HEMISPHERE PREFERENCE, ANXIETY, AND COVARIATION BIAS

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Summary—In Study I, normal subjects (N = 70) completed the Preference Test (PT), the Spielberger State-Trait Anxiety Inventory, and the Anxiety Sensitivity Index. Subjects with a preference for a right hemisphere thinking style (as indexed by PT) were found to have higher state anxiety and anxiety sensitivity scores than subjects with a left hemisphere thinking style. This finding is in line with the suggestion that the right hemisphere is involved in the development and maintenance of anxiety.

Study II explored whether the relationship between right hemisphere preference and anxiety may result from the different cognitive characteristics that are attributed to the two hemispheres. It might well be that cognitive biases that are thought to maintain or exaggerate anxiety states (e.g., covariation bias), emerge from a right hemisphere mode of information processing. Therefore, it was investigated whether covariation bias is linked to right hemisphere preference. Subjects were exposed to a series of slides comprising pictures of spiders, weapons, and flowers. Slides were randomly paired with either a shock, a tone or nothing. Aposteriori, subjects indicated the contingencies of each stimulus/outcome combination. Data confirmed that anxiety was related to covariation bias. However, the hypothesis that cognitive biases are linked to a right hemisphere style of thinking was only partially sustained.

INTRODUCTION

Two recent lines of research have attempted to elucidate the role that the two cerebral hemispheres play in the development and maintenance of human anxiety and phobias. The first line is exemplified by the studies of Hugdahl (1987, 1989) in which fairly direct experimental manipulations (e.g., tachistoscopic procedures) were employed to assess the differential involvement of the two hemispheres in fundamental processes such as orienting and classical conditioning. These studies have shown, for example, that fear-relevant stimuli (e.g., pictures of snakes) elicit a cardiac defence reaction when they are flashed to the right hemisphere, but not when they are flashed to the left hemisphere (Hugdahl, Franzon, Andersson & Walldebo, 1983; see also Dimond & Farrington, 1977). Another interesting finding was that slides of angry faces that are flashed to the right hemisphere and then paired with aversive shock, evoke a conditioned skin conductance during a next phase in which these slides are foxeally presented. However, such a conditioned response does not occur when slides have been presented to the left hemisphere and then paired with shock (Hugdahl & Johnsen, 1991). By and large, the results of Hugdahl and associates suggest that the right hemisphere of normal Ss is more sensitive to fear-relevant stimuli and is more likely to acquire a conditioned fear response than the left hemisphere.

The second line of research relies on indirect measures of hemisphere involvement in anxiety. For example, Tucker and Newman (1981; see also Shearer & Tucker, 1981) confronted normal Ss with emotional slides, among them fear-relevant pictures (e.g., disfigured bodies, snakes, etc.). One group of Ss was instructed to process these slides in an analytic/verbal way, whereas the other group of Ss were instructed to employ an imaginal/global approach. Tucker and Newman found that the emotional material elicited greater peripheral vasoconstriction (as measured by skin temperature) in the imaginal/global group than in the analytical/verbal group. To the extent that one is willing to accept that the left hemisphere has an analytic mode of processing while the right hemisphere has an imaginal mode of processing, this finding suggests that a habitual reliance on the right hemisphere is associated with stronger fear responses. This suggestion was underlined in a recent study by Merckelbach, Muris and de Jong (1990; see also Merckelbach, 1992) in which it was found that normal Ss with a

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predominantly right hemisphere style of thinking (as measured by the Preference Test (Zemhausen, 1978)) have higher scores on phobia and depression questionnaires than Ss with a left hemisphere thinking style.

