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Arts-based methods for hallucination research

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ABSTRACT

Introduction: Neurocognitive models of hallucinations posit theories of misattribution and deficits in the monitoring of mental or perceptual phenomena but cannot yet account for the subjective experience of hallucinations across individuals and diagnostic categories. Arts-based research methods (ABRM) have potential for advancing research, as art depicts experiences which cognitive neuropsychiatry seeks to explain.

Methods: To examine how incorporating ABRM may advance hallucination research and theories, we explore data on the lived experiences of hallucinations in psychiatric and neurological populations. We present a multiple case study of two empirical ABRM studies, which used participant-generated artwork and artist collaborations alongside interviews.

Results: ABRM combined with interviews illustrated that hallucinations were infused with sensory features, characterised by embodiment, and situated within lived circumstances. These findings advance neurocognitive models of hallucinations by nuancing their multimodal nature, illustrating their embodied feelings, and exploring their content and themes. The process of generating artworks aided in disclosing difficult to discuss hallucinations, promoted participant self-reflection, and clarified multimodal details that may have been misconstrued through interview alone. ABRM were relevant and acceptable for participants and researchers.

Conclusion: ABRM may contribute to the development of neurocognitive models of hallucinations by making hallucination experiences more visible, tangible, and accessible.

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Introduction

As a divergence from shared reality, hallucinations are one of the most fascinating phenomena across psychiatry, psychology and neurology. Within western academic and medical contexts “hallucinations” refer to sensory experiences without a corresponding external source. Yet, the lived experience entails many facets. Hallucinations can occur in any of the sensory modalities, alone or entangled with other aspects of distress, are often imbued with emotional valence and a sense of reality, situated within personal histories and sociocultural contexts, and are reacted to and enacted in the body. Through examining two novel studies using arts-based research methods (ABRM), this paper argues that integrating ABRM into current research practices can enrich hallucination research by contributing to cognitive neuropsychiatric models of hallucinations, while also offering acceptability and relevance to participants and novel routes for data dissemination and public engagement.

The cognitive neuropsychiatry of hallucinations: the current situation

Why do some people perceive things that others do not? A dominant neurocognitive model of auditory hallucinations posits that inner speech (self-generated thought) is misattributed to a non-self source, resulting in the experience of hearing a voice (Alderson-Day & Fernyhough, 2015). This model is a variant of source/reality monitoring accounts of hallucinations, which hypothesise that hallucinations arise from alterations in how people monitor their thoughts or mental imagery, contributing to a reduced capacity to discriminate between self/other, imagined/perceived or internal/external origins. Other prominent models suggest hallucinations relate to deficits in intentional inhibition, whereby sensory memories or associations intrude into conscious mental experience, or from alterations in perceiving or processing sensory information (Waters et al., 2012).

Hallucinations are supported by a plurality of neuroanatomical correlates, depending on the modality and associated pathology. A meta-analysis of neuroanatomical abnormalities related to hallucinations across diagnoses and modalities found distinct grey matter signatures for hallucinations in psychiatric (primarily schizophrenia) compared to neurological (primarily Parkinson's) patient populations (Rollins et al., 2019). However, the extant literature lacked neuroimaging studies of hallucinations in other modalities, such as tactile or olfactory, and many studies used hallucination assessment scales that do not distinguish between modality or ask whether hallucinations occur beyond audition or vision. Systematic reviews of phenomenological and sociocultural research have also highlighted the scarcity of literature on: hallucinations beyond the auditory modality, multimodal hallucinations, the emotional and embodied dimensions of hallucinations, and have underlined the neglect of research investigating the inter-relationship between qualities of hallucinations and the circumstances in which they arise (Melvin, 2020). Although evidence indicates that certain circumstances precipitate and influence hallucinations - such as adversity, trauma, sensory deprivation, sleep difficulties or bereavement - much remains unknown about the specificity of these relationships (Alameda et al., 2020; Longden & Read, 2016; Melvin, 2020; Parrett & Mason, 2010). Whereas research, healthcare practice and discourse on hallucinations

have increasingly acknowledged the contribution of biological, psychological and socio-cultural factors to causal accounts of hallucinations, progress remains to integrate the diversity of individuals' lived experiences (Cassidy et al., 2018; Cromby et al., 2013; Longden & Read, 2016).

