the meeting to be recorded. You do not have to agree to be recorded, and this will not affect you taking part.
- Provide some basic information about yourself, such as age, gender and tough childhood experiences.

- Complete a questionnaire about your experience of hearing voices or spirits. This should take no longer than 2 hours. If you are completing your appointment remotely, the researchers will read this questionnaire out loud for you to respond to over the phone or share their screen via Microsoft Teams video call. We will also email or post you a copy of the questionnaire so that you have your own copy.
- Provide feedback of how you found the session; this should take no longer than 5 minutes. The researcher will ask you if it is ok to look at your clinical notes to do a brief check on any diagnoses that might be recorded on there.
- Throughout your involvement in the study all other care / treatments will remain the same unless changed by your care team.

Will I be compensated for my time?

You will be compensated with a £15 voucher for your time, and you will be reimbursed for any travel expenses.

What are the possible risks or downsides of taking part?

The questionnaire involves talking about your experiences of hearing voices, which may be uncomfortable to discuss. Some questions may cover issues that are sensitive and/or distressing for you, such as asking about tough childhood experiences. There are no right or wrong answers and you do not have to answer any questions you do not want to. You are free to ask the interviewer to move on to another question or to stop the session altogether if you find any of the questions upsetting. Your treatment in your team will not be affected if you decide to stop the questionnaire, and you will still be reimbursed for your time.

At the end of the study, you will have a chance to tell us what your experience of participating in the research was like, and we will take this into consideration for this and future studies

What are the possible good things about taking part?

Some people find that they value talking about their experiences with someone independent; the Research Worker will be interested in listening to you, will be empathic and will not judge you.

Although this will not be a direct benefit to you, you will be contributing to providing researchers with increased knowledge into the nature of hearing voices, as well as helping to develop a new questionnaire. We also hope that what we find out using this new questionnaire will make the experience more understandable and acceptable to other people, and help us inform psychological therapies for people who find the experience distressing.

Will my responses be confidential?

Yes. All data collected will be kept confidential, and identified only by a code that will not personally identify you. No names will be used when the results of the study are published or talked about so your identity will never be revealed in any reports based on this study. The only exception is that if you tell the researcher something that makes them concerned for your safety or the safety of others, they will have to share this information as appropriate. In our experience this is an extremely rare occurrence.

How your personal data will be used in compliance with General Data Protection Regulation (GDPR)

Your data will be processed in accordance with the General Data Protection Regulation (2018). All information we collect for the study will be kept securely and anonymously on paper and on password-protected computers on a secure University or NHS network. Your research data will be identifiable by a participant number, not your name. Personal details like your name and how to contact you, with a record of your participant number, will be kept securely and separately from your research data.

If you have given us permission to record the research meeting, the recording will be stored securely on an encrypted recording device, with only your participant number, and will be transferred as soon as possible to a secure University or NHS drive as an encrypted file. This means only members of the research team with a specific password can access them. If you agree, we may send the recording to a transcription company (outside of the University), who will transcribe the recordings while maintaining confidentiality and adhering to GDPR regulations (2018). Once transcriptions are completed the recordings will be destroyed.

We will be using information from you in order to undertake this study: this will include your name, gender, ethnicity, age, date of birth, marital status, where you live, religious affiliation, , occupation, parent's occupation, diagnosis, current medication, previous therapy, any tough childhood experiences, and the responses to the questionnaire. The information that can identify who you are will be kept completely separate to the responses to the questionnaire, in a locked cabinet that can only be accessed by the research team. The data that are entered and kept on a secure computer will not have your name or date of birth, and will be linked to your code only.

King's College London (KCL) is the lead sponsor for this study based in the United Kingdom, and will act as the data controller for this study. This means that we are responsible for looking after your information and using it properly. We will only use information that we need for the research study. This information will be part of two trainee clinical psychologist's research projects. Everyone involved in this study will keep your data safe and secure. We will also follow all privacy rules. We will make sure no-one can work out who you are from the questionnaire responses.

With your consent, we will keep anonymised data (i.e., data that cannot be traced back to you) for future research. Your personal details will be kept for up to 10 years in line with information governance guidelines, and then will be confidentially destroyed. We will keep a completely anonymised copy of the database indefinitely, from which you will not be able to be identified at all.

What are my choices about how my information is used?

