



IMPULSIVITY AND ANXIETY DIFFERENCES IN COGNITIVE INHIBITION

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Summary—An identity negative priming task was employed to investigate cognitive inhibition in 245 undergraduates. The task presented consecutively a prime and a probe display that contained a target and a distractor. Negative priming is observed when subjects must respond to a target in the probe display that had been a distractor in the prime display. This task also served to study the Eriksen interference effect by comparing a condition in which the target and the distractor had the same identity with a condition in which they had different identities. Subjects completed the Sensitivity to Punishment and Sensitivity to Reward Questionnaire designed to measure Gray's anxiety and impulsivity dimensions. Results showed that impulsives had a lower cognitive inhibition than non-impulsives, whereas impulsive women also showed a greater Eriksen interference effect than non-impulsive women. Furthermore, no differences in task performance were found between anxious and non-anxious groups. Our discussion considers the importance of studying cognitive functioning in personality research. © 1997 Elsevier Science Ltd. All rights reserved

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INTRODUCTION

The purpose of this study is to investigate anxiety and impulsivity differences in negative priming. Research in this field has shown that a reduced cognitive inhibition is observed in children, the elderly, schizophrenics and subjects with schizotypal personality traits. However, recent research has also found differences in the performance of these tasks arising from other personality traits such as impulsivity and anxiety.

Negative priming tasks measure differences in cognitive inhibition (Tipper, 1985). The most widely used versions of the task are identity and semantic negative priming. Identity negative priming refers to an increase in reaction time to the target in a probe display that had appeared as a distractor in the immediately preceding prime display. Semantic negative priming occurs when distractor and a later target are semantically related. A more recent version, called location negative priming task, consists of an increase in reaction time to a target appearing in the location that was previously occupied by a different distractor in the prime display (Tipper, Brehaut & Driver, 1990). The most common explanation of the negative priming effect is that some time after a target selection, the activated representation of the distractor is suppressed or decoupled from potential effectors (Neumann & DeSchepper, 1991; Tipper & Cranston, 1985). If this distractor or its location becomes the target in the following trial, the inhibition takes some time to dissipate, slowing the response time to the target. However, Neill, Valdes, Terry and Gorfein (1992) have offered an alternative view based on Logan (1988)'s theory of automatization. Following this view, the presentation of a stimulus automatically evokes the retrieval of the most recent episode involving that stimulus. If this stimulus was a distractor in the preceding trial, an ignore-it tag is automatically retrieved, and this sets off a competition with the actual requirement of responding to it. This response competition would cause the negative priming effect. In short, both inhibition and episodic retrieval approaches could separately contribute to explain negative priming (Fox, 1995; May, Kane & Hasher, 1995).

Negative priming is a robust phenomenon observable with a wide variety of experimental stimuli

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and responses (Houghton & Tipper, 1994). The effect is observed even when the distractor in the prime display and the target in the probe display are presented in different perceptual modalities, showing that the effect is not due to repetition priming (Driver & Baylis, 1993). The effect has also been observed when subjects are required to make different types of responses to the prime and probe displays, indicating that the effect is not associated with specific motor responses (Tipper, MacQueen & Brehaut, 1988). This consistency of negative priming across different procedures has led Tipper to hypothesize the existence of a specific locus for the inhibition function between perception and action (Tipper, 1991).

Individual differences in negative priming have been studied in many different populations. The degree of negative priming has usually been interpreted as an indicator of the strength of the inhibitory process: less negative priming should indicate weaker inhibitory processes and hence, greater interference of distractors over targets. Populations classically cited as showing a lower or null negative priming are children (Tipper, Bourque, Anderson & Brehaut, 1989), children with Attention Deficit Disorder with Hyperactivity (ADDH; McLaren, 1989, cited by Houghton & Tipper, 1994), the elderly (Hasher, Stolfus, Zacks & Rypma, 1991), schizophrenics (Beech, Powell, McWilliam & Claridge, 1989), subjects with schizotypal personality traits (Beech & Claridge, 1987), patients with obsessive-compulsive disorder (Enright & Beech, 1990, 1993a, 1993b) and subjects scoring high on the Cognitive Failure Questionnaire (CFQ; Tipper & Baylis, 1987). The populations that have been the subject of most research are children, the elderly, and schizophrenics. These groups have shown a lower magnitude of identity and semantic negative priming, but not in location negative priming tasks (see May *et al.*, 1995, for a recent review). However, some studies have found other personality correlates of negative priming.

Tipper and Baylis (1987) studied differences in selective attention in subjects scoring high and low in the CFQ (Broadbent, Cooper, Fitzgerald & Parkes, 1982). This questionnaire was constructed to measure everyday failures in selective attention, and correlates slightly and positively with the Neuroticism scale of the Eysenck Personality Questionnaire (Broadbent *et al.*, 1982; Matthews & Wells, 1988). High CFQ scorers have shown a greater interference by distractors across different paradigms (Broadbent, Broadbent & Jones, 1986; Tipper & Baylis, 1987, Experiment 1), suggesting a less efficient selection of targets when distractors are present. In their second experiment, Tipper and Baylis (1987) found that subjects with high scores on the CFQ had a lower magnitude of identity negative priming than low scorers. They concluded that the inefficient selection of high CFQ scorers is due to a failure in distractor inhibition.

More recent studies have investigated impulsivity (Visser, Das-Smaal & Kwakman, 1996) and anxiety differences (Fox, 1994) in negative priming. Visser *et al.* (1996) studied identity negative priming in children rated high or low by their teachers for either cognitive or social impulsivity. The negative priming effect was studied using the Stroop colour-word paradigm, that also yields a measure of interference. High socially impulsive children showed a reduced negative priming if compared with low ones, but no differences between groups were observed in the magnitude of interference. High and low scorers on cognitive impulsivity did not differ in their performance of the task.

Anxiety differences in negative priming have been studied in patients with anxiety disorders and in trait-anxious normal subjects. Enright and Beech (1993a) showed that the magnitude of identity negative priming was not equivalent in different anxiety disorders: obsessive-compulsive disorder patients showed a reduced negative priming when compared with patients with agoraphobia, monophobia, social phobia, panic disorder, and generalized anxiety disorder. These differences were obtained in two different negative priming procedures: the Stroop Task and a task consisting of naming letters coloured in red while ignoring an adjacent letter coloured in green. In another study, Enright and Beech (1993b) reported that patients with obsessive-compulsive disorder also showed a reduced semantic negative priming (i.e. a slowing of responses to targets associated semantically with distractors in the preceding trial). This lower cognitive inhibition in patients with obsessive-compulsive disorder was interpreted as the mechanism that allows the entry of unwanted intrusions into consciousness, making it more difficult to suppress these specific thoughts.

Fox (1994) has studied location negative priming in a sample of students classified according to the Spielberger Trait-Anxiety Inventory. The task yielded both interference and negative priming measures. Her results showed a lower negative priming in high trait-anxious subjects when compared

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