The evolution of hallucination research has witnessed an expanding interest in the experiences of people across the diagnostic spectrum, and with no clinical diagnosis. It is now recognised that hallucinations' immediate and embodied feelings can occur in multiple sensory modalities, and are influenced by individual circumstances and narrative, including trauma and culture (Melvin, Crossley & Cromby, 2021; Montagnese et al., 2021; Pienkos et al., 2019; Woods et al., 2015). Integrating new research on the multisensory and embodied features of hallucinations, and their situated contexts, may advance the limitations of current cognitive and neurocognitive models. Moreover, incorporating the lived experience of hallucinations into clinical research and practice is necessary to guide the development of effective psychiatric care.

How can we target hallucination research gaps?

Phenomenological approaches utilising survey, interview and ethnographic methods have catalysed advances in hallucination theory and clinical practice and given clues to pathophysiology and aetiology.

A recent survey about voice-hearing in individuals with and without clinical histories highlighted the thought-like quality of some auditory hallucinations, the often-accompanied bodily feelings (reported by 66% of voice-hearers), such as feeling the heat, tingling or a dream-like state and distinct personalities recognised in voice-hearing experiences (Woods et al., 2015). Prior surveys evidenced the characterological nature of auditory hallucinations, and the dialogue and relationship developed between hallucination and voice-hearer over time (Nayani & David, 1996). Ethnographic approaches encompassing in-depth interviews with people experiencing hallucinations alongside discussion with case-workers, have built a compelling narrative around the interrelationship between socio-culturally situated negative life events and auditory verbal hallucination phenomenology and function (Vallath et al., 2018).

What are Arts-Based Research Methods (ABRM)?

ABRMs involve research wherein art is essential to any or all stages of research; from data collection to dissemination (Knowles & Cole, 2008). Art forms range from visual methods (drawing, photography, sculpture) to narrative (poetry, ethnographic-fiction) to performative (theatre, dance, film). Although the use of art is familiar in therapeutic practice and recovery settings, ABRMs have seen limited uptake in psychiatry and psychology research. To our knowledge, only two completed studies have used visual art to explore hallucination experiences: Upthegrove et al. (2016) asked participants to take photos of anything that represented their hallucinations, and Melvin and colleagues used visual diary and body-mapping to explore the feelings and circumstances of hallucinations in daily life (Melvin, 2020; Melvin et al., 2021). The methods deployed detailed the relational experiences of hallucinations, as characterised by feelings (multi-sensory, embodied, of reality, of knowing) that often signalled encounters with powerful

entities, and were localised to areas in the body or extended into peripersonal space. In related hallucinatory phenomena of migraine aura, analysis of drawings and paintings produced by migraine sufferers depicting the visual experience has enabled linkage of the aura content and specific neural processes (Schott, 2007). This limited literature demonstrates how ABRMs broaden the scope of hallucination neuroscience.

How might ABRMs advance hallucination research?

ABRMs are particularly well-suited to the needs of hallucination research due to their communicative, compositional and participatory features. They can be used to study experiences that are difficult to put into words or that people may be hesitant to disclose, including sensations and feelings, personal histories (including trauma) and marginalised perspectives (Chadwick, 2017; Reavey, 2011). Furthermore, art's multimodal capacities readily suit the multimodal lived experience of hallucinations and may allow participants to document their experiences in the sensory modality in which they primarily occur. Importantly, ABRMs provide agency to participants to steer research and introduce new information that may not be readily obtained through existing structured methods (Knowles & Cole, 2008; Mannay, 2010, 2016; Packard, 2008). To explore the extent to which ABRM may provide useful insights for cognitive neuropsychiatric theories of hallucinations, we present a multiple case study of two ABRM studies exploring lived experiences of hallucinations.

Materials and methods

We briefly summarise the methods from two studies, which are further detailed in the Supplementary Material. We present in the results as a synthesised examination of how ABRMs provide useful insights for cognitive neuropsychiatric theories of hallucinations.

Study 1. Feeling and circumstance: hallucinations in first-episode psychosis

This study (Melvin, 2020; REC: 18/LO/0418) used prospective and retrospective participant-generated ABRM (visual diary, open arts-based task, a life-timeline) alongside semi-structured interviews to investigate hallucinations. The open arts-based task data is focused upon within this article.

Sixteen adults currently accessing an Early Intervention in Psychosis (EIP) service and experiencing hallucinations (daily or every-other day) in any modality gave informed consent to participate. Participants took part in procedures over periods of at least four weeks. They documented hallucinations as they arose in a visual diary for one week, after which a semi-structured interview was conducted to share their diary and current-lived circumstances. Subsequently, all 16 participants were invited to complete an optional open arts-based task at home, and/or attend a further semi-structured interview regarding their personal history and artwork (if they chose to create them). Eleven participants did the open arts-based task; thirteen completed the second semi-structured interview and life-timeline. The open arts-based task encouraged participants to reflect on their experiences and create arts-based expressions using a creative medium of their choice. The

semi-structured interviews, which were transcribed verbatim, provided space for participants to talk through their artworks and their meanings. Participants' own representations of their artworks were held as central and formed the basis of a novel participatory embodied process analysis of the dataset (see Supplementary Material).

