Pergamon

S0005-7967(96)00080-0

Behav. Res. Ther. Vol. 35, No. 1, pp. 29–34, 1997

0005-7967/97 $17.00 + 0.00

PRECONSCIOUS PROCESSING BIAS IN SPECIFIC PHOBIA

MARCEL VAN DEN HOUT,* NIENKE TENNEY, KARIN HUYGENS and PETER DE JONG

Department of Experimental and Abnormal Psychology, University of Limburg, PO Box 616, 6200 MD, Maastricht, The Netherlands

(Received 16 July 1996)

Summary—The occurrence of processing bias manifested by the modified Stroop task does not require that the subjects be aware of the stimuli presented. Earlier studies have shown that even when stimuli are backwardly masked so that conscious identification is prevented, patients suffering from Generalised Anxiety Disorders slow down colour-naming masks that are preceded by threatening words. In non-patient samples, processing bias on the modified Stroop task is related to the level of trait anxiety. We tested whether this preconscious processing bias is related to anxiety *per se* and whether it also occurs in specific phobias. Indeed, in a group of 37 spider phobics, the intensity of phobic complaints was significantly associated with interference measures on both the masked and the unmasked modified Stroop task. Preconscious processing bias was not associated with treatment gain. Interference on the masked and unmasked Stroop task was reduced after treatment. Though the lack of a no treatment control group precludes definite conclusions, our findings suggest that preconscious biases are influenced by behaviour therapy. Results are critically discussed. Copyright © 1997 Elsevier Science Ltd

INTRODUCTION

Anxiety patients favour processing threat-related information over neutral information (Logan & Goetsch, 1993), and this 'processing bias' may serve to maintain the disorder (Eysenck, 1992). Findings with a backwardly masked, modified Stroop task indicate that negative information does not necessarily have to be consciously perceived in order to be selectively processed. That is, compared to healthy controls, anxiety patients take longer to colour-name threat words than neutral words, even when the words are backwardly masked and cannot be consciously perceived. Using this paradigm, two studies showed that this preconscious processing bias occurs in Generalised Anxiety Disorders (GADs) (Mogg, Bradley, Williams & Mathews, 1993; Bradley, Mogg, Millar & White, 1996). High trait anxiety may be conceptualised as a subclinical form of GAD; indeed, three studies with non-patient samples indicated that the same processing bias for subliminally presented threat cues is related to the degree of trait anxiety (Macleod & Hagan, 1992; Macleod & Rutherford, 1992; van den Hout, Tenney, Huygens, Merckelbach & Kindt, 1995). However, it is worth noting that high trait anxiety scores and a diagnosis of GAD are not only associated with anxiety *per se* but also with a broader range of symptoms, such as neuroticism, anxiety sensitivity, and elevated scores on the SCL-90.

We administered the masked Stroop task to a group of spider phobics whose fears are highly circumscript and who typically do not suffer from other psychological problems. Based on the premise that preconscious processing bias is associated with anxiety *per se*, it was predicted that the severity of spider phobia would be related to preconscious processing bias and that this association would remain intact when measures of neuroticism, anxiety sensitivity and other psychological problems were controlled for.

In a cross sectional (van den Hout *et al.*, 1995) and a prospective (Macleod & Hagan, 1992) study, it was found that interference on the masked Stroop task was associated with emotional vulnerability. Yet, while preconscious prioritizing of negative information may predict vulnerability to real-life stress, this may not hold true for treatment prognosis. Earlier studies found that pre-treatment physiological reactivity to feared cues predicts a good outcome (Lang,

*Author for correspondence.

MeLamed & Hart, 1970; De Jong, Merckelbach & Arntz, 1991). A plausible explanation is that this reactivity reflects a low activation threshold of a hypothetical fear network, while its activation may be a prerequisite for emotional processing and, thus, good outcome (Foa & Kozak, 1986). Interference on the masked Stroop task, like physiological reactivity to threat cues, may indicate that the fear network has a low activation threshold and may, therefore, predict good outcome. Testing this was the second aim of the study.

Cognitive bias, as measured by the unmasked Stroop task, wanes after successful therapy (Lavy, van den Hout & Arntz, 1993; Mattia *et al.*, 1993; Matthews, Mogg, Kentish & Eysenck, 1995), and according to Mogg *et al.*'s recent study of 11 GAD patients (Mogg *et al.*, 1995), processing bias on the masked Stroop task also declines after treatment. We were able to obtain post-therapy scores on the Stroop tasks for 21 of the 40 spider phobics in the present study. Acknowledging that the lack of a no treatment control group precludes definite conclusions, we tentatively explored whether, in spider phobics, one-session treatment leads to a decrease in processing bias on the unmasked, and especially the masked, versions of the Stroop task.

METHOD

Subjects and treatment

Forty females (mean age 29.5 yr) who met the DSM-IV criteria for spider phobia were recruited via advertisements in local newspapers. In exchange for participating in our research project, they received a one-session treatment (for details of the treatment, see e.g. Arntz & Lavy, 1993), which was shown to yield good clinical results.

Assessments and procedure

Treatment effects were defined as the reduction in scores on the Spider Phobia Questionnaire (SPQ; Klorman, Weerts, Hastings, MeLamed & Lang, 1974) and on a Behaviour Avoidance Test (BAT). The SPQ measures subjective fear of spiders by way of 31 yes/no questions and has been recommended as outcome measure. During the BAT, *S*s were asked to come as close as they dared to a jar containing a spider. Performance was scored on a 13-point scale (for details of the BAT, see Arntz, Merckelbach & de Jong, 1993). SPQ and BAT were administered before and after treatment.

The presence and severity of non spider phobic problems were measured with the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Garsky & McNally, 1986), the Neuroticism subscale of the Eysenck Personality Inventory (EPI; Eysenck & Eysenck, 1964), and the Symptom Checklist (SCL-90; Arrindell & Ettema, 1980).

Stimulus words for the Stroop tasks were depicted on slides and projected on a screen approximately 2.5 m in front of the *S*. The size of the words was 26–54 cm × 9 cm. Each presentation was preceded by 1-sec warning tones, and the interval between slides was 3 sec. A compare shutter, directed by a Compaq Deskpro 386/25e PC, assured slide onset. Subjects held a microphone in their hands that was connected to a voice level detector that stopped the computer's clock at the initiation of the *S*s vocal response. At that moment, slide presentation terminated. Unmasked target words were presented in red, yellow, blue and green; the same colours were used in the masked condition. In the latter condition, the target word was replaced after 20 msec by a mask consisting of a randomly selected letter string of as many letters as the masked word. Masks and masked words had identical colours and were projected by different Kodak carousels that were directed by the same PC. There were four types of stimuli: unmasked spider words, unmasked neutral words, masked spider words and masked neutral words. Spider words included: *hidden*, *spider*, *web*, *creep*, *legs*, *fear*, *hairy* and *insect*. Neutral words were matched for number of syllables, and frequency in Dutch. They were: *percentage*, *square*, *potato*, *month*, *fork*, *blanket*, *pen* and *pocket*. Each word was presented in each of the four colours under both masked and unmasked conditions. Thus, each of the 16 words was presented eight times. The order of administration was random, with the restriction that neither a particular colour nor a particular word type (spider vs neutral), nor a condition (masked vs unmasked) was presented more than three consecutive times. Threat interference was computed for each *S* by