It should be borne in mind that the relationship between an imaginal mode of information processing and actual right hemisphere reliance is largely inferential (i.e. intuitively plausible rather than experimentally proven). In addition, the notion of a habitual left or right hemisphere thinking style [i.e. "hemisphericity" (e.g. Bakan, 1978)] has been criticized by some authors (e.g. Beaumont, Young & McManus, 1984). Meanwhile, studies concerned with information processing styles and emotional disorders are important in that they might provide a bridge between the experimental findings of, for example, Hugdahl and colleagues and studies on cognitive biases in neurotic disorders (e.g. Williams, Watts, Macleod & Mathews, 1988). As for the latter category of studies, cognitive-experimental research on anxiety has found, among other things, that phobic patients tend to overestimate the contingency between fear-relevant stimuli (e.g. slides of spiders) and aversive events (e.g. electric shock), even when there is no systematic correlation between stimuli and aversive events (e.g. Mineka Tomarken, 1989, de Jong, Merckelbach, Arntz & Nijman, 1992). In other words, phobics tend to perceive an illusory correlation between fear-relevant stimuli and aversive experiences. It may well be that this tendency acts to maintain the phobic complaints (see for an analysis that comes close to this suggestion McNally & Foa, (1987)). Cognitive biases such as the tendency to perceive illusory correlations might be related to certain information processing characteristics (a non-analytic, holistic approach; overreliance on imagery, etc.) which, in turn, are linked to right hemisphere functioning. In more general terms, then, it might be worthwhile to explore whether cognitive biases in fearful Ss can be pinpointed to neuropsychological mechanisms (e.g. Power, 1991).

STUDY I

Given the potential clinical relevance of research concerned with information processing styles and anxiety, the first study attempted to replicate the previously reported association between right hemisphere thinking style and anxiety scores that was found in normals (Merckelbach et al., 1990). In that study, anxiety was measured by means of a self-report questionnaire [i.e. the Fear Questionnaire (Marks & Mathews, 1979)] that asks for the presence of a limited set of phobias. In contrast, the present study examined the relationship between hemisphere thinking styles and a broader index of anxiety, namely the state anxiety version of the Spielberger State-Trait Anxiety Inventory [STAI state (Spielberger, Gorsuch & Lushene, 1970)]. Additionally, Ss completed the Anxiety Sensitivity Index [ASI, (Reiss, Peterson, Gursky & McNally, 1986)], a self-report instrument that measures fear of bodily arousal sensations.

Method

Subjects

Ss were 70 undergraduate students (28 men). The mean age was 22.2 yr (range: 18–39 yr).

Procedure and assessment

Ss were invited to complete the following questionnaires: the Preference Test [PT; (Zemhausern, 1978)], the state anxiety version of the STAI (Spielberger et al., 1970), and the ASI (Reiss et al., 1986). Ss completed the questionnaires in their regular class room.

The PT is a 20 item paper and pencil test and measures 'style of thinking': 10 items address what can be termed a "right hemisphere mode of thinking" (right hemisphere items, e.g. "I have a good sense of direction") and 10 items address a "left hemisphere mode of thinking" (left hemisphere items e.g. "I find it easy to think of synonyms for words"). It is worthy of note that the PT does not contain "emotional" items. Thus, the extent to which the PT items are susceptible to mood-congruent effects seems limited. Ss use 10-point scales (ranging from 0 = 'not at all'/‘never’ to 10 = 'very much'/‘always') to indicate the degree to which the items apply to them. To obtain an index of hemisphere reliance or preference, the mean score on the right hemisphere items is subtracted from the mean score on the left hemisphere items. Thus, a positive difference score reflects a stronger preference for a left hemisphere thinking style (i.e. an analytic, verbal approach). In contrast, a negative
difference score reflects a stronger reliance on a right hemisphere thinking style (i.e. a holistic, non-verbal approach). While the connection between PT and hemisphere activity is inferential, there are some indications that the PT correlates with other (non-obtrusive) measures of hemisphere reliance [e.g. conjugate lateral eye movements (de Jong, Merckelbach & Muris, 1990; see also Zemke, Notaro, Grosso & Schiano, 1981)]. Furthermore, reading efficiency has been found to correlate with PT scores, with poor readers having a negative PT difference score [i.e. a right hemisphere thinking style (Oexle & Zemke, 1981)].

The state anxiety version of the STAI (Spielberger et al., 1970) is a widely used questionnaire with good psychometric properties. It contains 20 items (e.g. "I feel scared") that are rated on a four-point scale (ranging from 'not at all' to 'very much'). Scores are summed to obtain a total state anxiety score (maximum = 80).

The ASI (Reiss et al., 1986) is a 16-item self-report scale. The ASI items focus on fear of anxiety symptoms (e.g. "it scares me when my heart beats rapidly"). The items are rated on a five-point scale ranging from 0 ('very little') to 4 ('very much'). Scores are summed to obtain a total ASI score (maximum = 64). The ASI has adequate test–retest stability and has been validated for non-clinical populations (e.g. Donnell & McNally, 1990).