Study 2. Sound and vision: a collaboration between service-users, artists, and the public to explore the lived experience of hallucinations

This study (University of Cambridge REC: 20/LO/0420, ClinicalTrials.gov Identifier: NCT04399096) pairs local artists with participants who experience hallucinations to collaboratively create representative visual art. Participants are five adults given a diagnosis of a psychotic disorder, primarily schizophrenia, and five adults with a neurodegenerative condition, primarily Parkinson's disease (PD), to qualitatively and quantitatively compare and contrast the nature and content of hallucinations in these illnesses. Five artists are each paired with two participants, one from each patient group, to balance artistic styles between groups. Following informed consent, two semi-structured discussions between participant and artist take place, the first allowing participants to describe their experiences of hallucinations and the artist to ask questions, and a second 1–6 weeks later to present preliminary sketches and ideas, and to discuss any modifications such that the participant feels it is an accurate representation of their experience. Artworks will be photographed and displayed online and at science festivals, with attendees encouraged to complete online surveys to collect structured information on their perceptual and hallucination-like experiences and life history, which will form a unique dataset for the exploration of the content of hallucinations across mental health and illness. The artworks will be accompanied with excerpts of the discussions and analysed with visual content analysis (Bell, 2001) to find common or distinct iconographic elements and textual content analysis (Hsieh & Shannon, 2005) to identify emerging themes and specific objects, animals or people that are present in the hallucinations that occur as symptoms of psychotic disorders or Parkinson's disease. During analysis, participants' own descriptions of the material forms the context for interpretations.

Results

We illustrate how a multidisciplinary approach integrating ABRM into the interview and other methods can directly advance cognitive neuropsychological models of hallucinations through three routes: (1) nuancing their multimodal nature, (2) revealing the embodied feelings of hallucinations, (3) exploring the content and themes of hallucinations, shedding light on psychosocial contexts and enabling comparison across the diagnostic spectrum. We include verbal descriptions from participants in quotations and example artworks from our studies to illustrate these routes, which are consistent with the broader conclusions of the respective studies.

(1) Beyond hearing voices: hallucinations in other sensory modalities

A recent review summarising the theoretical and clinical landscape of multimodal hallucinations (MMH) noted that current theories are not able to fully explain the prevalence

or presentation of multimodal hallucinations (Montagnese et al., 2021). Both Fernyhough (2019) and Montagnese et al. (2021) hypothesise that some cognitive and neural processes, such as the corresponding sensory system, show a modality-specific contribution to hallucinations, whereas other processes may be modality-general, such as misattribution biases or reality monitoring deficits. Although multimodal hallucinations have been described by some authors (Chesterman & Boast, 1994; Lowe, 1973), there is limited empirical data on the prevalence rates, content and qualities of hallucinations beyond voices and visions. This may be partly due to the limited granularity of commonly used clinical symptom assessment tools, such as the Positive and Negative Syndrome Scale (PANSS) and the Neuropsychiatric Inventory Questionnaire (NPI), which do not document sensory modality.

ABRM may offer a finer-grained perspective of hallucinations including and beyond voices, by centering data generation towards participants' experiences, rather than structured interviews or questionnaires. For example, a participant in Study 1 experienced recurrent simultaneous MMH of encounters with a "purple spirit guide" who "takes me through journeys where I'm flying through space and I see stars ... It honestly feels like I'm there, like I'm floating". Through creating an artwork of this experience (Figure 1) and sharing it with the researcher, the data generation was oriented towards capturing this visual and bodily experience. ABRM may be relevant in efforts to understand experiences of visions and associated conditions. For most individuals with



Figure 1. Simultaneous multimodal hallucinations of travelling through space, alongside visitations and encounters with divine, loving celestial beings; participant generated artwork from Study 1. The right corner of the image is covered to maintain anonymity consistent with provided informed consent.



Figure 2. Preliminary sketches by one artist resulting from collaborative discussions with service-users with lived experience of hallucinations from Study 2. The artwork on the left represents a lived experience of visual hallucinations and sensed presence in Parkinson's disease and the artwork on the right represents a lived experience of auditory hallucinations in schizophrenia. The artworks were produced by Dr Fiona Blake, whose further artwork can be found at: <https://www.fionablake.art/>.

