Brief Communication

HEMISPHERE PREFERENCE, PHOBIA, AND DEPRESSION

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The present study was undertaken in order to examine whether depression and anxiety are related to preference for a right hemisphere mode of thinking. On the basis of a paper-and-pencil test presumably measuring hemisphere preference (Preference Test; Zentzhausern, 1978), normal subjects (N = 75) were assigned to a group characterized by a left hemisphere thinking style, a group characterized by a right hemisphere thinking style and a group with mixed tendencies (left and right hemisphere tendencies). Additionally, subjects completed the Fear Questionnaire and the Depression Symptom Inventory. It was found that subjects with a right hemisphere thinking style reported more depressive and fear symptoms than subjects with a left hemisphere thinking style. This finding is in line with theories which assume that the right hemisphere is characterized by a negative, dysphoric emotional tendency.

Keywords: hemisphere preference, negative emotions.

In the past years, the differential involvement of the two hemispheres in emotions has attracted considerable attention (see reviews by e.g., Joseph, 1988; Levy, 1983; Silberman & Weingartner, 1986). Although no consensus has been reached as yet, a number of authors argue that whereas the left hemisphere is specialized for positive emotions, the right hemisphere is specialized for negative emotions (e.g., Silberman & Weingartner, 1986; Dimond & Farrington, 1977; Davidson & Schaffer, 1983). Closely related to this point of view are theories which assume that certain manifestations of psychopathological characteristics are associated with a habitual preference for right rather than left hemisphere functioning. There is, indeed, evidence to indicate that, for example, repression and denial (Gur & Gur, 1975), trait anxiety and neuroticism (Montgomery & Jones, 1984), and hysterical personality characteristics (Shevrin & Smokler, 1980) correlate positively with right hemisphere reliance.

A large majority of the studies done in this area recorded conjugate lateral eye movements for establishing subjects’ hemisphere preference (see e.g., de Jong, Merckelbach & Muris, 1990). However, as Ehrlichman and Weinberger (1978) pointed out, the notion that predominantly left and right lateral eye movements reflect right and left hemisphere reliance, respectively, is not unproblematic. Lateral eye movements can best be viewed as a measure that is influenced by both trait (hemisphere preference) and state variables (e.g., type of question, position of the interviewer, etc.). A second feature of the above cited studies is that many of them focussed on psychopathological traits (e.g., trait anxiety) rather than symptoms.

The present study examined whether the relationship between dysphoria and right hemisphere reliance hold up when a “trait” measure of hemisphere preference is used and when more clinically relevant (i.e., symptom-oriented) indices of dysphoria are employed.

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Hemisphere reliance was measured with the Preference Test (PT; Zenhausern, 1978), a paper-and-pencil task that is said to be a trait measure of hemisphere preference.

METHOD

Subjects

The subjects were 75 undergraduates (25 men). Their mean age was 23.5 years (range: 19–45).

Procedure and Measures

Subjects were tested individually. They sat in a comfortable chair placed in a sound-attenuated room. Subjects were asked to complete the PT (Zenhausern, 1978), the Edinburgh Handedness Inventory (EHI; Oldfield, 1971), the Fear Questionnaire (FQ; Marks & Mathews, 1979) and the Depression Symptom Inventory (DSI; Bouman, 1987).

The PT asks subjects to indicate to what extent they prefer an intuitive, nonverbal versus an analytical verbal style of reasoning. It contains 20 items, 10 of them presumably addressing a right hemisphere mode of thinking (right hemisphere items; e.g., “Do you like using symbols and/or images in solving problems?”) and 10 of them presumably addressing a left hemisphere mode of thinking (left hemisphere items; e.g., “How good is your ability to think of synonyms for words?”). Subjects use 10-point scales for indicating their position on these items. To obtain an index of hemisphere preference, the mean score on the right hemisphere items is subtracted from the mean score on the left hemisphere items. Consequently, a positive difference score reflects a relative preference for a left hemisphere mode of thinking (i.e., an analytic, verbal approach), whereas a negative difference score reflects a relative preference for a right hemisphere mode of thinking (i.e., an holistic, nonverbal approach). Although the connection between PT and hemisphere functioning is largely inferential, i.e., intuitively plausible (Swenson & Tucker, 1983), previous studies (e.g., Dunivin & Zenhausern, 1981; de Jong et al., 1990) have found that PT difference score relates to other (nonobtrusive) indices of hemispheric reliance (e.g., trait-state measures such as lateral eye movements). This suggests that the PT is a valid measure of hemisphere reliance (Zenhausern, Notaro, Grosso & Schiano, 1981).

The EHI is a reliable 10-item questionnaire which conceptualizes handedness as a continuous variable (Oldfield, 1971). A handedness quotient (range −100 to +100) can be derived from the EHI, with −100 indicating pure left handedness and +100 indicating pure right handedness.

The FQ is a 15-item questionnaire which asks for phobic symptoms. It contains three scales: A social phobia scale, an agoraphobia scale, and a blood-injury phobia scale. In the present study, a total phobia score (ranging from 0 (not phobic) to 120 (extremely phobic) was obtained by summing the three subscale scores. It has been shown that the FQ is sensitive to phobic tendencies in normal populations (Arrindell, Emmelkamp & van der Ende, 1985).

The DSI (Bouman, 1987) is a self-rating depression questionnaire. It asks subjects to indicate to what extent they suffer from symptoms like feelings of loneliness, sleep disturbances, etc. The summed DSI score varies between 0 (no depression symptoms) and 116 (all 29 depression symptoms present).
The data were analyzed in two steps. First, Pearson product-moment correlations between PT, EHI, FQ, and DSI were computed. Second, on the basis of PT scores, three groups were formed: subjects scoring in the upper 20% of the PT distributions (relative strong left hemisphere preference), subjects scoring in the lower 20% of the PT distribution (relative strong right hemisphere preference), and the remaining subjects (mixed hemisphere preference). Using one-way analyses of variance (ANOVAS), differences in EHI, FQ, and DSI scores between these three groups were evaluated.