You can stop being part of the research study at any time, without giving a reason but your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained, unless you request for us to remove your data. To safeguard your rights, we will use the minimum personally-identifiable information possible.

Where can you find out more about how your information is used?
You can speak to the research team about how we use your information, or:

- Visit www.hra.nhs.uk/information-about-patients/
- Contact King's College London's Data Protection Officer (Ms Olenka Cogias) at info-compliance@kcl.ac.uk; 0207 848 1380 / South London and Maudsley NHS Foundation Trust, dataprotectionoffice@slam.nhs.uk).

What will happen to the results of the research study?

The results of the study will be written up in two theses as part of a Doctorate in Clinical Psychology and submitted for publication in peer-reviewed journals. We will also send you a summary of the findings as soon as the study is completed if you wish. Results will be anonymous and no personal information will be identified in any publication of the results.

Who is organising and funding the research?

This research is supported by internal funding (two Trainee Clinical Psychologist's research budgets). King's College London is the lead sponsor of the research. South London and Maudsley NHS Foundation Trust (SLaM) is the co-sponsor for the research.

What if I have a complaint?

If you have a concern about anything related to this study, please ask to speak with the Researcher or their supervisor, who will do their best to answer your questions. If you wish to discuss a concern with someone independent to the research team or wish to discuss how to make a formal complaint, you can do this through the local NHS Trust Patient and Liaison Service (PALS):

PALS Office SLaM, The Maudsley Hospital, Denmark Hill, London, SE5 8AZ

Tel: 0800 731 2864 Email: pals@slam.nhs.uk

Who has reviewed the study?
This research was reviewed by a group of researchers and clinicians. People with experience of using local mental health services have provided advice on study procedures and the questionnaire so that the study will be carried out in the best possible way.

All research in the NHS is also looked at by an independent group of people, called a Research Ethics Committee, to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given a favourable opinion (approved) by the London (Dulwich) Committee on 16th January 2020.

Contact details

If you have any questions relating to this research, or concerns about participation, please contact:

Molly Bird, Trainee Clinical Psychologist, molly.bird@slam.nhs.uk, 0754 656 1044

Emma O'Neill, Trainee Clinical Psychologist, emma.oneill@slam.nhs.uk, 0772 034 0339

Professor Emmanuelle Peters, Chief Investigator and Supervisor, 020 7848 0347

Thank You!

PARTICIPANT INFORMATION SHEET

The Varieties of Individual voiCe-Experiences Scale (VOICES)

You are being invited to take part in a research study. Before you decide if you would like to take part, we would like you to understand why the research is being done and what it will involve. Please read this information sheet carefully and decide if you would like to take part or not. Taking part is completely your choice. Whether you decide to take part or not, it will not affect your usual care.

What is the study about?

- Many people report experiences of hearing voices. Some people describe them as hearing spirits, communications from objects or animals around them, telepathic messages, or "clairaudient" experiences (i.e., psychic hearing); for others they are seen as tricks their mind plays on them and/or a mental health problem. We are interested in all these experiences – we want to understand the different ways people live with voices, and make no assumption about what they are, where they come from, or what they mean.
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- Hearing voices has been linked in some people to upsetting events in childhood (e.g. bullying, discrimination, physical assault, abuse) and internalised stigma (believing that negative stereotypes directed towards you are true). This study also aims to explore whether there is a link between these areas and how people make sense of their voice hearing experiences.

Why have I been asked to take part in this study?

You have been invited to participate because you or an organisation you belong to has identified that you have reported experiences of hearing voices and/or you have expressed an interest in taking part.

Do I have to take part?

No, you do not have to take part. It is entirely up to you to decide whether or not you would like to take part. You can take your time to think about it. If you decide to take part, you will be asked to sign a study consent form, which just means that you agree to take part. Even after signing this, **you are still free to withdraw at any time,** and you don't need to give a reason. Whether you decide to take part or not, or stop part way through the study, this will not affect your usual care or your rights in any way.