Parkinson's in Study 2, hallucinations involved visual and sensed presence without hearing spoken language. Some saw groups talking (as Figure 2 depicts) and one participant described "I couldn't participate or touch them or talk to them [...] It was like watching the television". For studying such experiences, visual art offers a means to foster comprehensive modality-specific communication, and visual representations of experience provide a basis to inquire about specific elements of hallucinations.

Representing the lived experience of hallucinations with visual artwork furthermore helps depict important details of hallucinations that may be lost or misinterpreted through verbal descriptions or questionnaires alone. For example, a common experience by participants with Parkinson's was seeing groups of figures (Figure 2), but the characteristics of these figures differed between participants. Upon presenting a sketch of the artist's interpretation during the second meeting (Figure 2), the artist asked "Are these more like the people that you see?". The participant responded "Uhm, well, I can't see on the sketch any of the deformities which I've seen on them [...] three fingers on one hand, and one arm shorter than the other, with stubb fingers on each, no legs". In another collaboration, a participant described seeing groups of people speaking to one another, but upon seeing a sketch of the artwork, commented that the people needed to be more slender, that "None of them are colours, they're all grey", and that "I wouldn't see their faces full on, I would only see the side view". These visual qualities would have been unknowingly misconstrued without ABRM. Triangulating data generation with interviews and ABRM may enhance the accuracy of phenomenological



Figure 3. Simultaneous multimodal hallucination -auditory verbal, visual and olfactory hallucination-involving encounters with presences. An experience which arose whilst seeking emergency healthcare and was described as overwhelming.

methods, especially for hallucinations beyond voices, which may not be reducible to spoken or written language.

Whereas interviews communicate knowledge serially, hallucinations may involve the co-occurrence of varied feelings in parallel, including visual, somatic and sensory qualities. [Figure 3](#) illustrates a participant's experience of overwhelming simultaneous and serial multimodal hallucinations involving auditory verbal, visual, olfactory senses and encounters with multiple entities. Arts-based data offers the potential to represent different layers of experience at once, the co-occurrence of which may be difficult to articulate. Both participant-generated ABRM (Study 1) and collaborative ABRM (Study 2) enabled rich, pluralist descriptions of hallucinations in varied modalities that may nuance the literature indicating that MMH are commonplace (Lim et al., 2016).

(2) Embodiment and feelings

Whereas emotions have largely been overshadowed by causal accounts of hallucinations in putative cognitive mechanisms (McCarthy-Jones, 2017), more recent hypotheses have described how feelings of shame may be a causal factor in auditory verbal hallucinations (McCarthy-Jones, 2017; Woods, 2017). This is supported by recent research showing that shame mediates the association between childhood trauma and hallucination-proneness in the general population (Bortolon & Raffard, 2019), whereas dissociation, emotional

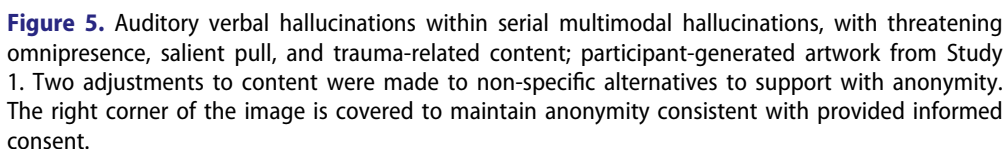


Figure 4. Trauma-related bodily hallucinations within serial multimodal hallucinations, of crawling sensations upon skin which extended into peri-personal space; participant generated artwork from Study 1. The right corner of the image is covered to maintain anonymity consistent with provided informed consent.

dysregulation, avoidance, numbing, mediate this link across the non-clinical to psychosis spectrum (Bloomfield et al., 2021). These negative feelings, sometimes interlinked with trauma, cannot always or easily, be conveyed in words. The value of ABRM in studying the embodiment and feeling of hallucinations is explored through trauma-related hallucinations and hallucinations that may feel shameful.

In health and social sciences, ABRM are highly regarded in their utility for generating data and knowledge on feelings and embodiment (Ellingson, 2017; Mannay, 2016; Reavey, 2011). Figures 4 and 5 illustrate the well-established empirical association between sexual traumas and hallucinations in terms of bodily feelings, peripersonal space, and emotional feelings. These self-portraits communicate how the participant's experience of rape during adolescence continued "ringing on" over time; the participant had "never really told anyone ... just kept it totally to myself ... but then it started to manifest" through hallucinations.

