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Hearing their Voices: Aligning Computational Psychiatry with the Hearing Voices Movement

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Established approaches to the diagnosis and treatment of psychosis face a growing challenge. Critical Psychiatry demands we put patient rights, autonomy, and recovery at the forefront of treatment. They downplay the role of the brain in etiology and, thus, the efficacy of pharmacological treatments, which they argue do more harm than good[1]. This may be dismissed out of hand by the contemporary psychiatrist: while there are adverse effects of antipsychotics, these drugs outperform placebos in controlled clinical trials—a bar that is not met by cognitive therapies[1]. However, some critical psychiatry views find empirical support: psychotic symptoms worsen in the context of social isolation[2], they are sensitive to the emotionality expressed by family members, and they are statistically associated with trauma[3].

We suggest the burgeoning field of computational psychiatry (CP) may reconcile biological psychiatry with critical psychiatry as well as the values and goals of those with lived experience of psychosis. We will focus on auditory verbal hallucinations or 'voices.' We will highlight how the Hearing Voices Network (HVN), a growing recovery-oriented organization that emphasizes accepting voice-hearing experiences[4], and a new predictive processing account of hallucinations[5], might offer similar insights. Given the HVN's tendency to downplay biomedical explanations of voices, it may seem that the HVN and brain-based CP make strange bedfellows. However, CP emerged from a desire for consilience across multiple levels of explanation, whether neurobiological, cognitive, or social. It is about modeling the world and the brain within it. By spanning and uniting levels of explanation, CP embraces the pluralism central to the HVN, and brings the power of this pluralism to the service of clinical care.

The HVN is comprised of peer-support groups for voice-hearers, known as 'hearing voices groups,' wherein voice-hearers and their advocates work together to provide mutual support, share insights, and suggest ways to understand voices[4], helping voice-hearers to live peaceably with their experiences[4]. Such groups provide an attractive alternative for voice-hearers who feel they have not been fully helped, and sometimes harmed, by traditional approaches, or who feel that their stories have not been acknowledged[4]. Crucially, there are many frames of reference through which voice-hearing may be seen (biological, social,

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spiritual), and the voice hearer is encouraged to choose their interpretation and develop a personal relationship with their voices[4].

Although CP encompasses many different theoretical approaches, we adopt a Bayesian predictive processing (PP) framework. Within this framework, perception (like cognition and belief) is an active, synthetic process: we perceive what would need to be present around us in order for our sensations to make sense[5]. The brain contains a hierarchical model of its environment, built from prior experiences, to infer the causes of its sensations by combining feed-forward 'bottom-up' information from the sensory organs with feedback or 'top-down' predictions from higher-level regions, and weighting these sources based on their precision[5].

We recently demonstrated[6] that hallucinations are associated with high-precision priors, such that new percepts are created from whole cloth. They may be experienced as voices because our auditory apparatus is tuned to (i.e., has strong priors for) the natural statistics of speech. And they may be experienced as agents communicating because we believe that voices are typically attached to an agent. They are distressing because they are non-consensual and they engage the highest levels of our inferential hierarchy—those levels that contain our narratives about ourselves[7]. Thus, PP can honor, incorporate, and draw valuable information from the personal narratives of voice-hearers like those in the HVN.

We are not born with our models of the world; we infer their parameter values through experience. However, those values may be innately constrained. For example, the expectation that a caregiver would protect us may be relatively hardwired. If that expectation is violated, we may develop a world model—and a set of social expectations—that color our perceptual inferences in a maladaptive manner. Thus, the HVN's focus on trauma as a potential cause of voice-hearing can be brought within the explanatory fold.

If the PP account is correct, we should expect voices to be exacerbated in contexts where uncertainty is increased, when one would rely more strongly on one's priors. Furthermore, voices should be mollified by more predictable circumstances. These are common themes discussed at hearing voices groups (see Figure 1).

Since PP strives to understand voices in terms of the usual functioning of perceptual and cognitive apparatuses, it is able to embrace the HVN's mission of normalizing voices. Even non-voice-hearers can be impelled to hallucinate in our laboratory[6] and, indeed, most of perception may be considered a controlled hallucination.

The experts in experience who comprise the HVN have much to teach computational psychiatrists, who should be interested in the richness of their experiences. We should be aligning ourselves to explain and mitigate the features of voice-hearing that are most salient and distressing to voice-hearers. One challenge to alignment is finding an acceptable common language. We humbly suggest that, because the CP approach unites levels of explanation, it might be a means through which experts by education (academics, clinicians, advocates) and experts by experience can realize their shared aim of a deeper understanding of voices.