Results

Pearson p–m correlations between PT, STAI, and ASI are presented in Table 1. As can be seen, PT correlates negatively with STAI: the stronger a person’s reliance on a left hemisphere thinking style, the lower his or her state anxiety scores. The association between PT and ASI was also negative, but did not reach the conventional significance level. As was expected, the two anxiety measures correlate positively.

On the basis of the distribution of the PT scores, three groups of Ss were formed; Ss scoring in the upper 20% of the distribution (n = 14; Ss with a relatively left hemisphere preference), Ss scoring in the lower 20% of the distribution (n = 14; Ss with a relatively right hemisphere preference), and the remaining Ss (n = 42; Ss with a mixed hemisphere preference). The mean state anxiety and ASI scores of the three groups are shown in Table 2. State anxiety and ASI scores of the three groups were subjected to one-way analyses of variance (ANOVA). The ANOVA performed on the ASI scores did not yield a significant effect: F(2, 69) = 1.69, P = 0.19. Yet, when the mean ASI scores of the left hemisphere preference and the right hemisphere preference group were compared with a t-test, a significant difference emerged (t(26) = 1.80, P < 0.05 one-tailed), with the latter group having higher ASI scores. The ANOVA of the state anxiety scores yielded a significant effect: F(2, 60) = 3.78, P < 0.05. The right hemisphere preference group had significantly higher state anxiety scores than the left hemisphere preference groups (t(26) = 2.56, P < 0.01, one-tailed).

Discussion

The results presented above can be summarized as follows. Firstly, although not of a dramatic magnitude, correlations were found between hemisphere thinking style and anxiety scores. Ss with a relatively strong reliance on a right hemisphere thinking style were found to have higher state anxiety and anxiety sensitivity scores than Ss with a relatively strong reliance on a left hemisphere thinking style. These results confirm the findings of an earlier study (Merckelbach et al., 1991).

There are at least two theories that may account for the connection between hemisphere thinking style and anxiety. The first theory assumes that there is an inborn affective asymmetry between the hemispheres. Although there is a lack of consensus about the details of this affective lateralization,
many authors believe that the right hemisphere sustains negative emotions, whereas the left hemisphere sustains positive emotions (Davidson & Fox, 1982; Weber & Sackheim, 1984). Activation of one rather than the other hemisphere, for example, through certain cognitive activities would evoke a direct emotional effect. There is some evidence to support this notion (see for a review, Silberman & Weingartner, 1986). For example, Drake (1987) instructed normal Ss to shift their eyes to the left or to the right, thereby inducing contralateral cerebral activation. Orienting towards the right (i.e. left hemisphere activation) was followed by positive evaluations of pictorial stimuli. In contrast, orienting towards the left (i.e. right hemisphere activation) was followed by negative evaluations of these stimuli (see also Merckelbach & van Oppen, 1989).

The second theory stresses the different cognitive characteristics of the two hemispheres. The rational and verbal strategy of the left hemisphere would inhibit emotional responses, while the nonverbal and imaginal ideation of the right hemisphere would exaggerate emotional responding (e.g. Tucker & Newman, 1981). Thus, emotions would be modulated by lateralized cognitive characteristics rather than produced by inborn affective tendencies of the two hemispheres. If this cognitive point of view is correct, one would predict that cognitive biases that promote anxiety responses (i.e. the illusory correlation phenomenon; see below) are more often found in persons who rely on right hemisphere strategies rather than persons who rely on left hemisphere strategies.

STUDY II

The second study tentatively explored whether cognitive biases such as illusory correlation are, indeed, related to an imaginal mode of information processing. In a recent study employing an 'illusory correlation' paradigm, it was demonstrated that the strength of the bias to overassociate fear-relevant stimuli with shock is correlated with the severity of phobic complaints (de Jong et al., 1992). Employing the same illusory correlation paradigm, the present study investigated if and to what extent covariation bias is correlated with a right hemisphere mode of thinking. Houtz and Frankel (1988) provided empirical support for the hypothesis that Ss with a right hemispheric preference are less successful in problem-solving tasks than Ss with a left hemisphere preference. In a similar vein, it might well be that an imaginative approach will lead to less accurate covariation detection in an 'illusory correlation' paradigm than a more analytic approach. Inaccurate covariation detection, in turn, may lead to (or confirm) an unrealistic representation of cue-outcome relationships (e.g. between phobic stimuli and aversive consequences). From this perspective, covariation bias might be one of the mediating factors between right hemisphere preference and anxiety.

