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Short communication

Have we overlooked the significance of multinodal hallucinations in schizophrenia?

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ABSTRACT

Scant research attention has been devoted to the phenomenon of multimodal hallucinations, with majority of studies focusing on auditory hallucinations (AH) in psychosis. The current study aimed to explore the frequency and characteristics of these multisensory hallucinations in a primary AH cohort. It was concluded more than half of our sample reported comorbid hallucinations in one or more sensory modes. This conveys significant research and clinical implications, in terms of steps taken for adequate assessment and intervention.

1. Introduction

Hallucinations, or sensory events perceived in the absence of corresponding external stimuli, occur in people with or without diagnosed mental health conditions. Yet they remain intimately associated with psychotic disorders, being reported by up to 80% of these patients (McCarthy-Jones et al., 2017). Whilst hallucinations can occur in any sensory mode, research and treatment to date has largely focused on its allegedly most common manifestation – auditory hallucinations (AHs), and within this, the auditory-verbal modality, or 'hearing voices'. Given our species' unique linguistic abilities and their role in facilitating social communication, this prioritising of AHs is understandable, but also problematic. The explosion of interest in AHs over the past decades has been accompanied by a serious neglect of the other sensory modes, with the latter receiving only a fraction of research attention. For example, a cursory Scopus search dated 22/11/2018 revealed roughly 180 visual, 20 olfactory, 12 tactile and 6 multimodal hallucination studies, paling in comparison to in excess of 1000 publications on AHs. This has left non-auditory as well as multimodal hallucination phenomenologies poorly understood, their underlying mechanisms largely unexamined, and the potential impact on affected patients clearly overlooked.

Multimodal hallucinations may be defined as events occurring in two or more sensory modes, concurrently or in isolation, not necessarily sharing an origin or thematic content. Prevalence studies have just begun to emerge, with lifetime multimodal hallucinations (53%) in psychosis estimated to be twice that of unimodal hallucinations (27%; Lim et al., 2016). This study also showed that patients with voices or visions also had more than a two- or ten-fold respective likelihood of hallucinations in other modes. In an international collaborative study, a third of an Irish sample and half of an Australian sample, comprising schizophrenia-spectrum patients, had hallucinated in more than one modality (McCarthy-Jones et al., 2017). In terms of modal co-occurrence, *auditory + visual* was most common, followed by *auditory + olfactory, auditory + tactile*, and *auditory + visual + tactile*, with other combinations occurring at much lower rates (though concurrent and sequential events were not differentiated). An earlier study suggested comorbid auditory and visual hallucinations were associated with heightened delusionality and negative affect (Oorschot et al., 2012). This was revisited in a psychosis sample with primary visual hallucinations (Dudley et al., 2018), where it was tentatively concluded that multimodal hallucinations were likely accompanied by greater conviction and distress (though no statistical analyses were undertaken due to limited subgroup sizes).

One of the most inclusive phenomenological studies of AHs was conducted in the 1990s, as part of a validation study for the Mental Health Research Institute Unusual Perceptions Schedule (MUPS; Carter et al., 1995). Preliminary data on multimodal hallucinations were also collected. In light of the apparent neglect of non-auditory hallucinations, we aim to present previously unpublished information relating to multimodal hallucinations in a primary AH group, and discuss ensuing implications. We will focus on the frequency, characteristics and timelines of visual, tactile, olfactory and gustatory hallucinations in a psychosis cohort experiencing predominant AHs.

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Table 1.
Prevalence of non-auditory hallucinations based on a primary AH MUPS sample (N = 199).

Phenomena	*Yes* (%)	*Unsure* (%)	*No* (%)
Visual hallucinations	52.8	5.0	42.2
Visual changes	18.9	–	81.1
Colour changes (e.g. seem sharper, more vivid)	9.0	–	90.3
Tactile hallucinations	46.2	4.0	49.7
Bodily sensations (e.g. prickly)	9.7	–	90.3
Bodily responses	33.2	1.5	64.8
Olfactory hallucinations	35.7	2.0	62.3
Gustatory hallucinations	18.1	3.0	78.9
Timelines			
Co-occurrence with voices			
Precisely same time	34.8	–	63.7
Around same time	62.1	–	37.3
Onset with voices	*Coincides*	*Before/after*	*Unrelated*
	17.1	58.6	21.1
Frequency of bodily sensations	*Often*	*Sometimes*	*Rarely*
	33.3	48.5	13.6

Note. Row-wise percentages adding up to less than 100 reflect missing data (less than 5% per variable).

