Covariation bias and the return of fear

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Summary—Several studies have indicated that phobic fear is accompanied by a covariation bias, i.e. that phobic Ss tend to overassociate fear-relevant stimuli and aversive outcomes. Such a covariation bias seems to be a fairly direct and powerful way to confirm danger expectations and enhance fear. Therefore, it has been suggested that covariation bias is an important factor in the maintenance of phobic fear. However, thus far there are no empirical data available to exclude the alternative possibility that covariation bias is a mere epiphenomenon of fear. To explore the “causal” status of covariation bias, successfully treated spider phobics who participated in an earlier study on covariation bias were asked to complete a Spider Phobia Questionnaire at 2 yr follow up. Results indicate that Ss who displayed a covariation bias immediately after treatment are more vulnerable to relapse than Ss who did not show such a bias. This finding strengthens the idea that covariation bias may enhance fear, thereby contradicting the suggestion that covariation bias is a mere epiphenomenon of phobic fear.

INTRODUCTION

In a series of experiments Tomarken, Mineka and Cook (1989) demonstrated that Ss have the tendency to overassociate fear-relevant stimuli and aversive outcomes. In these experiments, Ss were shown a large series of fear-relevant (snakes or spiders) and fear-irrelevant (flowers and mushrooms) slides. Immediately at slide offset one of three outcomes occurred: an aversive shock, a tone, or nothing. All slide/outcome combinations were presented equally often. In other words, the conditional probability of a certain outcome given a certain slide was always 1/3. After the experiment proper Ss were asked to rate how often each slide type was followed by each outcome. Although all slide/outcome combinations occurred equally often, Ss typically overestimated the covariation between fear-relevant slides and aversive shocks. This so-called ‘covariation bias’ appeared to be particularly strong in high fear Ss. Further research of de Jong, Merckelbach, Arntz and Nijman (1992) with clinical rather than analog spider phobics confirmed that phobic fear is, indeed, an important determinant of such a covariation bias. In that study it was found that untreated women who were spider phobic strongly overestimated the covariation between phobia-relevant slides and shock whereas successfully treated phobics did not.

It has been suggested that a bias to overestimate the contingency between phobic stimuli and aversive events logically serves to confirm and/or enhance fear (e.g. Mineka & Sutin, 1992; de Jong & Merckelbach, 1993). That is, fear may induce covariation bias; in turn, covariation bias sustains/enhances perceived threat; perceived threat maintains/intensifies fear, etc. Thus, covariation bias would be an important factor in the maintenance and enhancement of phobic fear. However, despite its face validity no empirical data are available to confirm or disconfirm the presence of a reciprocal relationship between covariation bias and phobic fear. Although both the finding that especially high fear Ss show a covariation bias (Tomarken et al., 1989) and the finding that this bias can be reduced as a result of treatment (de Jong, Merckelbach, Arntz & Nijman, 1992; de Jong & Merckelbach, 1993) fit with the presumed relationship, neither of these findings excludes the alternative possibility that covariation bias is a mere epiphenomenon of phobic fear.

Yet, a critical implication of the proposed reciprocal relationship between phobic fear and covariation bias would be that successfully treated phobics who nevertheless show a post-treatment covariation bias, are more vulnerable to relapse than Ss who do not display such a post-treatment bias. That is, the residual bias would enhance the perceived threatfulness of the phobic cue, thereby increasing the likelihood that phobic fear becomes reinstated. The present experiment tested the prediction that a residual covariation bias is a good predictor of relapse by asking Ss who participated in an earlier study on covariation bias (de Jong & Merckelbach, 1993) to complete a Spider Fear Questionnaire (SPQ; Korman, Weerts, Hastings, Meltzoff & Lang, 1974) at 2 yr follow up.

