Schizophrenic cognition: Taken out of context?

David R. Hemsley

Psychology Department, Institute of Psychiatry, Denmark Hill, London SE5 8AF, England. **d.hemsley@iop.kcl.ac.uk**

Abstract: This commentary addresses: (a) the problems of definition which have been prominent in the use of the term *context* in schizophrenia research; (b) potentially useful distinctions and links with other theories of schizophrenic cognition; and (c) possible pathways to schizophrenic symptoms. It is suggested that at least two major aspects of the operation of context may be distinguished and that both may be impaired in schizophrenia.

In this stimulating article, the authors define context in terms of its mode of operation rather than in terms of stimulus parameters. This neatly sidesteps the problem of the various ways in which context has been defined in the schizophrenia literature, ranging from task instructions to an immediately preceding simple stimulus. Phillips & Silverstein (P&S) are therefore dealing with what Mayes et al. (1985) refer to as *interactive context.* However, the characteristics of nontarget stimuli will determine whether they influence target processing. Although such factors as temporal and spatial contiguity will play a role, a crucial determinant will be the pattern of stored predictive relationships existing between target and nontarget stimuli, as emphasized by Phillips and Singer (1997a). This is similar to the operation of Broadbent's (1971) "pigeon-holing" mechanism, which acts to bias category state thresholds; a disturbance of this process in schizophrenia was proposed many years ago (Hemsley 1975).

A number of distinctions may be important to an understanding of schizophrenic dysfunctions: (1) Temporal versus spatial context. These may influence the processing of target stimuli in different ways and in many experimental situations may be difficult to disentangle. For example, the situation may be complicated by abnormalities of visual scan paths in schizophrenia (e.g., Green et al. 2000). (2) The parameters of the target/nontarget relationship may crucially affect the nature of the influence observed and the extent of any schizophrenic abnormalities (cf. Strandburg et al. 1997). (3) Context can clearly have both inhibitory and facilitatory effects (cf. Cohen et al 1996). Abnormalities in both inhibitory (e.g., Braff et al. 1999; Hemsley 1994) and facilitatory (e.g., Spitzer 1997) processes have been documented in schizophrenia, although findings on the former, employing a variety of paradigms, appear better established. (4) Linked to (2) is the issue of "tonic" versus "phasic" context. Lubow (1989) goes so far as to define context as "all of those environmental stimuli relatively constant during the course of a procedure" (p. 74). Depending on one's definition of "procedure," this could exclude many findings that have been considered relevant to contextual disturbance in schizophrenia.

The word *context* is derived from the Latin *contexere* – to weave together – and can mean both "the connection of the parts of a discourse" and, more concretely, "the parts which immediately precede or follow any particular passage of text and determine its meaning" (*Standard Oxford English Dictionary*). It is clear that the above definition relates specifically to language, and in fact many of the early studies of schizophrenic contextual disturbance were concerned with language behaviour (e.g., Hemsley & Richardson 1980). However, current research is clearly not restricted to this domain, and the presumed abnormality is claimed to underlie a much wider range of behaviours and experiences characteristic of schizophrenia. Thus, Anscombe (1987) argued that "perceptions are not placed in a context of background knowledge" (p. 256). In similar vein, Hemsley (1994) suggested that it is a failure of context to activate appropriate schema to guide processing that is crucial to the emergence of some forms of delusional beliefs. For example, the application of entirely inappropriate frames of reference to sensory input could correspond to primary delusions.

Although the most straightforward link between contextual disturbance and schizophrenic symptoms is that concerning language behaviour, thought disorder is but one instance of the disorganisation that may characterise psychosis. Jensterle et al. (2000) argue that there are "two sources of constraint on our behaviour which increase its long term coherence and organization" (p. 116). First, there is "contextual priming," roughly equivalent to Shallice's (1988) "contention scheduling system." Second, a "top-down" process, dependent on goals and plans. Failure of either may lead to disorganised behaviour, but it is apparent that at times the latter has also been viewed as a *contextual* disturbance – for example, when *context* is taken to include task instructions. This well illustrates the problems of definition that exist in this area and which the target article goes some way to resolve.

A disturbance in the operation of context has even been invoked to explain the disruption in the "sense of self" that many see as characteristic of schizophrenia (cf. Hemsley 1998). In this paper (Hemsley 1998), I argued that the influence of context may correspond to the "transitive" aspects of conscious experience. In a related formulation, Epstein (2000) suggests that one component of James' (1890) "stream of thought" consists of "a fringe of dimly sensed contextual information" that controls the entry of information into awareness (Epstein 2000, p. 550). Hemsley (1998) argued that the sense of self in normal subjects in part arises from the consistent manner in which context activates stored material to integrate with sensory input; a disturbance in the system is emphasized in the model of schizophrenia put forward by Gray, Hemsley, and their colleagues (e.g., Gray et al. 1991; Hemsley et al. 1993).

To emphasise the breadth of research findings which have been subsumed under the context deficit model, it should be noted that this model has been invoked to explain schizophrenic performance on Latent Inhibition (LI), Negative Priming (NP), and Pre-Pulse Inhibition (PPI) paradigms. Therefore, in Hemsley (1994), I suggested that all involved a weakening of contextually elicited inhibitory processes. While I acknowledged that they appear to be very different, all are heavily dependent on the integration of previously presented material with current sensory input.

It is clear that in the schizophrenia literature, a disturbance in the operation of context has been inferred from numerous paradigms. However, a study by Elvevag et al. (2000) employing a variety of tasks "did not suggest a simple unitary context deficit" (p. 885). This is perhaps not surprising: Even within the field of animal learning theory, at least four different roles for context have been proposed (Hemsley et al. 1993). It is possible that abnormalities in schizophrenia exist in several aspects of the operation of context. A possible way forward is suggested by O'Reilly and Rudy (2001). While accepting the important role of the hippocampus in "encoding conjunctions between context and stimulus elements" (p. 316), they argue that this system must operate in parallel with a contextual system which "integrates over multiple experiences to extract generalities" (p. 311). They emphasize the bidirectional influences operating, and note that "the development of cortical representation can affect the trajectory of hippocampal learning and vice versa." If the development of schizophrenic symptoms is based on circuits involving both frontal and temporal regions (cf. Friston 1998), abnormalities in both aspects of the operation of context might be expected.

https://doi.org/10.1017/S0140525X03310027 Published online by Cambridge University Press