



## EXPLICIT AND IMPLICIT MEMORY BIAS IN SOCIAL PHOBIA. THE ROLE OF SUBDIAGNOSTIC TYPE

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**Summary**—Forty-five patients with social phobia and 45 normal controls were compared on explicit memory (cued recall) and implicit memory (word stem completion) for positive, neutral, social threat, and physical threat words. Although there were no significant differences between the social phobics and the normal controls, the subgroup of patients with non-generalized social phobia showed an implicit memory bias for social threat words. The results are discussed in terms of a critical analysis of the concept of implicit memory bias, which is operationalized as the difference between a bias on primed and unprimed words, and where the latter represents a “baseline bias”. In the present study, this baseline word completion bias for social threat words showed a strong negative correlation ( $r = -0.72$ ) with the implicit memory bias for social threat words, and showed positive correlations with several psychopathology-related measures among the social phobics. It is suggested that future research should consider results on both implicit memory bias and its corresponding baseline bias. The possibility is discussed that implicit memory bias and baseline bias may serve as indexes of externally and internally generated priming effects, and that the relative contributions of external and internal priming may differ in different subtypes of social phobia. © 1997 Elsevier Science Ltd

### INTRODUCTION

Research on memory bias in anxiety disorders has showed that memory bias may differ: (1) between various anxiety disorders, and (2) between different kinds of memory tasks in Ss with the same anxiety disorder. First, there is more evidence of memory bias in patients with panic disorder (Amir, McNally, Riemann & Clements, 1996; Cloitre & Liebowitz, 1991; Cloitre, Shear, Cancienne & Zeitlin, 1994; McNally, Foa & Donnell, 1989) than in patients with other anxiety disorders. Second, there is some evidence of an implicit memory bias for threat words in patients with generalized anxiety, even when they show no evidence of an explicit memory bias (Mathews, Mogg, May & Eysenck, 1989a; MacLeod & McLaughlin, 1995).

In the case of social phobia, there is as yet no evidence of a memory bias for social threat words (Cloitre, Cancienne, Heimberg, Holt & Liebowitz, 1995; Rapee, McCallum, Melville, Ravenscroft & Rodney, 1994), although Lundh and Öst (1996b) found evidence of a memory bias for critical faces in social phobics. The main purpose of the present study was to test for the existence of an explicit and implicit memory bias for social threat words in patients with social phobia, by using basically the same procedure as that used by Mathews *et al.* (1989a) with GAD patients. This involved the use of four categories of words (positive, neutral, social threat, and physical threat), self-referenced imagery as encoding task, and two memory tasks—one for explicit memory (cued recall) and one for implicit memory (word stem completion). Bias for social threat words was defined as performance on social threat words subtracted with performance on neutral words.

On explicit memory tasks, the S is asked for his or her conscious recall or recognition of information presented during the encoding stage of the experiment. On implicit memory tasks, on the other hand, the S is not asked to retrieve this information, but is given a task which will show retention of this material more indirectly. There are a number of different measures of implicit memory, e.g. word stem completion, word fragment completion, lexical decision, anagram solution, tachoscopic identification, etc., which do not always correlate (Roediger *et al.*, 1989). The present study used a word stem completion task; this choice, however, was not dictated by theoretical considerations, but by the fact that this was the first task on which evidence was found of an implicit memory bias in anxiety patients (Mathews *et al.*, 1989a).

In the original study by Mathews *et al.* (1989a), after which the present study was modeled, the Ss were shown 64 three-letter word stems, and were asked to complete these word stems with the first word that came to mind. Thirty-two of these word stems were *primed*, in the sense that they represented the three initial letters of words presented in the encoding phase, whereas the remaining 32 were *unprimed*. The number of primed word completions minus the number of unprimed word completions was used as the measure of *implicit memory*. The concept of *implicit memory bias* was operationalized as the difference between the implicit memory for threat words and the implicit memory for non-threat words.

Theoretically, it is relevant to point out that this measure of implicit memory *bias* for threat words is equivalent to the word completion bias for threat words *on primed words* (i.e. the number of completions of primed threat words subtracted with the number of completions of primed non-threat words) minus the word completion bias for threat words *on unprimed words* (i.e. the number of completions of unprimed threat words subtracted with the number of completions of unprimed non-threat words). That is, the measure of bias for threat words *on unprimed words* represents a kind of 'baseline bias' in the computation of the measure of implicit memory bias. A theoretically relevant question here is what happens when an anxiety patient is presented with a word stem which belongs to an *unprimed* threat word—will he or she then be more inclined than a normal *S* to respond with the unprimed threat word? This is partly analogous to other tasks with ambiguous stimuli (e.g. homophones), where anxiety patients have been found to be more inclined to interpret the ambiguous stimulus as threatening than normal Ss (e.g. Eysenck, MacLeod & Mathews, 1987; Mathews, Richards & Eysenck, 1989b). If anxiety patients are assumed to think relatively more threatening thoughts than other persons, then this might be expected to result in a cognitively generated 'self-priming' for threat words in anxiety patients, which might lead to a bias for threat words also in the completion of words which have not been primed as part of the experimental procedure. What is being referred to as 'baseline bias' in this paper, then, would not represent a bias on words which are unprimed in any absolute sense, but would rather be the result of a spontaneously generated 'self-priming', which may be assumed to differ between anxiety patients and normal controls. In order to explore the possible relevance of this kind of baseline bias in the present study, an index of baseline bias for social threat words was calculated by subtracting the number of word completions of unprimed social threat words with the number of word completions of unprimed neutral words.

A further question that was explored is whether different subtypes of social phobia may differ on bias measures. In DSM-III-R (American Psychiatric Association, 1987), a generalized subtype of social phobia was introduced, defined by fear of 'most social situations', and there is evidence (Mannuzza *et al.*, 1995) that the DSM-III-R subtypes can be reliably distinguished in clinical samples.

Operational criteria for distinguishing between generalized and specific (or 'non-generalized') subtypes of social phobia have been used in several studies (e.g. Stemberger, Turner, Beidel & Calhoun, 1995; Turner, Beidel & Townsley, 1992). In these studies, patients are given a 'specific' or 'non-generalized' subtype diagnosis if they fear only circumscribed situations such as giving speeches, speaking in meetings, eating or writing in public, and/or using public restrooms. Stemberger *et al.* (1995) found evidence that these subtypes differ on personality traits and possible mode of onset: social phobics of the generalized subtype had a more frequent history of shyness, and scored significantly higher on neuroticism, and significantly lower on extraversion, whereas social phobics of the specific subtype showed a significantly higher frequency of traumatic conditioning episodes. There is also evidence that specific social phobics (public speaking phobics) show greater heart rate reactivity in a challenge situation than generalized social phobics (Heimberg, Dodge, Hope & Becker, 1989; Hofmann, Newman, Ehlers & Roth, 1995; Levin *et al.*, 1993). In view of these differences, it may be of interest to compare the different subtypes also on measures of cognitive bias.

Finally, one purpose of the present study was to explore the meaning of the various kinds of bias by studying their intercorrelations and their correlations with other psychopathology-related measures. All Ss were therefore administered Frost, Marten, Lahart and Rosenblate's (1990) Multidimensional Perfectionism Scale (MPS) and Fenigstein, Scheier and Buss' (1975) Self-Consciousness Scale (SCS). The latter includes one subscale for Private Self-Consciousness (i.e.

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