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- Sign a consent form (if you complete the study remotely, we will send you a consent form via email or post for you to sign and return, or you can give audio/video recorded consent to take part over the phone or video call with the researcher). You will be given a copy to keep along with this information sheet.
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- Complete a questionnaire about your experience of hearing voices or spirits. This should take no longer than 2 hours. If you are completing your appointment remotely, the researchers will read this questionnaire out loud for you to respond to over the phone or share their screen via Microsoft Teams video call. We will also email or post you a copy of the questionnaire so that you have your own copy.
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We will be using information from you in order to undertake this study: this will include your name, gender, ethnicity, age, date of birth, marital status, where you live, religious affiliation, , occupation, parent's occupation, previous therapy, any tough childhood experiences and the responses to the questionnaire. The information that can identify who you are will be kept completely separate to the responses to the questionnaire, in a locked cabinet that can only be accessed by the research team. The data that are entered and kept on a secure computer will not have your name or date of birth, and will be linked to your code only.

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What are my choices about how my information is used?

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- Visit www.hra.nhs.uk/information-about-patients/
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What will happen to the results of the study?

The results of the study will be written up in two theses as part of a Doctorate in Clinical Psychology and submitted for publication in peer-reviewed journals. We will also send you a summary of the findings as soon as the study is completed if you wish.

Results will be anonymous and no personal information will be identified in any publication of the results.

Who is organising and funding the research?

This research is supported by internal funding (two Trainee Clinical Psychologist's research budgets). King's College London is the lead sponsor of the research. South London and Maudsley NHS Foundation Trust (SLaM) is the co-sponsor for the research.

What if I have a complaint?

If you have a concern about any aspect of this study, you should ask to speak to the researchers who will do their best to answer your questions:

Chief Investigator: Professor Emmanuelle Peters,
emmanuelle.peters@kcl.ac.uk,
Tel: 020 7848 0347

Who has reviewed the study?

This research was reviewed by a group of researchers and clinicians. People with experience of using local mental health services have provided advice on study procedures and the questionnaire so that the study will be carried out in the best possible way.

All research is also looked at by an independent group of people, called a Research Ethics Committee, to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given a favourable opinion (approved) by the London (Dulwich) Committee on 16th January 2020.

Contact Details

If you have any questions relating to this research, or concerns about participation, please contact:

Molly Bird, Trainee Clinical Psychologist, molly.bird@slam.nhs.uk, 0754 656 1044
Emma O'Neill, Trainee Clinical Psychologist, emma.oneill@slam.nhs.uk, 0772 034 0339
Professor Emmanuelle Peters, Chief Investigator and Supervisor, 020 7848 0347

Thank you!

CONSENT FORM

Title of the Study: The Varieties Of Individual voiCe-Experiences Scale (VOICES)

Please add initials in each box if you agree to each statement

1. I confirm that I have read and understand the information sheet dated 16.01.2023 (V7) for the above study. I have had the opportunity to consider the information and ask questions. These have been answered to my satisfaction. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. My medical care or legal rights will not be affected. ☐

3. I understand that relevant sections of my clinical notes will be looked at by members of the research team. I give permission for these individuals to have access to my clinical notes. ☐

4. I agree that my identifiable data can be stored up to ten years, but will be kept separate to my anonymised questionnaire responses. ☐

5. I understand that research using my anonymised data will be aimed at developing a new questionnaire and will be part of two trainee clinical psychologist's theses which could help improve psychological therapies for people who find the experience distressing. ☐

6. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐

7. I agree to a written record of my verbal consent being made and stored securely. ☐

8. I agree to take part in the above study. ☐

Optional (this will not affect your participation in the study):

1. I agree for my meeting with the researcher to be recorded. ☐

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Name of participant	Date	Signature
----------	----------	----------
Name of person taking consent	Date	Signature

When completed, 1 copy for participant, and 1 copy for research site file.

CONSENT FORM

Title of Study: The Varieties Of Individual voiCe-Experiences Scale (VOICES)

Please add initials in each box if you agree to each statement

1. I confirm that I have read and understand the Information Sheet dated 16.01.2023(V2) for the above study. I have had the opportunity to consider the information and ask questions. These have been answered to my satisfaction. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason. ☐

3. I agree that my identifiable data can be stored up to ten years, but will be kept separate to my anonymised questionnaire responses. ☐

4. I understand that research using my anonymised data will be aimed at developing a new questionnaire and will be part of two trainee clinical psychologist's theses which could help improve psychological therapies for people who find the experience distressing. ☐

5. I understand that the information collected about me will be used to support other research in the future, and may be shared anonymously with other researchers. ☐

6. I agree to a written record of my verbal consent being made and stored securely. ☐

7. I agree to take part in the above study. ☐

Optional (this will not affect your participation in the study):

1. I agree for my meeting with the researcher to be recorded. ☐

----------	----------	----------
Name of participant	Date	Signature
----------	----------	----------
Name of person taking consent	Date	Signature

When completed, 1 copy for participant, and 1 copy for research site file.

