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Letter to the Editor

Naming names: auditory hallucinations, inner speech, and source monitoring

Although competing explanations exist (Asaad & Shapiro, 1986; Bentall, 1990; Hoffman, 1991; Beck & Rector, 2003; Waters *et al.* 2006), the theory that auditory hallucinations (AH) represent inner speech that is erroneously attributed to an external (non-self) source is currently in vogue within cognitive psychology. In the past few years, several detailed variants of an inner speech/source-monitoring (ISSM) theory of AH have been presented along with reviews of supporting evidence (Gallagher, 2004; Seal *et al.* 2004; Ditman & Kuperberg, 2005; Laroï & Woodward, 2007; Jones & Fernyhough, 2007). In contrast, Langdon and colleagues (2009) recently presented findings that are at odds with an ISSM theory of AH. In response, I would like to highlight several practical and clinical observations and questions that challenge an ISSM theory of AH and that should be accounted for in future aetiological explanations:

- (1) First, as many authors concede, the ISSM theory only provides an aetiological framework for auditory *verbal* hallucinations. Although source monitoring defects may be a common underlying thread, non-verbal AH and hallucinations of other sensory modalities probably involve pathophysiologically distinct brain structures or networks. There is, therefore, little empirical rationale for lumping all hallucinations together, as DSM-IV and clinicians typically do, or assuming that the treatment of different types of hallucinations is homogeneous.
- (2) While there are now various attempts to define AH, clear and consistent definitions of 'inner speech' are lacking. Explaining whether there are different types of inner speech and how inner speech differs from thinking, thinking with language, auditory imagery, verbal imagery, or verbal memory are vital considerations in accounting for the phenomenology and aetiology of AH. Clinically, and as Langdon and colleagues (2009) illustrate quite clearly, patients with AH do not lose the capacity for normal inner speech altogether, but instead only experience some inner speech as originating from non-self, if at all.

Likewise, patients sometimes carry on an internal dialogue with 'voices', but only experience one side of this dialogue as an hallucination. Some patients hear their own thoughts aloud, while others experience AH without typical characteristics of inner speech (e.g. as the 'voice' of other people such as members of one's family or of the opposite sex, the devil, multiple voices, or voices commenting in the third person). Existing ISSM theories do not adequately account for these phenomenological variations in AH.

- (3) Any attempt to mechanistically define AH must clearly distinguish them from, or equate them with, other forms of pathological experience. For example, the subjective experience of AH differs from thought insertion, but they are hardly distinguishable within ISSM theories that hypothesize that AH are errors of misidentification or a form of anosognosia (e.g. 'alien-voice syndrome' or 'inner speech anosognosia'). In this manner, ISSM theories do not conform to established definitions of AH (e.g. in DSM-IV) as *sensory* experiences, suggesting that either the theory or the definition warrants revision.
- (4) As with inner speech, 'source monitoring' requires a consistent, valid definition. While some have made important distinctions between source and self-monitoring (Laroï & Woodward, 2007), few authors clearly account for how source monitoring and insight might be related. Patients describing AH report variations in source (inner *v.* outer) and origin (self vs. non-self) as well as insight. For example, a patient might describe 'hearing a voice inside my head that's not me or my own thoughts, yet I know it's not really another person but rather my brain playing tricks on me'. Such distinctions remind us that many variables such as insight are continuous rather than dichotomous and suggest that there may be many different 'layers' to source monitoring.

Although the intuitive appeal of an ISSM definition of AH is that it is nearly tautological (e.g. by definition AH are self-generated experiences that are experienced as non-self), a closer look at the phenomenological diversity of AH challenges cognitive psychologists to more carefully 'name names' and establish valid terms. As Langdon *et al.* (2009) acknowledge, such diversity also indicates that there may very well be not one unifying theory, but myriad pathophysiologies, subjective experiences, and potential treatments of AH.

Declaration of Interest

None.

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The authors reply

We are grateful for Professor Pierre’s thoughtful response to our paper. We comment in turn on each of his key points about inner speech models of auditory verbal hallucinations (AVHs).

We are in complete agreement with Professor Pierre that one ought not to assume that hallucinations, even within a single modality, are homogeneous (see e.g. Jones, in press). Different dimensions of the phenomenology of AVHs (e.g. hearing the voice of oneself/another; hearing the voice in an external/internal location) might also be associated with distinct neural mechanisms (e.g. Stephane *et al.* 2003). As such, researchers are now designing studies which examine groups of patients with more phenomenologically homogenous hallucinations (e.g. García-Martí *et al.* 2008). Ideally, future research may examine even finer-grained comparisons between groups of patients, each with phenomenologically distinct types of AVHs (e.g. commands *v.* overheard conversations) in order to isolate those mechanisms which are specifically associated with the different facets of AVHs.

Second, we agree that many inner speech theories neither clearly define inner speech nor account well for the varied pragmatics of AVHs. In particular, more attention needs to be paid to the relationship between the acts of thinking and of speaking internally as it bears on the phenomenon of AVHs. We have elsewhere (Jones & Fernyhough, 2007, 2009) considered these issues in detail, highlighting problems with many of the methodologies that have been used to examine inner speech in neuroimaging studies, and noting that auditory verbal imagery may be particularly likely to be the raw material of (at least some) AVHs. Similarly, Hoffman *et al.* (2008) have argued that source monitoring errors may be most likely when generating verbal imagery of non-self speakers compared to when speaking in one’s own voice in inner speech.

Professor Pierre also suggests that any attempt to mechanistically explain AVHs must clearly distinguish them from, or equate them with, other forms of pathological experience (e.g. thought insertion); although, it should be noted here that there is nothing *a priori* pathological about AVHs (Romme & Escher, 1993). We agree that the sensory qualities of AVHs are much neglected in inner speech theories, as pointed out in our own paper and expanded upon elsewhere (Jones & Fernyhough, 2007; Jones, in press). It is indeed a good question as to how thought insertion, which also involves the misattribution of source, differs from AVHs. This difference needs to be explicitly accounted for in modified inner speech models of AVHs, and these modifications will probably require further clarity of definition regarding the concepts of ‘thinking’ and of ‘inner speech’.

Declaration of Interest

None.

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