

Hemispheric laterality and dissociative tendencies: Differences in emotional processing in a dichotic listening task

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Abstract

The present work investigates whether the hemispheric processing of both verbal and emotional stimuli, studied by means of a dichotic listening task, differs between normal high and low dissociators as assessed by the Dissociative Experiences Scale (DES; Bernstein & Putnam (1986). Development, reliability and validity of a dissociation scale. *Journal of Nervous and Mental Disease*, 174(2), 727–735). Two groups of subjects (50 high and 50 low dissociators), participated in the experiment. The task consisted in identifying both verbal and emotional stimulus-targets, respectively, on successive sessions. Reaction time and response accuracy were registered and analysed using ANOVA (Analysis of Variance). The interaction between stimuli (verbal, emotional), channel (right ear, left ear), and dissociation level (high, low) reached statistical significance in terms of accuracy measures (d' : $F(1, 98) = 4.75$; $p < .05$). Both high and low dissociators exhibited the expected right ear advantage (REA effect) on verbal targets. On the other hand, whereas low dissociators exhibited the expected left ear advantage (LEA effect) on emotional targets, high dissociators failed to follow this typical pattern of hemispheric asymmetry: both hemispheres exhibited similar performances. These results confirm the hypothesis that dissociation is related to changes in hemispheric processing, specifically of emotional information.

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1. Introduction

The concept of dissociation refers to a disruption in the usually integrated functions of consciousness, memory, identity, or perception of the environment (DSM-IV; APA, 1994). Some authors have pointed out (e.g. Kihlstrom, Glisky, & Angiulo, 1994) that the category of dissociative disorders holds a special status in psychopathological taxonomy because the name of the syndrome suggests the hypothetical process underlying it. Thus, dissociation is assumed to be the mechanism involved in the disruption of mental functions which causes dissociative disorders. Dissociative symptoms and syndromes include distorted sensorial perception, depersonalization, derealization, dissociative amnesia, conversion disturbances, fugue states, and dissociative identity

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disorder or multiple personality (Krystal, Bremner, Southwick, & Charney, 1997). Although the term dissociation was adopted from clinical grounds (Janet, 1989), non-pathological dissociative experiences are usual among the general population, being commonly accepted that there is a continuum from normal daily dissociative experiences to abnormal psychopathological forms of dissociation (Bernstein & Putnam, 1986; Kihlstrom et al., 1994; Orbach, 1994; Spiegel & Cardeña, 1991). Thus, normal individuals differ in the extent to which they report dissociative experiences. The Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) is a self-report measure used to assess the tendency to dissociate, discriminating between high and low levels of dissociation within normal limits, as well as potential pathological ones (Bernstein Rosser-Hogan, 1991; Carlson & Putnam, 1993; Ross, Shaun Joshi, Raymond Currie, & Anderson, 1990; Steinberg, Rounsaville, & Cicchetti, 1991). Taking into account that levels of dissociation range from normality to pathology, a distinction should be made between normal forms of dissociation (involved in common everyday experiences such as transient attention lapses) and dissociative disturbances (major forms of dissociation leading to a pathological failure to integrate thoughts, feelings, memories, and actions into a coherent and unified sense of consciousness) (Atchinson & McFarlane, 1994). The existence of normal forms of dissociation among the general population has helped to raise general interest in the knowledge of the psychological and neurophysiological bases of dissociative processes.

Little is known about the psychological and neurophysiological mechanisms involved in dissociation. The main psychological functions affected by dissociative processes are emotion, memory, and consciousness; and it has been postulated that underlying mechanisms are related to attention parameters (Freyd & DePrince, 2001; Freyd, Martorello, Alvarado, Hayes, & Christman, 1998). Normal high dissociators show greater interference in a standard Stroop task and less interference in a dual-task Stroop task than low dissociators, suggesting that high dissociators may be better at divided attention and worse at focused attention than low dissociators (DePrince & Freyd, 1999; Freyd et al., 1998). Recently, however, results from an event-related potential study have shown high dissociators to have enhanced divided and focused attention abilities (Ruiter, Hans Phaf, Veltman, Kok, & van Dyck, 2003).

Dissociative tendencies also have implications for memory processes. In a free recall task, high dissociators remembered fewer emotionally charged words than low dissociators (Holtgraves & Stockdale, 1997). In a directed forgetting task, high dissociators remembered fewer emotionally charged words than neutral words; low dissociators, on the contrary, remembered more neutral words than emotional words (Freyd & DePrince, 2001). Dissociation seems to be related also to working memory. High dissociators showed a larger verbal working memory span than low dissociators (Ruiter, Phaf, Elzinga, & van Dyck, 2004). As a whole, these studies indicate that, within normality, dissociation is related to changes in attention and memory processes. Differences between normal high and low dissociators suggest that dissociation is related to particular ways of cognitive processing, considered as a dissociative style (Ruiter et al., 2003, 2004).

Several studies in different fields of research have led to establish a relationship between dissociation and hemispheric laterality, both in clinical and experimental work. In clinical research, the analysis of neuropsychological and neurophysiological EEG evidences has led to suggest that in chronic hysteria (relabelled under conversion disorders within the category of somatoform disorders in DSM-IV), a disruption of the inhibitory regulation from the left to the right hemisphere results in right overactivation which produces neuropsychological disorganization in the right hemisphere, that is, abnormal right hemisphere organization (Flor-Henry, 1994). Changes in laterality measures, such as handedness associated to different personalities, as well as in hemispheric performance in psychological tasks and hemispheric EEG activity, have also been observed in patients suffering from dissociative identity disorder (corresponding to the old diagnosis of multiple personality) (Flor-Henry, 1994; Henninger, 1992; Marinos, 1998). These clinical studies support the hypothesis that pathological dissociation is related to changes in hemispheric laterality.

The relationship between dissociation and laterality has also been studied in normal subjects. Recently, Spitzer et al. (2004) have tested, using a transcranial magnetic stimulation approach, the hypothesis that dissociation may represent a functional disconnectivity syndrome. Results showed that high dissociators had lower left hemisphere excitability, when compared to the right hemisphere excitability, whereas this difference was absent in low dissociators. High dissociators also showed a shorter transcallosal conduction time from the left to the right hemisphere than low dissociators. The authors interpreted their results as suggesting that dissociation involves a cortical asymmetry consisting in a functional superiority of the left hemisphere over the

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