A recent study by Hugdahl and Johnsen (1991) provides further support for this line of reasoning. In that study, Ss were presented with fear-relevant stimuli flashed either to the right (RVF; i.e. left hemisphere) or to the left visual field (LVF; i.e. right hemisphere). During the acquisition phase, the lateralized stimuli were paired with shock outcome. Only in case stimuli had been presented in the LVF, subsequent stimulus presentations (in the visual centre) elicited conditioned electrodermal responses. This suggests that the right hemisphere is more susceptible to associate fear-relevant stimuli with aversive outcomes.

In the present study, both the Zenhausern Preference test (PT) and the Questionnaire on Mental Imagery (QMI) were used as indices of hemisphere preference. It was anticipated that Ss with negative
PT scores (indicating non-verbal/holistic approach) and Ss with low QMI scores (indicating strong imagery) would show a stronger covariation bias than analytic subjects and/or subjects with only weak imaginative power.

Method

Subjects

Ss were 20 female undergraduate students. The mean age was 21 yr (range: 18–24 yr). Ss were paid for their participation in this experiment. Due to apparatus failure, covariation data of one S was not available, leaving 19 Ss in the final sample.

Assessment

Before the experiment proper, Ss were asked to complete several questionnaires: as in Study I, Ss completed the PT and the STAI-state. Additionally, Ss were invited to complete the Spider Phobia Questionnaire [SPQ, (Klorman, Weerts, Hastings, Melamed & Lang, 1974)], and the Questionnaire on Mental Imagery [QMI (Sheenan, 1967)].

The SPQ is a 31-item self-report instrument that measures fear of spiders and has reasonable psychometric properties (Fredrikson, 1983). The QMI is a widely used index of imagery ability (e.g. Cook, Melamed, Cuthbert, McNeil & Lang, 1988; Mereckelbach et al. 1991). It contains 35 items which pertain to images in specific modalities (e.g. in the visual modality: 'seeing a sunset': in the auditory modality: 'hearing steam escape from a boiling kettle', etc.). Ss are asked to rate the vividness of these images on a seven-point scale, with 1 indicating 'very vivid' and 7 indicating 'not at all vivid'. Thus, the total QMI score varies between 35 (very good imagery ability) and 245 (very poor imagery ability).

Stimulus material and apparatus

In the experiment proper, three categories of slides were used: four different slides depicting spiders (phobogenic stimuli), four different slides depicting aimed weapons (ontogenetically fear-relevant stimuli), and four different slides depicting flowers (neutral stimuli). The slides were projected on a white screen (80 × 120 cm), 3 m in front of the S. A Kodak Carousel was used for stimulus presentation. Following each stimulus, three types of outcomes could occur: a 1-sec shock, a 1-sec tone, or nothing at all. Electrical shocks (d.c.) were delivered from a specially designed shock generator and administered to the S's lateral side of the upper right arm through two electrodes (8 mm diameter Ag-AgCl). Tones were delivered by a tone generator (60 Hz, 50 dB) connected to a loudspeaker inside the experimental (sound attenuated) room. Stimulus presentation, delivery of shocks and tones, and intertrial intervals were controlled by a PDP Minic II laboratory computer.

Procedure

At the completion of the questionnaires, Ss were introduced to the laboratory. During the experiment, Ss sat in a chair in a sound-attenuated room. A one-way screen separated the experimental and the apparatus room. Ss were explicitly informed that it was their task to determine the relationship between categories of slides and outcomes. Following this, electrodes were attached. Then, shock intensity level was varied using a shock work-up procedure. Stepwise, electrical current was increased until the S indicated that the shock was "uncomfortable but not painful". After it was established that the task was clear to the Ss, they were left alone and the lights were dimmed.

Next, Ss were exposed to 72 slides each of 8 sec duration. Three different categories were used (see above). One of three outcomes occurred at slide offset: a shock (aversive outcome), a tone, or nothing at all (neutral outcomes). All slide–outcome combinations occurred equally frequently, thus the conditional probability of each slide type given prior occurrence of each outcome was 1/3. Slides were presented in a quasi random order with the restriction that a similar slide-outcome combination never appeared on two successive trials. Across Ss, three different sequences of slides were used to control for possible primacy and latency effects. Therefore, each of the sequences started with another slide type.

