

Obsessive–compulsive disorder patients display enhanced latent inhibition on a visual search task

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Abstract

Latent inhibition (LI) is a phenomenon that reflects the ability to ignore irrelevant stimuli. LI is attenuated in some schizophrenic patient groups and in high schizotypal normal participants. One study has found enhanced LI in patients with obsessive–compulsive disorder (OCD [Swerdlow, N. R., Hartston, H. J., & Hartman, P. L., 1999. Enhanced visual latent inhibition in obsessive–compulsive disorder. *Biological Psychiatry*, 45, 482–488]). The present experiment replicated this finding using a within-subject visual search LI task, with OCD patients displaying more LI than healthy controls. The contrasting LI effects in schizophrenia and OCD are discussed in terms of how these groups differentially process relevant and irrelevant stimuli, and how that outcome affects subsequent behavior.

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Introduction

Obsessive–compulsive disorder (OCD) has been extensively studied at the biological, genetic and psychological levels (for reviews, see Aouizerate et al., 2004; Kuelz, Hohagen, & Voderhozer, 2004; Wilson, 1998). In the past two decades, cognitive psychologists have explored the relationship between OCD and information processing variables, particularly those that index attentional processes. However, a recent review of the literature (Kuelz et al., 2004), covering studies of visual reaction time, speed of information processing, attention span, sustained attention, set shifting, and selective attention, concluded that, “There is little evidence...for dysfunctional basic attention (abilities) in OCD patients”.

Of the various attentional processes that have been studied in OCD, selective attention is particularly relevant, as distractibility by irrelevant stimuli is often observed in these patients (Kuelz et al., 2004). Whereas

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in Kuelz et al.'s review, selective attention is indexed only by the Stroop paradigm, several studies have examined selective attention in OCD using other methodologies. Enright and Beech (1990, 1993a) combined the Stroop task with a negative priming task (NP; Tipper, 1985). Patients with OCD displayed reduced NP effects compared to non-patients and to patients with other anxiety disorders. In another study, OCD patients displayed no evidence of NP while showing facilitation, rather than inhibition, on a semantic NP task (Enright & Beech, 1993b).

Enright and Beech interpreted these findings as indicating reduced cognitive inhibition in OCD. They contended that patients with OCD are deficient in their ability to selectively attend to relevant stimuli while filtering out irrelevant stimuli, both external and internal. A study by Clayton, Richards, and Edwards (1999), using the Test of Everyday Attention, reached very similar conclusions. Finally, Okasha et al. (2000) found that patients with OCD were over-attentive to irrelevant stimuli and displayed delayed attention to relevant tasks. They also were deficient in their ability to shift cognitive sets, a finding that has been reported by others (Head, Bolton, & Hymas, 1989; Lucey et al., 1997; Veale, Sahakian, Owen, & Marks, 1996).

Another useful tool for assessing the effects of irrelevant stimuli on subsequent behavior is the latent inhibition (LI) procedure (Lubow, 1989). The LI phenomenon is observed when a previously irrelevant stimulus becomes weakened in its ability to contribute to new learning as compared to a novel stimulus. This robust selective attention effect has been demonstrated with a variety of learning paradigms and across many different species (for reviews, see Lubow, 1989, 2005). The normal LI effect has been interpreted as being the result of a decline of stimulus-specific attention during a preexposure (PE) stage, the consequence of which is that subsequent associations with that stimulus are more difficult to acquire or express as compared to a novel stimulus or a previously attended one. (For alternative explanations of LI based on competition/retrieval concepts, see Bouton, Nelson, & Rosas, 1999; Miller & Escobar, 2002.)

Numerous studies have demonstrated that LI can be used to index dysfunctional attentional processing in pathological groups. When LI is attenuated, as in non-medicated schizophrenic patients with positive symptoms (e.g., Gray, Hemsley, & Gray, 1992; Gray, Pilowsky, Gray, & Kerwin, 1995; but see Swerdlow, Braff, Hartston, Perry, & Geyer, 1996), it is usually attributed to high levels of distraction, such that during the PE stage attention to the preexposed stimulus is maintained rather than reduced. Conversely, when LI is potentiated, this may indicate an inability to shift from a previously learned association to a new one. This condition may have two independent sources. In the PE stage of an LI experiment, the patient learns two associations: an association between an irrelevant stimulus and the absence of a consequence (A-0), and an association between a relevant stimulus and the presence of a consequence (B+). In the test stage, where the relationships are reversed (A+, B-0), potentiated LI may result from a failure to abandon either one or both of the associations that were learned in the PE stage. In either case, there would appear to be something akin to an attentional rigidity, an inability to “switch sets” when the previously irrelevant stimulus becomes the currently relevant target. Such attentional inflexibility also can be described in terms of controlled and automatic attentional processes (Schneider & Shiffrin, 1977), or, relatedly, implicit and explicit processes. By the end of the PE stage, the process underlying the ignoring of the irrelevant stimulus by normal participants has moved from the fully controlled (explicit) mode towards increased automaticity (implicit mode). When a switch is made from the PE-stage to the control-demanding test-stage, test-trials that contain targets that were distractors in the PE phase will be responded to more slowly than those trials that have novel targets (Lubow & Kaplan, 2005). Therefore, groups that are deficient in set switching, such as OCD patients, should exhibit potentiated LI relative to healthy controls.

The evidence related to attention deficits in OCD motivated Swerdlow and his colleagues to examine LI in OCD patients. In the first of two studies, Swerdlow et al. (1996), using an auditory LI task that has been effective in detecting reduced LI in schizophrenic patients (e.g., Baruch, Hemsley, & Gray, 1988), failed to find LI differences between OCD patients and normal controls. The authors reasoned that the absence of enhanced LI in OCD may have been the result of using auditory stimuli and/or a ceiling effect produced by task difficulty. Indeed, with a relatively easy visual task, Swerdlow, Hartston, and Hartman (1999) did obtain potentiated LI in OCD patients as compared to non-anxious controls. The authors interpreted their results as indicating that patients with OCD have difficulty in switching cognitive sets, as indicated by the delay in learning that previously irrelevant stimuli have become relevant. However, they used a new between-subject LI procedure for which there was no comparable data from other pathological groups. In addition, the LI effect

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