The initial manifestation (recurrently experienced over time) was where "I feel like things are crawling on me"; this is depicted in Figure 4, where hallucinations in the body and peripersonal space mirrored the sensations of sexually transmitted infections the participant had historically contracted through rape. Over time, voice-hearing arose and Figure 5 illustrates what it felt like to them. The voice "comes from all different directions" in peripersonal space, felt threatening as "he [malevolent presence] just wouldn't leave us alone", the confusion that "it's too much to process" and the



Some participants within our studies experienced hallucinations as embarrassing or shaming. It appeared that the process of ABRM—wherein participants themselves partially steer the focus and process of data generation—may have enabled them to speak more openly about such experiences. Indeed, ABRM are argued to reduce the power imbalance between researchers and participants (Reavey, 2011), which may aid the disclosure of hallucinations associated with difficult feelings. In Study 2, for example, a participant who had hallucinated young men exhibiting sexual behaviour commented that “someone might be hesitant in saying anything” about this kind of hallucination, adding that “I don’t really want to talk about it[these hallucinations] because it can so easily be misconstrued”. In Study 1, the hallucinations and trauma presented in Figures 4 and 5 were described as deeply confusing and difficult to acknowledge or share with

others too. The participant said that had arts-based methods not been available, “it would have been more difficult for me to get across to you what I had been through”.

The value of ABRM in sharing experiences extended from research into clinical practice too:

I showed this to my actual psychiatrist because he asked me once what have you been going through and I was like I don't know? Do you know what I mean? Where to start? How to say it? Or what to say? So I ended up showing them all this that I've been doing [participant generated artworks] with you, and that has been really helpful in getting across to people what I've been going through actually.

Here ABRMs offered a nonverbal medium to assist the participant to cognitively organise and articulate complex embodied experiences that were difficult to share in words. This example highlights how the created artwork can also enhance agency through stimulating discussions in a way that is tailored to the survivors' experiences and readiness to share.

(3) Specific content and themes in the hallucination continuum

In Study 1, art pieces were able to highlight the content of sensory information from varied modalities, their felt reality, their interrelationship with immediate social and material circumstances, and ongoing personal histories.

Although limited, the extant literature is clear on the need to study the context of hallucinations (particularly within daily life) in terms of places, activities, social-company and time of day (Delespaul et al., 2002; Vallath et al., 2018). Figure 4 readily shares content on the immediate circumstances of this hallucination, including the material setting (home bedroom), immediate social circumstances (alone) and time of day (night) alongside its communication of modality, embodiment, emotion and trauma-relatedness. The potential for the composition of multiple phenomena within a single art-piece (Johnson, 2008)—e.g., self, material circumstances, social relationships, built environment—provides an appreciation of the interrelationship between variables that may not otherwise be studied together (e.g., bodily hallucinations and built environment). Indeed, hallucinations are situated in immediate material and social circumstances (including living situation, support-network, finances) and this is relevant not only to prevention and coping strategies, but also to cognitive mechanistic models.

Participant-generated and collaborative artworks provide a means for themes and content of hallucinations to be shared, through both concrete depictions and more abstract qualities of the art pieces (further detailed in Supplementary Material). Through Figures 1–5, numerous aspects of specific content related to understandings of hallucination content are shared: multimodality, embodiment, characterisation of hallucinatory entities, hallucinatory trauma sequelae, the relational power and presence of hallucinations, reality and source monitoring, the cultural context of hallucinations, authority, the natural world and the cosmos, hallucination's interrelationship with spirituality and personal beliefs, the binding of hallucinations and social and material worlds. There are also thematic patterns across Figures 1–5: feeling bodies, good and evil, multi-modal content, the contribution of immediate circumstances to hallucinations and the contribution of ongoing personal histories (including traumatic and adverse events).

The rich content from ABRM enables comparing hallucination experiences across the diagnostic continuum. Study 2 is a comparative study of diagnoses, psychosis and PD, with different proposed (neurodevelopmental vs. neurodegenerative) aetiologies. By pairing artists with participants from each diagnostic group, artistic styles are counterbalanced to assist assessment of hallucinatory content. The first series of sketches from one artist illustrates the comparative capacity of ABRM (Figure 2). A prior meta-analysis identified distinct grey matter substrates associated with hallucination presence in psychiatric compared to neurodegenerative diagnoses (Rollins et al., 2019). This work informed our hypothesis for Study 2 that the content of the art pieces for participants with psychosis compared to PD will be qualitatively and quantitatively different. Through qualitative content analysis (Abdulah et al., 2020; Liamputtong, 2020), we predict different themes to emerge across artworks, and we will document distinct and common iconographic elements (e.g., animals, people, objects) through visual content analysis (Bell, 2001).