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References

1. Jauhar S, McKenna PJ, Radua J, Fung E, Salvador R, Laws KR. Cognitive-behavioural therapy for the symptoms of schizophrenia: systematic review and meta-analysis with examination of potential bias. The British journal of psychiatry : the journal of mental science. 2014;204(1):20–29. [PubMed: 24385461]
2. Hoffman RE. A social deafferentation hypothesis for induction of active schizophrenia. Schizophr Bull 2007;33(5):1066–1070. [PubMed: 17631618]
3. McCarthy-Jones S, Longden E. Auditory verbal hallucinations in schizophrenia and post-traumatic stress disorder: common phenomenology, common cause, common interventions? Front Psychol. 2015;6:1071. [PubMed: 26283997]
4. Corstens D, Longden E, McCarthy-Jones S, Waddingham R, Thomas N. Emerging perspectives from the hearing voices movement: implications for research and practice. Schizophr Bull 2014;40 Suppl 4:S285–294. [PubMed: 24936088]
5. Powers AR, III, Kelley M,Corlett PR Hallucinations as top-down effects on perception. Biol Psychiatry Cogn Neurosci Neuroimaging. 2016;1(5):393–400. [PubMed: 28626813]
6. Powers AR, Mathys C, Corlett PR. Pavlovian conditioning-induced hallucinations result from overweighting of perceptual priors. Science. 2017;357(6351):596–600. [PubMed: 28798131]
7. Hirsh JB, Mar RA, Peterson JB Personal narratives as the highest level of cognitive integration. Behav Brain Sci. 2013;36(3).

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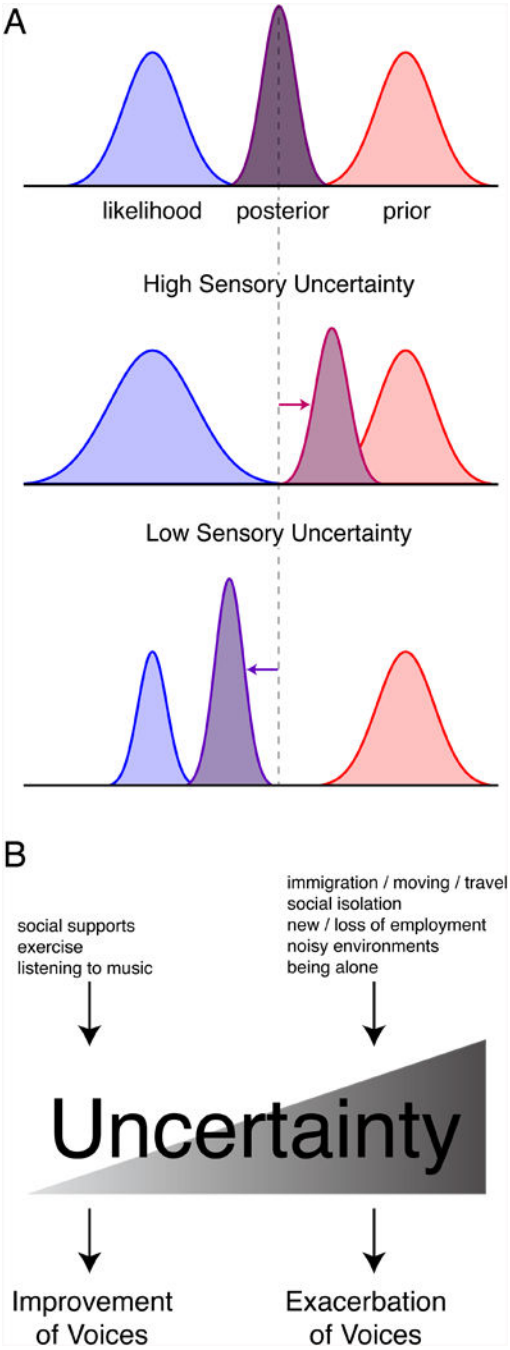

Figure 1. Uncertainty in voice-hearing.

A. Perception is the combination of sensory evidence (*likelihood*) and prior beliefs (*prior*), weighted by their relative precision (or inverse variance) to infer a posterior probability of any given event. When uncertainties of prior and likelihood are relatively equal (*top*), the posterior takes both into account relatively equally. In the context of increased sensory uncertainty (*middle*), posteriors are pulled toward priors, increasing hallucinations[6]. By contrast, in the context of decreased environmental uncertainty (*bottom*) posteriors are pulled toward the likelihood, decreasing probability of hallucinations. **B.** Factors that result

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in improvement in (*left*) and exacerbation of (*right*) voices, per members of the HVN. The former factors decrease sensory uncertainty, whereas the latter increase it. We highlight sensory processes that influence voice-hearing; however, higher-level factors (like faith, spiritual belief) may influence hallucinations through hyper-priors and prediction errors over the lower-level priors that could possibly pertain.