After the experiment, Ss completed the Covariation Questionnaire (CQ). The CQ asked Ss to estimate the percentage of occurrence of each outcome given the prior occurrence of each slide type.
A sample item would be as follows: "Given that you saw a weapon slide, on which percentage of those trials weapons were followed by shock?" For all estimates, 100 mm visual analogue scales (VASs) were used ranging from 0 (i.e. never) to 100% (i.e. always).

Data reduction and analysis

In line with the earlier covariation studies of Tomarken, Mineka and Cook (1989), covariation estimates were subjected to a set of a priori t-tests in order to evaluate whether the spider/shock covariation estimates differed from the weapon/shock, flower/shock, spider/tone, and spider/nothing covariation estimates. The standard deviation (SD) of the reported estimates (within Ss) was used as an additional index of the Ss ability to detect covariations. Note that all covariations between slides and outcomes were equal. Consequently, the smaller the standard deviation, the more accurate the Ss' covariation estimates. Conversely, the higher the standard deviations, the greater the discrepancies between the various stimulus-outcome estimates, the poorer the judgments. Both measures of covariation bias were used in the correlational analysis: standard deviations (SD) over all covariation estimates (within Ss) and the covariation estimates of the spider/shock associations (IC). Pearson r correlations were computed between hemisphericity (QMI, PT) anxiety (SPQ, STAI), and Ss' ability to detect covariations (SD, IC).

Results and Discussion

Questionnaires

Mean SPQ score was 9.9 (range 2–28). The distribution was comparable to the distribution reported by Fredrikson (1983) for his 'normal' student sample. Scores on the QMI, PT and STAI-state are depicted in Table 3.

Covariation estimates

Across all Ss, the spider/shock estimates (IC) differed significantly from the weapon/shock estimates, t(18) = 3.17, P = 0.005, but not from the flower/shock estimates, t(18) < 1. In addition, the difference between the spider/shock estimates and the spider/tone estimates was marginally significant, t(18) = 2.48, P = 0.023. Finally, the spider/shock estimates tended to be higher than the spider/nothing estimates, t(18) = 2.26, P = 0.036. Thus, in general, Ss showed a weak bias to overassociate the spider/shock combination. Mean IC was 44.6 (range: 10–90); mean SD was 13.3 (range: 1.3–30.3).

Hemisphere preference, covariation bias, and phobic fear

Correlations between indices of covariation bias, anxiety, and hemisphere preference are shown in Table 4. As was predicted, there was a significant correlation of the QMI score with Ss' accuracy of covariation detection, suggesting that inaccurate covariation detection is related to a right hemisphere mode of information processing. However, the correlations between the other 'hemisphericity' index (PT) and both measures of covariation bias (SD and IC) did not attain significance. Thus, at best, the present results only partially sustain the hypothesis that cognitive biases are linked to a right hemisphere style of thinking.

In line with the hypothesis that inaccurate covariation detection may be related to anxiety, the index of anxiety (STAI) was positively correlated with Ss' inaccurate in detecting covariations. However,
Table 4. Correlations between indices of anxiety (SPQ, STAI), hemisphericity (PT, QMI), and covariation bias (IC = spider/shock estimates; SD = accuracy).

<table>
<thead>
<tr>
<th></th>
<th>IC</th>
<th>SD</th>
<th>STAI</th>
<th>SPQ</th>
<th>PT</th>
</tr>
</thead>
<tbody>
<tr>
<td>QMI</td>
<td>-0.05</td>
<td>-0.50**</td>
<td>0.00</td>
<td>-0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>PT</td>
<td>0.17</td>
<td>0.12</td>
<td>-0.26*</td>
<td>-0.05</td>
<td>—</td>
</tr>
<tr>
<td>SPQ</td>
<td>0.42**</td>
<td>0.04</td>
<td>0.34*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>STAI</td>
<td>0.20</td>
<td>0.31*</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

*p < 0.15, n = 19 (one-tailed).