Analogous approaches have been used with interview data of auditory verbal hallucinations to consider components of speech, such as relative frequencies of words, grammatical categories or semantic domains, verb complexity, mean length of utterance, proportion of grammatical utterances, proportion of negations (Collins et al., 2020) to answer questions on the commonalities or differences in experiences. This comparative ABRM study of diagnoses will contribute towards continuum models that consider the prevalence, mechanisms, and phenomenology of hallucinations within non help-seeking and clinically-diagnosed populations (Baumeister et al., 2017; van Os & Reininghaus, 2016).

Discussion

We present a multiple case study of two studies involving art-making by people who experience hallucinations in the context of first-episode psychosis, psychotic-spectrum diagnosis or Parkinson's. The new insights into hallucinations that these methods provide can advance cognitive and neurocognitive models of hallucinations in several ways.

First, ABRM are suited for exploring the multimodal nature of hallucinations with artworks from Study 1 presenting tactile/bodily, auditory and visual hallucination, simultaneously and serially across time, whilst Study 2 offers a comparative approach to representing modalities in different diagnostic populations. Recent research indicates that multimodal hallucinations are more common than unimodal auditory hallucinations for people diagnosed with a schizophrenia spectrum disorder (Lim et al., 2016), and that the prevalence and clustering of sensory modalities vary between psychotic and neurodegenerative conditions (Dudley et al., 2019). The nascency of this research and its implications for theory and treatment (Montagnese et al., 2021) necessitates methods to accurately characterise multimodal hallucinations. The alternative ways of representing hallucinations through ABRM open up novel possibilities for representing and communicating different aspects of experience. The field's focus on auditory hallucinations may in part relate to the shared verbal features of the experience and existing data generation methods (e.g., interviews, self-report questionnaires). However, we emphasise that data generated from ABRM is not usually the artwork alone, but includes participants' interpretation of the artwork, and the process of the artwork's creation.

Second, ABRMs facilitate the expression of feelings that are a core component of the lived experience of hallucinations (Melvin et al., 2021). Indeed, Study 1 (Figures 4–5)

illustrates feelings of confusion, shame and threat, as well as the ways in which trauma is embodied and felt during hallucinations. This is particularly true when conveying difficult experiences around trauma, shame or sexuality, the latter showing a robust association with childhood trauma (Blom & Mangoenkarso, 2018). Whereas shame and other negative emotions have been associated with hallucination manifestation, onset and content, the complex feelings that occur during hallucinations are not well documented, nor is the role of the body in how they are experienced. ABRM, especially body-mapping (Melvin et al., 2021; Boydell et al., 2018), can advance understanding of the embodiment and feelings of hallucinations.

Third, the content and themes of hallucinations revealed by ABRM elucidate their relationship with an individual's circumstances and ongoing history (Study 1) and allow a comparative approach between disorders (Study 2). Hallucinations arise within psychosocial contexts and personal histories that contribute to the voice-hearing experience and may help explain the heterogeneity in hallucination phenomenology (Vallath et al., 2018). ABRM, along with experience sampling methods (Bless et al., 2020) that characterise contextual circumstances, are pivotal in advancing this area. There is increasing recognition that hallucinations occur across a spectrum of disorders, as well as for people without a diagnostic history (Baumeister et al., 2017; Rollins et al., 2019). A recent study conducting a retrospective chart review of patients with different neurodegenerative conditions showed differing relationships between hallucination content and pathology, indicating that qualities of the lived experience of hallucinations is an indicator of disorders-specific pathology and aetiology (Naasan et al., 2021).

Making room for new theories

ABRMs provide a “bottom up” rather than prescriptive approach to empirical research, allowing participants to identify which aspects they regard as most important to their experience of hallucinations. ABRMs have proved effective when engaging with children, migrants, people impacted by a significant disability or mental distress, and other otherwise vulnerable and marginalised groups (Boydell et al., 2018; Søndergaard & Reventlow, 2019). ABRM could therefore promote engagement with under-researched populations in hallucination research, such as children and adolescents (Maijer et al., 2019) or people from non-Western countries and cultures (Larøi et al., 2014). Arts-based practices have also been shown to empower participants and enable reflexive thought processing, which can enrich data collection for research interviews. “Your interpretation has made me think more deeply about it”, commented one participant with Parkinson's on a preliminary sketch by an artist in Study 2. “It's very interesting to investigate, a lot of things are clearer to me [after discussing the preliminary artwork]”, commented another. ABRM may additionally help dismantle stigma and catalyse the discussion of difficult topics (Boydell et al., 2018). One participant with Parkinson's commented to the artist after discussing the preliminary sketch,

I often do feel people can't help me because they don't understand, so I've got to get on and deal with it [...] You've shown me that you do understand how I feel, and I've always thought that other people wouldn't understand.