2. Methods

A description of materials and procedure has been published elsewhere (Copolov et al., 2004). The MUPS (amongst other measures) was administered to a primary AH group (N = 199) in Australia. Briefly, participants had a mean age of 32.8 ± 10.7, of which 32.7% were male, with 70.6% achieving up to *Year 12* education, 13.2% partnered, 84.9% born in an English-speaking country, and the majority receiving a diagnosis of some form of a psychotic disorder (80.9% schizophrenia, 13.6% affective psychosis, 5.5% other psychiatric diagnoses). Mean antipsychotic use was 423 ± 308 mg of *chlorpromazine* equivalent. For the purposes of the current study, our analyses focused on *Other types of hallucinatory experiences* (MUPS Item 39a-f) and *Sensations/symptoms accompanying the voices/sounds* (MUPS Item 28a).

3. Results

Multimodal hallucinatory data are shown in Table 1. Significant percentages of these voice-hearing patients had comorbid hallucinations in other sensory domains; ~50% had hallucinations in the visual domain, ~30% in the olfactory domain, and ~20% in the gustatory domain. A proportion experienced visual and/or colour changes accompanying visual hallucinations; a minority had frequent or occasional bodily sensations alongside tactile hallucinations, whereas bodily responses, during which an actual physical reaction was elicited by the voice(s), were notably more common, affecting up to a third of patients. We also examined timelines of these events. A third of patients had multimodal hallucinations coinciding precisely with the voice(s), the remainder of patients had these experiences immediately preceding or following onset of the voice(s).

4. Discussion

The current study aimed to explore the frequency, characteristics and timelines of multisensory hallucinations, as reported by a primary AH group. Overall, we concluded hallucinations in non-auditory modes are common in psychosis, with more than half of our sample reporting comorbid hallucinations in at least one other sensory mode. Despite the robust empirical evidence showing AHs: i) are highly prevalent in psychotic disorders, ii) cause significant distress and functional impairment, iii) with liable cognitive mechanisms identified, and iv) are associated with specific neuroanatomical correlates, the lack of research attention, and thus current knowledge, with respect to other sensory modes means the true prevalence and impact of multimodal hallucinations in psychosis remain unknown. In fact, we may intuitively expect these patients to be more preoccupied and convinced due to the perceived veracity of their multisensory experiences, leading to heightened distress and functional interference. Though explicit empirical evidence supporting this is still lacking, preliminary studies have certainly pointed towards such a likelihood (Dudley et al., 2018; Oorschot et al., 2012).

Emerging empirical evidence does however raise speculation of a subgroup of 'multimodal hallucinators', distinct from the 'voice only hallucinator' typically described (McCarthy-Jones et al., 2014). This unaddressed subgroup may correspond to some hitherto unidentified hallucination subtype, with discrete etiological and neurocognitive underpinnings, and could benefit from tailored interventions. A major critique of existing cognitive models of AHs point to these being largely language-based, and incompatible for translation across sensory modalities. An inclusive cognitive model of multimodal hallucinations is thus sorely lacking. Perhaps the next logical step would be to look at what a systematic examination of multimodal hallucinations in psychosis would entail as well as possible clinical/therapeutic applications. Specialised assessment tools to accurately evaluate this complex phenomenon are in their infancy. To this end, an industry gold-standard measure should: i) tap into the physical (e.g. frequency, duration), cognitive (e.g. conviction, controllability) and emotional (e.g. negative content, distress) characteristics of hallucinations within each sensory modality, as well as ii) explore constructs that span multimodal hallucinations, involving timelines (i.e. simultaneous or serial), relatedness of content (i.e. congruent or incongruent), and other possible interactions between sensory modes. The emphasis on 'hearing voices' to the exclusion of other hallucinatory modes has also seemingly manifested in the clinical sphere. Non-auditory and multimodal hallucinations tend not to be routinely tackled in clinician-patient interactions. Having a well-validated measure on hand should encourage clinicians to delve deeper into these lesser known symptoms.