Participant demographic form

Thank you very much for taking part in the study. Please fill in the below. The information on this form will be held in confidence in accordance with the general Data Protection Regulation. Please discuss with researcher if there are any questions. Please leave answers blank if you do not wish to fill them in.

Participant ID code:

Gender:

Ethnicity:

Age:

Marital Status:

Which city do you live in?

Religion Affiliation, if any (no religion, religion or spirituality):

How important is your religion or spirituality to you (very important, somewhat important, not important):

Occupation (in employment, in education/training, not employed):

Parent's occupation:

Diagnosis (if known):

Current medication(s) (if known):

Have you ever had therapy (currently or previously) focussing on your voices specifically?
If yes, roughly how many hours of therapy did you have?
Type of therapy you had (if known):
How long has it been since you finished therapy?

Some people report that they had tough childhoods. Would you say that you had a tough childhood? Would you say that in childhood you experienced (Tick all that apply):

□ Not Applicable	□ Physical Abuse	□ Emotional Abuse	□ Sexual Abuse	□ Neglect
□Bullying	□Isolation/Alienation	□Other_____		

Participant demographic form

Thank you very much for taking part in the study. Please fill in the below. The information on this form will be held in confidence in accordance with the general Data Protection Regulation. Please discuss with researcher if there are any questions. Please leave answers blank if you do not wish to fill them in.

Participant ID code:

Gender:

Ethnicity:

Age:

Marital Status:

Which city do you live in?

Religion Affiliation, if any (no religion, religion or spirituality):

How important is your religion or spirituality to you (very important, somewhat important, not important):

Occupation (in employment, in education/training, not employed):

Parent's occupation:

Have you had any therapy (currently or previously) focussing on your voices specifically?
If so, roughly how many hours of therapy did you have?
Type of therapy you had (if known):
How long has it been since you finished therapy?

Some people report that they had tough childhoods. Would you say that you had a tough childhood? Would you say that in childhood you experienced (Tick all that apply):

□ Not Applicable □ Physical Abuse □ Emotional Abuse □ Sexual Abuse □ Neglect

□Bullying □Isolation/Alienation □Other_____

Participant Feedback

Thank you very much for taking part in the study. As a final thing we would be grateful if you could answer a few questions about how you have found meeting today. Your feedback would be very helpful for us to make sure we are conducting our study in a respectful way and to identify anything we might need to change. There are a couple of general questions about how you have found today followed by a couple of more specific ones:

Participant ID code:

Questions:

1. What was your general experience of taking part in this study?

.....
.....
.....
.....
.....
.....

For the following questions please rate your experience of today from 0-10:

2. How relevant were the things we asked you today? (0-10)

0 1 2 3 4 5 6 7 8 9 10

|---------|--------|--------|--------|--------|-------|--------|-------|--------|--------|

Not at all A little Somewhat Quite a lot Extremely

Was there anything you feel that we missed out?

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.....
.....
.....
.....
.....

3. How distressing did you find taking part in the study

0 1 2 3 4 5 6 7 8 9 10

|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

Not at all A little Somewhat Quite a lot Extremely

If you have found it distressing in any way we would like to apologise; was there any specific aspect which you found upsetting? And is there anything different we could do to avoid this in the future?

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4. How interesting did you find taking part?

0 1 2 3 4 5 6 7 8 9 10

|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

Not at all A little Somewhat Quite a lot Extremely

5. How difficult did you find taking part?

0 1 2 3 4 5 6 7 8 9 10

|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

Not at all A little Somewhat Quite a lot Extremely

6. Overall how positive an experience did you find taking part in this study?

0 1 2 3 4 5 6 7 8 9 10

|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|

Not at all A little Somewhat Quite a lot Extremely

7. How respected and listened to have you felt taking part?

0 1 2 3 4 5 6 7 8 9 10

|---------|--------|--------|--------|--------|-------|--------|-------|--------|--------|

Not at all A little Somewhat Quite a lot Extremely

8. Is there anything we could do or say differently to make sure people feel respected and listened to?

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.....
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9. Would you be willing to do this kind of research again?