**p < 0.05, n = 19 (one-tailed).

These correlations did not reach the conventional level of significance. In addition, there was a significant positive correlation between the index of phobic fear of spiders (SPQ) and the spider/shock covariation estimates (IC). This result is in line with earlier findings that high but not low fear Ss show a covariation bias (e.g. Tomarken et al., 1989; de Jong et al., 1992). Yet, the present findings provide no support for the suggestion that this relationship between covariation bias and phobic fear e.g. anxiety is mediated by hemisphere preference. Finally, no significant correlation could be found between the PR and QMI scores. On the one hand the result is difficult to reconcile with the widely held assumption that imagery is a function of the right hemisphere (e.g. Springer & Deutsch, 1981). On the other hand, it may be taken as support for the position of Ehrlichman and Barret (1983) who argue that there is insufficient empirical basis for considering imagery a right hemisphere function. It might well be, as Parah (1984, p. 268) stated, that "the right hemisphere hypothesis does not actually apply to image generation per se, but rather to various forms of so-called 'spatial ability' and higher visual perceptual processing". In other words, visual vs nonvisual thinking style might be closer related to hemisphericity than imagery ability per se (see also Zenhausern, 1978).

**General Discussion**

The present study was performed to replicate and extend the earlier finding that a relatively strong reliance on a right hemisphere thinking style is related to higher levels of anxiety (Merckelbach et al., 1991). In addition, it was explored whether this relationship between hemisphere preference and anxiety is mediated by the different cognitive characteristics that are ascribed to the left and right hemispheres.

Pertinent to the first aim of this study, the present results corroborate the earlier finding that right hemisphere preference is a vulnerability factor for anxiety (Merckelbach et al., 1991). Hemisphericity was found to be related to state anxiety (STAI-state) as well as fear of bodily sensation (ASI).

At least two mechanisms can be put forward to explain this link between right hemisphere dominance and anxiety. First, a study by Davidson and Fox (1989) provides evidence for the suggestion that right frontal activation marks a vulnerability factor to experience negative emotions. That is, the threshold for experiencing and expressing negative affect due to a certain stressor is lowered in Ss showing relatively strong right frontal hemisphere activation. Thus, it might be inferred that Ss predominantly relying on a right hemisphere mode of information processing are characterized by relatively strong right frontal activation. In its turn, this strong right activation might increase Ss' susceptibility to negative emotions like anxiety (see e.g. Silberman & Weingartner, 1986).

The second mechanism linking hemisphericity and anxiety might be constituted by the different cognitive characteristics of both hemispheres. For example, Tucker and Newman (1981) demonstrated that global and imaginal thinking exaggerates emotional experiences, whereas verbal and analytic ideation seems to effectively inhibit emotional responses. From this it may be inferred, that Ss with a right hemispheric style of information processing might be prone to anxiety due to the cognitive characteristics of the right hemisphere (i.e. its capacity for global and conceptual integration of sensory with visceral cues). That is, Ss typically relying on right hemisphere strategies would be more prone to cognitive biases (e.g. covariation bias) that are known to maintain or exaggerate fear responses (i.e. covariation bias) than Ss preferring a left hemisphere style of thinking. This prediction was tested in Experiment 2.

The current findings are in line with earlier results (e.g. de Jong et al., 1992), in that they show that
high fear Ss are likely to overestimate the association between fear-relevant stimuli and aversive outcomes. Similarly, high state anxious Ss appeared to be less accurate than low anxious Ss in detecting covariations in an illusory correlation paradigm. However, the prediction that Ss with a right hemisphere style of thinking are prone to cognitive biases such as covariation was, at best, only partially confirmed. Only the relationship between imagery ability and Ss' overall inaccuracy in covariation detection (SD) pointed in that direction. Yet, right hemisphere thinking style (indexed either as imaginative power, or as visual thinking style) was not correlated with a specific bias to associate fear-relevant stimuli with shock (IC).

Of course, the present failure to find a significant relationship between hemisphericity and specific covariation bias does not imply that there is no such a relationship. Selecting Ss with more extreme preference for a right or a left hemispheric mode of information processing might have yielded quite different results. In addition, rather indirect indices of hemisphericity were used in the present experiment. It might well be the case that, given the relatively small samples size, these indices were lacking of sufficient sensitivity. Meanwhile, the fact that imagery ability and covariation detection accuracy were found to be associated suggests that it might be worthwhile to evaluate the connection between hemisphericity and cognitive bias with a more straightforward index of hemisphere functioning [e.g. baseline EEG (Davidson & Fox, 1989)].

To summarize, the present study corroborates the hypothesis that right hemisphere preference is positively related to high anxiety levels. The hypothesis that cognitive characteristics linked to each hemisphere mediate the relationship between hemisphere thinking style and anxiety was, at best, only partially sustained.

REFERENCES