Collections of art pieces provide novel datasets that can reveal unexplored facets of the hallucinatory experience. This has proven true for the hallucination-like experience of migraine aura, where analysis of drawings and paintings produced by migraine sufferers depicting their aura has enabled links between the aura content and specific neural processes (Schott, 2007). Similarly, examination of a collection of 562 migraine aura illustrations identified depiction of out-of-body experiences and macrosomatognosia or microsomatognosia (perceptions of the body or body parts as abnormally large or small), suggesting that migraine aura can impact cognitive maps of body schema in addition to presenting as a visual phenomenon (Podoll & Robinson, 1999; Robinson & Podoll, 2000).

Integrating arts-based research methods into hallucination research

There is a pragmatic rationale in integrating ABRM into hallucination research, as the data it generates offers relevant insights and diverse forms of knowledge to several streams of hallucination scholarship. High methodological quality is best assured when ABRMs are used in conjunction with other methods (e.g. interviews) so that interpretations of art pieces remain anchored in the intentions and situated experience of participants. Utilising ABRM may require collaboration with scholars in other disciplines or those with ABRM expertise, enhancing the quality and scope of research (Larøi et al., 2014). The value of multi-disciplinary hallucination research (including creative practitioners and facilitators), has been illustrated through Mary Robson's work and the broader Hearing the Voice (2020) project. Notably, ABRMs also readily generate data examples and creative materials to support dissemination and public engagement. Whereas hallucination research articles may often be lengthy and inaccessible, the adage rings true that pictures are worth a thousand words.

Five primary ways that ABRM can be incorporated into hallucination research and practice are summarised in (Table 1). Consistent with the designs, advantages and examples summarised, the temporal nature of hallucinations can be understood by

Table 1. Summary of approaches to including ABRM into hallucination research.

Study design	Advantage of incorporating ABRM	Example
Mixed methods	To offer a plural lens of investigation, to triangulate the quality of results, to foreground studies to anchor them in lived experience.	In study 1, quantitative ecological data were generated in visual diaries alongside visual expressions, micro body-maps and written descriptions, all of which were discussed in interviews (Melvin 2020 ; Melvin et al., 2021).
Quantitative research	To investigate the prevalence of experiences, the priorities of populations, or to compare across populations.	Comparative content analysis in Study 2.
Qualitative research	To explore novel research areas or populations, to investigate experiences in-depth, to understand the situated context of experience.	Upthegrove et al. (2016) and Study 1's (Melvin, 2020) in depth explorations of hallucinations among people accessing early intervention in psychosis services.
Public engagement	To share hallucination research in an accessible format to bridge the gap between academic and public knowledge.	Aims and scope of Study 2.
All designs	To reflexively consider one's positionality in relation to the topic, to document reflections, to map concepts and make sense of phenomena, to creatively communicate hallucination research ideas.	Example of arts-based reflections in study 1 (Melvin, 2020, pp. 441–442).

ecological methods. Ecological methods include interviews alongside photography and diaries (Upthegrove et al., 2016) and MUSE maps. MUSE maps (Melvin et al., 2021) involve completing a visual diary entry with a micro body-map each time participants experience a hallucination, with opportunities and prompts to respond in both written and visual modes of expression. These ABRMs echo recent work using experience sampling methods (ESM) to document the temporal dynamics of hallucinations (Bless et al., 2020). Integrating ABRM with ESM would enrich research on the diverse circumstances and temporal patterns of hallucinations.

Beyond theory: improving participatory agency, dissemination and accessibility of hallucination research

ABRMs invite participants to bring their own agenda to research. In both study designs, artworks offered an attuned prompt for the interview and the opportunity to orientate data generation towards what is salient to participants about their lived experience of hallucinations, rather than centering around a standardised questionnaire or structured interview. Ethical considerations include taking into account participant preferences for the way they communicate their experiences. In Study 1, for example, participants could choose the artistic medium they responded to, with a variety of art forms utilised across the sample. Similarly, in Study 2, participants were briefed that the artist would work in their usual medium or style (e.g., realist or abstract), but would collaborate with the participant to ensure the artwork represented their experience. In our studies, ABRMs offered participants “relief”, “understanding” and techniques that “help [with] explaining to people what’s happening”. A further ethical consideration includes analysing sensitive arts-based data within research. In this multiple case study, both studies used interviews to capture participants’ interpretations of the artworks’ meaning and associations. Analysis of ABRM was grounded in participants’ own descriptions of the artworks, rather than researchers’ interpretations.