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.....

Thank you again for all of your time today.

Appendix 7: Ethical approval

NHS
Health Research Authority

London - Dulwich Research Ethics Committee
Health Research Authority
2nd Floor
2 Redman Place
Stratford
London
E20 1JO

26 April 2023

Dr Emmanuelle Peters
Reader in Clinical Psychology / Honorary Consultant Clinical Psychologist
King's College London, Institute of Psychiatry, Psychology & Neuroscience
PO77, HWB, Psychology
De Crespigny Park
London
SE5 8AF

Dear Dr Peters

Study title:	**The Varieties Of Individual voiCe-Experiences Scale (VOICES): A novel questionnaire to understand the experience of hearing voices.**
REC reference:	**20/LO/0010**
Protocol number:	**N/A**
Amendment number:	**The Varieties Of Individual voiCe-Experiences Scale (VOICES**
Amendment date:	**N/A**
IRAS project ID:	**255989**

Thank you for submitting the above amendment, which was received on 12th April. It is noted that this is a modification of an amendment previously rejected by the Committee.

The modified amendment was reviewed at the meeting of the Sub-Committee held on 24 April 2023. A list of the members who took part in the review is attached.

Ethical opinion

I am pleased to confirm that the Committee has given a favourable ethical opinion of the modified amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved are:

Document	*Version*	*Date*
Non-validated questionnaire [Voice Scale V3_03.02.2023 20230310T155427 GMT]	3.0	03 February 2023
Other [255989_Amend 1_modified]		12 April 2023

Other [VOICEs participant demographic form-Nonclinical group_V3_12.04.2023]	3.0	12 April 2023
Other [VOICEs participant demographicform_ClinicalGroup_V5_12.04.2023]	5.0	12 April 2023
Other [Amendment Sponsor Request Form 18.01.23 20230310T162219 GMT]	10	13 October 2022
Participant consent form [voices consent form_Clinical Group_V7 16.01.2023 20230310T155750 GMT]	7.0	16 January 2023
Participant consent form [VOICES Nonclinical group_Consent form_V2_16.01.2023 20230310T160120 GMT (1)]	2.0	16 January 2023
Participant information sheet (PIS) [voices PIS_Clinical Group V8_12.04.2023]	8.0	12 April 2023
Participant information sheet (PIS) [VOICES_PIS__Nonclinicalgroup_V3_12.04.2023]	3.0	12 April 2023
Research protocol or project proposal [Voices protocol version 5_16.01.2023 20230310T155154 GMT (1)]	5.0	16 January 2023

R&D approval

All investigators and research collaborators in the NHS should notify the R&D office for the relevant NHS care organisation of this amendment and check whether it affects R&D approval of the research.

Statement of compliance

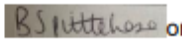
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

HRA Learning

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities– see details at: https://www.hra.nhs.uk/planning-and-improving-research/learning/

IRAS Project ID - 255989:	**Please quote this number on all correspondence**

Yours sincerely


on behalf of

Dr Thomas Kabir
Chair

E-mail: dulwich.rec@hra.nhs.uk

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Reza Razavi, Kings College London*

Confirmation of SLaM Trust Approval for Amendment SA2 (modified) 255989

Dear Prof Peters,

Study title: The Varieties Of Individual voiCe-Experiences Scale (VOICES)
REC Reference: 20/LO/0010
IRAS Project ID: 255989
SLaM R&D approval number: R&D2020/043
Amendment number and date: SA2 10/03/2023 (modified amendment date on HRA approval 12/04/2023)

I am writing to confirm that this amendment has been reviewed at the South London & Maudsley NHS Foundation Trust and can confirm Capacity and Capability to be implemented at this site under the existing HRA and R&D permission.

Please note that you may only implement changes that are outlined in the amendment form.

I take this opportunity to wish you continued success with your project.

Kind regards,

Dale Batham

R&D Governance Facilitator, Joint R&D Office of SLaM and IoPPN
King's College London
W1.12, Institute of Psychiatry, Psychology & Neuroscience (IoPPN),
King's College London, De Crespigny Park, London SE5 8AF