

Therapeutic advances for people with delusions will come from greater specification and empirical investigation

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Phenomenological accounts of delusions focus on the experiences of people – not the delusional content but its mode, manner or form. The emphasis on the detailed description and in-depth exploration of how the person experiences the self and the world, at times of disturbance and distress, is important. Phenomenology has much to teach mental health professionals about recognizing and validating patients' anomalous experiences and their emotional impact. Furthermore, Sass and Byrom (1) offer some elegantly formulated ideas about how information is processed by some people with delusions (their "hyposalience hypothesis") and possible links to certain neurocognitive accounts of delusions. But do these ideas point towards therapeutic advances? I do not think so.

There is much cognitive research on delusions which has informed and influenced cognitive behaviour therapy (CBT), but which appears neglected or even misinterpreted by Sass and Byrom. The cognitive approach, in common with these authors, does not view delusions as unitary phenomena, but it differs in that it also tests empirically the hypothesized mechanisms of cause and persistence of different delusion types. The most striking example concerns persecutory delusions, a common, clinically important delusion type. The recent cognitive research on persecutory delusions is not correctly represented by what Sass and Byrom call "the paranoia paradigm", i.e., "the tendency to view literal beliefs about external threat or attack as constituting the prototypical instance of delusion". On the con-

trary, the purpose is to understand the causal factors implicated in distinct types of delusion and thence to develop targeted interventions (2). Thus, recent research has examined persecutory, grandiose and religious themed delusions to explore hypothesized differences (for example, 3,4).

There is highly replicated evidence, in dozens of independently conducted studies, of reasoning biases in people with delusions, demonstrating, in comparison to control groups, the tendency to gather less information under conditions of uncertainty (or "jumping to conclusions") (see 2,5 for reviews). I agree that it is possible, as Sass and Byrom note, that the "jumping to conclusions" bias is partially reflected in their concept of an "anything goes mentality". Related to, but distinct from "jumping to conclusions" is a limited reflectiveness about one's own reasoning, which we have called poor belief flexibility – a relative incapacity to reflect on one's judgements, to review and reconsider first impressions and to consider alternatives. Recent evidence suggests that this over-reliance on rapid automatic thinking, at the expense of slower reflective thinking – adopting a two process model of reasoning, as in Kahneman's *Thinking, Fast and Slow* (6) – is an important mechanism of persecutory delusion persistence and change. A randomized study with 100 people with schizophrenia spectrum psychosis and paranoid thinking demonstrated that we can help people with persecutory delusions to become aware of thinking fast, and to slow down their thinking, thereby reducing their paranoia; this points the way forward for new therapeutic strategies (7).

It is of note, perhaps contrary to Sass and Byrom's assumption about the role of emotions underpinning grandiosity, that grandiose delusions

are even more strongly characterized by the "jumping to conclusions" reasoning bias than are persecutory delusions (3). But this is emphatically not to deny the importance of emotions in both grandiose and persecutory delusions (3). Sass and Byrom are incorrect in asserting that the paranoia paradigm emphasizes only reasoning biases. Cognitive models of delusions are multifactorial, and research has shown how emotional processes are also active as causal mechanisms of persecutory delusions.

Large scale epidemiological research, experiments and interview-based longitudinal studies have investigated social and psychological mechanisms of paranoid thinking and persecutory delusions (for example, 8-10). Emotional processes are clearly important. For example, Wickham et al (10), in a study of 7,000 members of the general public, found that multiple social and economic indices of deprivation predicted the occurrence of paranoia, and that this was partially mediated by measures of interpersonal trust and stress. Another study which followed 300 patients with schizophrenia spectrum psychosis over 12 months showed that a negative self-concept predicted the persistence and severity of persecutory delusions (8). An experimental investigation of how cannabis triggers paranoia showed that anomalies of experience and negative affect are the most likely mechanisms of action in causing paranoia (9).

Studies such as these lead directly to new therapeutic approaches to delusions. It is a travesty to suggest, as do Sass and Byrom, that CBT therapists working with people with delusions would endorse the idea that "proffering counter-evidence [can] really be the true therapeutic element in successful CBT for psychosis". Indeed, this was never the case. Very early, it was recognized that presenting counter-evidence

is a strikingly unproductive way to work with delusions (11). Rather, the therapy has always involved understanding the grounds for the person's belief – the unusual experiences and events underpinning it – while validating and empathizing with emotional distress; and exploring with the patient, collaboratively, alternative possibilities, cognitive, emotional and behavioural, in the light of the person's history and social environment.

More recently, informed by the more precise empirical evidence of mechanisms of specific symptom persistence, whether of reasoning biases, negative affect or negative self-concept, the CBT approach is to work with the process (if you like, with the mode or manner of the thinking rather than the content) and thereby to alleviate the delusion and its accompanying distress and impact on everyday life (2).

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DOI 10.1002/wps.20210

Answering some phenomenal challenges to the prediction error model of delusions

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Delusions are a challenge; a menagerie of odd beliefs with a diverse set of differential diagnoses and candidate pathologies (1). Their phenomenology has led many to deem them un-understandable (2). On the other hand, their susceptibility to treatment with D2 receptor antagonists has led many clinicians and scientists to consider them understood.

Delusions are neither fully understood nor un-understandable. 20-50% of patients have residual delusions even after adequate D2 blockade (3). A recent model challenges the un-understandability conclusion, suggesting a bridging hypothesis that unites neural and experiential aspects of delusions through computational theory (1). That hypothesis involves prediction errors (PEs) – the mismatches be-

tween expectation and experience that guide learning, attention, and belief formation and maintenance. If PEs are signaled inappropriately, delusions result (1).

Sass and Byrom (4) highlight some phenomenological challenges to this explanation. Here, I meet those challenges. I will argue that the aberrant PE model can indeed account for some of the more puzzling aspects of delusions, for example the central role of self-experience in delusions, the curious double bookkeeping in which patients may engage, the role of hyposalience (the bizarre as banal), the “anything goes” inferences made by many people with delusions, as well as bizarre delusions that appear to defy understanding.

Sass and Byrom also speculate that the brain default mode network (DMN) may mediate these latter phenomena. I will join them in this speculation, but I will argue that the DMN too is PE driven (5). As such, I will maintain that

PE is still a single factor explanation of delusions, even the most bizarre ones.

Sass and Byrom question whether aberrant PE can explain the centrality of self-experience to delusions, as well as some of the contents of delusions related to inflated self-concept or metaphysics. There is a nascent field examining self-representation in the brain (indeed, this circuitry often overlaps with the DMN). I believe we can conceive of healthy self-experience and ipseity disturbance in the context of PE theory.

PE theory posits that the brain builds hierarchical models to predict the causes of its sensory data (6). Any mismatch between prediction and data can have two consequences: a) it is ignored or overridden by prior beliefs (as is the case with optical illusions), or b) it is transmitted up the hierarchy where it updates the top-down prior with new learning (so expectation is different in the future) (6).