There are two key limitations associated with the current study. First, inclusion criteria for the original study meant that participants were recruited based on endorsing primary AH experiences. This means we are unable to comment on the true prevalence of multimodal hallucinations in psychosis; these figures could be easily elevated if primary non-auditory hallucinations were also taken into account. Second, the design of our study did not allow for analysis of i) co-occurrence of hallucinations across other modalities (outside of AHs), nor ii) the potential exponential increase in preoccupation and distress related to multimodal hallucinations in general. Given multimodal hallucinations, especially in non-auditory domains, have been overlooked, this forms an important avenue for future research.

Comprehensive AH phenomenological data have played a pivotal role in emerging treatments for voices. For instance, mindfulness approaches have found modest success, with voice-related constructs, such as omnipotence (Chadwick et al., 2000) or relational style (Perona-Garcelan et al., 2017), forming the therapeutic target. Related knowledge could be likewise be used to tailor interventions in other sensory modes. We need to move our focus beyond isolated AHs, and recognise the wider forest of hallucinatory experiences that exist. This will form a critical contribution, expanding current clinical practice beyond its focus on auditory manifestations, to more inclusively address patients' needs.

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Declaration of interest

The authors declare that there are no conflicts of interest.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.06.018.

References

Carter, D.M., Mackinnon, A., Howard, S., Zeegers, T., Copolov, D.L., 1995. The development and reliability of the mental health research institute unusual perceptions schedule (MUPS): an instrument to record auditory hallucinatory experience. Schizophr. Res. 16 (2), 157–165.

Chadwick, P., Sambrooke, S., Rasch, S., Davies, E., 2000. Challenging the omnipotence of voices: group cognitive behavior therapy for voices. Behav. Res. Ther. 38 (10), 993–1003.

Copolov, D., Mackinnon, A., Trauer, T., 2004. Correlates of the affective impact of auditory hallucinations in psychotic disorders. Schizophr. Bull. 30 (1), 163–171.

Dudley, R., Aynsworth, C., Cheetham, R., McCarthy-Jones, S., Collerton, D., 2018. Prevalence and characteristics of multi-modal hallucinations in people with psychosis who experience visual hallucinations. Psychiatry Res. 269, 25–30.

Lim, A., Hoek, H.W., Deen, M.L., Blom, J.D., Investigators, G., 2016. Prevalence and classification of hallucinations in multiple sensory modalities in schizophrenia spectrum disorders. Schizophr. Res. 176 (2–3), 493–499.

McCarthy-Jones, S., Smailes, D., Corvin, A., Gill, M., Morris, D.W., Dinan, T.G., Murphy, K.C., Anthony, O.N.F., Waddington, J.L., Australian Schizophrenia Research, B.,Donohoe, G., Dudley, R., 2017. Occurrence and co-occurrence of hallucinations by modality in schizophrenia-spectrum disorders. Psychiatry Res. 252, 154–160.

McCarthy-Jones, S., Trauer, T., Mackinnon, A., Sims, E., Thomas, N., Copolov, D.L., 2014. A new phenomenological survey of auditory hallucinations: evidence for subtypes and implications for theory and practice. Schizophr. Bull. 40 (1), 231–235.

Oorschot, M., Lataster, T., Thewissen, V., Bentall, R., Delespaul, P., Myin-Germeys, I., 2012. Temporal dynamics of visual and auditory hallucinations in psychosis. Schizophr. Res. 140 (1–3), 77–82.

Perona-Garcelan, S., Rodriguez-Testal, J., Senin-Calderon, C., Ruiz-Veguilla, M., Hayward, M., 2017. Mindfulness as a mediator between the relational style with voices and negative affect. Mindfulness 8 (2), 454–459.