METHOD

Subjects

Subjects were 19 treated spider phobics who participated in an earlier study on covariation bias and phobic fear (de Jong & Merckelbach, 1993). All Ss were women. In that study, subjects underwent an intensive one-session exposure treatment along the lines of Öst (1989). Before and after the treatment session subjects completed the SPQ. The SPQ is a validated 31 item self-report instrument that measures fear of spiders (Fredrikson, 1983). SPQ scores can range from 0 to 31. Immediately after the treatment session, Ss also underwent an illusory correlation paradigm (see below) to assess residual covariation bias. After 2 yr, Ss were invited to complete the SPQ a third time. From the 19 phobic Ss who participated in that study, 13 Ss (68%) returned the SPQ at follow up. The 6 remaining Ss were moved to an unknown address and could not be traced. The treatment effects as indexed by self-reported fear and behavioral measures were similar for Ss who returned and Ss who did not return the follow-up SPQ.
Procedure and data reduction

In the study of de Jong and Merckelbach (1993), Ss were exposed to a series of 72 slides. There were three different categories: slides of flowers, weapons, and spiders. Immediately at slide offset one of three outcomes occurred: a shock, a snare or nothing. All slide/outcome combinations were presented equally often, the conditional probability of a particular outcome given a certain slide being exactly 1/3. After the experiment Ss were asked to rate to what extent each of the slides was followed by each of the outcomes (ranging from 0—not at all to 100—always). For each S the sum of the three a posteriori reported stimulus/shock estimates was set at 100%, to facilitate comparison between Ss regarding their spider/shock covariation estimates. Thus, covariation bias was expressed as the spider/shock estimate divided by the sum of all three stimulus/shock estimates. Relapse was indexed by SPQ_{post} minus SPQ_{pre-treatment} (i.e., higher scores indicate larger relapse). To test the hypothesis under consideration, a Pearson r—m correlation was computed between covariation bias and relapse.

RESULTS AND DISCUSSION

Treatment effects

In general the treatment yielded good immediate and long-term results. Mean SPQ decreased from 22.4 during the pre-treatment assessment to 11.2 after the second treatment session, r(12) = 7.4, P < 0.001. By and large, this effect was maintained at 2 yr follow up: for the Ss who returned the final SPQ, the mean follow up score was 11.4 (see Table 1).

Covariation bias and relapse

Correlational analysis revealed a significant positive correlation between relapse and covariation bias (r = 0.61, P < 0.05). The present correlation between covariation bias and relapse is not mediated by residual fear immediately after treatment (as remains unaffected). This result provides an empirical basis for the alleged reciprocal relationship between covariation bias and phobic fear. Thus, the present data confirm the hypothesis that covariation bias may enhance fear, thereby contradicting the suggestion that cognitive biases are merely epiphenomena of fear.

The present findings are in line with the conviction that overestimation of threat plays a causal role in the origins and maintenance of irrational fears (e.g., Hadwin, Salkovskis, Kird & Clark, 1989). More specifically, the data suggest that relevant cues will be followed by aversive events. Note that the results of the present study fit nicely with recent findings of Margraf and Schneider (1993), who showed that there is a strong relationship between long-term treatment success and panic attacks and panic-specific cognitive changes (e.g., the perceived threat of physical symptoms).

Whereas a large number of studies have demonstrated that phobic fear is accompanied by cognitive biases such as anxiety sequences and anxiety biases (Logan & Gaetath, 1993), there is strong evidence to suggest that cognitive biases disappear rather than vice versa (see Merckelbach, van Hout, & Arntz, 1995) and covariation bias, very few studies have addressed the causal once anxiety is successfully treated, but this, of course, does not preclude the possibility that anxiety induces cognitive bias and Hagan (1992) showed that a measure of attentional bias is better able to predict subsequent development of dysphoria. The idea that cognitive biases play a causative role in the development of anxiety. Given the lack of reliable, theory-derived findings would be welcomed.

Furthermore, it would be interesting to examine how attentional bias and covariation bias are related to each other. Is the former bias operating at a lower perceptual level and the latter at the higher level of judgmental processes? (see Mineka & Sutter, 1992), or are both biases manifestations of a 'top down' bias in the decision mechanism that assigns processing priorities (see e.g. MacLeod & Mathews, 1991)? Studies measuring both types of cognitive biases could provide an answer.

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REFERENCES