RESULTS AND DISCUSSION

Table 1 shows Pearson correlations between PT, EHI, FQ, and DSI scores. As can be seen, correlations between PT on the one hand and FQ and DSI on the other hand were negative and significant: Apparently, the stronger a person's preference for a left hemisphere thinking style, the lesser his phobic or depression complaints. The positive correlation between FQ and DSI confirms earlier studies that reported a strong comorbidity of depression and anxiety (e.g., Marks, 1987).

No correlations were found between handedness (EHI) and FQ and DSI, a finding that is in line with the results of Merckelbach, de Ruiter, and Olff (1989). The correlation between EHI and PT was very small and only marginally significant \( (p = .06, \text{one-tailed}) \). Taken together, these findings suggest that the negative associations between PT and depressive or phobic complaints are not mediated by handedness.

Table 2 shows mean FQ and DSI scores of the group with a left hemisphere style \((n = 15; 3 \text{ men})\), the group with a "mixed" style \(n = 45; 15 \text{ men}\), and the group with a right hemisphere style \(n = 15; 7 \text{ men}\). The mean PT score of the group with a relatively strong preference for a left hemisphere mode of thinking was +1.5

![Table 1](image)

**Table 1**

Pearson Product-moment correlations between PT, EHI, FQ and DSI

<table>
<thead>
<tr>
<th></th>
<th>EHI</th>
<th>FQ</th>
<th>DSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td>.18</td>
<td>- .28(\dagger)</td>
<td>- .21(\dagger)</td>
</tr>
<tr>
<td>EHI</td>
<td>.03</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>FQ</td>
<td></td>
<td>.46(\dagger)</td>
<td></td>
</tr>
</tbody>
</table>

\(\dagger p < .05, N = 75, \text{one-tailed}\)

![Table 2](image)

**Table 2**

Mean FQ- and DSI scores of the right hemisphere style group, the "mixed" group and the left hemisphere style group. Standard deviations are given between parentheses

<table>
<thead>
<tr>
<th></th>
<th>FQ</th>
<th>DSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Hemisphere Style ((n = 15))</td>
<td>31.4</td>
<td>48.3</td>
</tr>
<tr>
<td></td>
<td>(12.1)</td>
<td>(12.3)</td>
</tr>
<tr>
<td>Mixed Style ((n = 45))</td>
<td>26.7</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>(13.5)</td>
<td>(12.6)</td>
</tr>
<tr>
<td>Left Hemisphere Style ((n = 15))</td>
<td>24.3</td>
<td>37.7</td>
</tr>
<tr>
<td></td>
<td>(10.5)</td>
<td>( 7.6)</td>
</tr>
</tbody>
</table>
(s.d. = .80), whereas that of the group with a relatively strong preference for a right hemisphere mode was −2.0 (s.d. = .33). The “mixed” subjects had a mean PT score of −.28 (s.d. = .74). As a one-way ANOVA indicated, the difference in PT scores between the groups were highly significant (F (2,72) = 44.9, p < .001). The percentage of women did not significantly differ among the three groups (Chi-square = 2.4, p > .20).

The groups did not significantly differ with respect to handedness as indexed by EHI scores: F (2,72) = 1.80, p = .18. Neither was there an overall significant difference in FQ scores: F (2,72) = 1.30, p = .30. However, the group with a right hemisphere style tended to have higher FQ scores than the group with a left hemisphere style [t (72) = 1.5, p < .07, one-tailed]. The mixed group did not differ significantly from either the left hemisphere style group [t (72) < 1] or the right hemisphere style group [t (72) = 1.1, p = .15, one-tailed].

The differences in DSI scores between the three groups reached significance [F (2,72) = 3.0, p = .05]. The right hemisphere style group reported significantly more depression symptoms than the left hemisphere style group [t (72) = 2.5, p < .01, one-tailed]. The difference between the mixed group and the left hemisphere style group reached borderline significance [t (72) = 1.4, p < .08, one-tailed], as did the difference between the mixed and the right hemisphere style group [t (72) = 1.6, p = .06, one-tailed].

To summarize, the results presented above indicate that there is an association between preferred hemisphere style (as measured by the PT) on the one hand and depression and phobic fear on the other hand in nonclinical subjects. Although effect sizes were certainly not dramatic, subjects with a right hemisphere style were found to have higher depression and phobic scores than subjects with a left hemisphere style. To the extent that one is willing to accept PT scores as valid indices of right, mixed, or left hemisphere preference, these findings are in line with theories which propose that the right hemisphere is characterized by a dysphoric tendency (e.g., Silberman & Weingartner, 1986). Further research along these lines might yield clinically important data. It is known that anxiety disordered and depressive patients tend to rely on dysfunctional cognitive rules (Williams, Watts, Macleod & Mathews, 1987). For example, anxiety disordered patients overestimate the dangerousness of phobic stimuli and depressive patients display a memory bias for negative items. It may well be the case that a preference for a right hemisphere mode of thinking results in such cognitive biases, which in turn, lead to dysphoric emotions. Also germane to the present context are results reported by Tucker and Newman (1981). These authors found that in normal subjects, experimentally induced emotions are reduced by an analytic, verbal coping strategy but augmented by a nonverbal, imaginal (i.e., a right hemisphere) strategy. In order to examine whether the same effects occur in clinical populations, future studies should concentrate on the connections between right hemisphere preference, cognitive biases, and clinical manifestations of dysphoria.

REFERENCES