Art pieces provide an enduring resource to readily share participants’ perspectives into scholarship and public engagement activities. Art can catalyse conversations with non-specialist audiences about hallucinations, as it offers greater accessibility than academic articles. Public engagement is a strong component of Study 2, which will display the resultant art pieces online and across science festivals. A central component of this engagement will be to encourage the public to share their own experiences through completing anonymous online questionnaires, giving us a platform to improve our understanding of the diversity of hallucination-like experiences across the population. This provides an example of how data from ABRM studies can shape both public engagement campaigns and future research.

As ABRM may re-orientate knowledge generation towards otherwise marginalised experiences, there may be an opportunity for research to contribute to positive clinical and social change. For example, acknowledging the potential interrelationship with trauma and adversity may support healthcare service provision and suitability. Furthermore, the scholarship that acknowledges the neurocognitive sequelae of avoidable traumatic and adverse circumstances may enhance initiatives aiming to prevent distress.

Variations in arts-based methodologies and study designs can accommodate participant needs and preferences. For example, in Study 1’s participant-generated ABRM design,

participants held the primary agency in creating their artworks (e.g., in choosing artistic medium, artwork content, composition, colour, number of pieces), and the art-making component of the study was optional, thus enhancing participant choice. However, barriers to ABRM accessibility may include: low confidence in art-making, availability of time and space to create art and motor skill difficulties. Such barriers can be addressed by collaborative ABRM study designs, such as Study 2, wherein participants were paired with artists to collaboratively guide the creation of artworks. Collaborative ABRM approaches provide a novel opportunity to transform one's private experiences (e.g., hallucinations) into a shared perceptual object (e.g., an artwork) by another. Many participants reported the benefit of feeling understood in seeing another able to capture the essence of their experience. A limitation of this process is that it requires verbal communication skills from participants to describe their hallucinations in detail to an artist. For participants with limited verbal communication skills or whose primary language is different than the researcher's, Study 1's participant-generated ABRM may be better suited.

In the studies we presented, ABRM were used in conjunction with interviews, with small samples. However, there may be a place within hallucination scholarship for larger sample studies using ABRM alone, without an adjunct method. One example would be a body-mapping study to identify where feelings or sensory phenomena are located during hallucinations, wherein participants draw on body outlines to indicate sensory experiences. Blom (2015) described

they (external AH) may occasionally be perceived as stemming from aberrant locations such as the belly, the knee, the nose, or the shoe, in the sense that they are described as being heard by the belly, the knee, the nose, or the shoe respectively, as if the voice hearer's ear were located in those places.

Body-mapping offers a novel and effective way to capture the locations of the feeling of hallucinations, potentially in the absence of detailed interviews. Overall, whilst ABRM application in hallucination scholarship may vary by research agenda, population needs and available resources, ABRMs offer valuable alternative forms of communication to generate phenomenological information.

Limitations

Small samples are common in ABRM studies, given the novelty of the methods and exploratory approaches. ABRM are often situated within a local context, and thus experiences and priorities of participants may not be generalisable to other sociocultural circumstances. ABRM study data are generated through the interrelationships between participants, researchers and potentially artists, and may therefore be impacted by social desirability bias (Podsakoff et al., 2003). Within such ABRM studies, an active role is sought from participants with consideration of their perspective, feelings and circumstances; however, this may be unfamiliar, uncomfortable or undesirable for some participants, who may prefer more passive roles that standardised measures may engender. Although ABRMs enhance participatory dialogue between participants and researchers, the authors do not have direct lived experience of accessing healthcare for hallucinations. Based on these limitations, we recommend for future studies incorporating ABRM to recruit larger sample sizes, study hallucinations in different cultural contexts, and to involve peer researchers throughout the research and reporting process.

We discuss how ABRM studies triangulated with interviews may contribute to hallucination research and practice; however, the aims of case studies were not to compare the acceptability or superiority of ABRM to other methodologies. Future studies may benefit from evaluating participants' experiences of ABRM.

Conclusion

ABRMs offer an effective, relevant and acceptable means of advancing cognitive neuropsychiatric research methods and theories. Future research may seek to incorporate ABRMs to enhance understanding of hallucinatory phenomena and lived experiences. Hallucinations are complex experiences that demand multidimensional research tools and designs that transcend disciplinary boundaries. Connecting cognitive neuropsychiatry and ABRM also has significant potential for improving clinical practice and dialogue with research populations.

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Data availability statement

The authors confirm that the data supporting the findings of this study are available within the paper or its supplementary materials. Due to the sensitive nature of this research, participants of this study did not agree for public access to their datasets.

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