
DICHOTIC LISTENING IN RELATION TO DYSPHORIA, SENSATION SEEKING, AND OTHER PERSONALITY CHARACTERISTICS

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Summary.—According to a 1983 model proposed by Levy, anxiety, dysphoria, and a critical attitude are associated with greater left- than right-hemisphere activity, while optimism and uncritical evaluations correlate with stronger right- than left-hemisphere activity. A dichotic-listening task and a set of personality questionnaires were administered to 150 students in psychology. The personality measures included Dutch versions of the Beck Depression Inventory, the Zung Self-rating Depression Scale, the Sensation-seeking Scale V and a brief MMPI. Correlations between the extent of left-hemisphere reliance as measured by a right-ear advantage score on the dichotic-listening task and the various personality measures were computed, forming a test of some aspects of Levy’s (1983) model. If performance on a dichotic-listening task reflects hemispheric reliance then we found little evidence, on the whole, to support Levy’s model.

According to Levy (1983), “individuals who tend toward introversion and are characterized by anxiety, depression, critical evaluations of self and others, and a generally pessimistic outlook are biased toward left-hemisphere reliance, contrasting with individuals who tend toward low anxiety, absence of depression, uncritical evaluations of self and others, and a generally optimistic outlook and who are biased toward right-hemisphere reliance” (p. 485). If Levy’s (1983) model is correct and if the extent of right-ear advantage on a dichotic-listening task is a measure of left- versus right-hemisphere reliance, then right-ear advantage can be expected to be associated with a number of personality measures. Specifically, dysphoria, negativism, and timidity should be expected to be positively associated with right-ear advantage while sensation seeking and extraversion should be negatively associated with right-ear advantage. In addition, based on findings that the right cerebral hemisphere is particularly involved in the mediation of affectively or motivationally determined somatic symptoms (Stern, 1977, p. 122; Galin, Diamond, & Braff, 1977; Kenyon, 1977), we hypothesized that somatization would be negatively associated with right-ear advantage. These hypotheses were tested in a study with Dutch university students.

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Subjects

Subjects were 65 men and 85 women. All were students in psychology. Most were first-year students and received credits for participating in the study. A total of 130 subjects reported being right-handed; 20 reported being left-handed or ambidextrous.

Instruments

We administered a dichotic-listening task and a number of personality questionnaires to these subjects.

Dichotic-listening task.—The dichotic-listening task we used (Bakker, van der Vlugt, & Claasen, 1978; van der Vlugt, 1979) requires 24 trials. Trials 13 through 24 are a repetition of the first 12 trials, with the modification that the input to the two ears is reversed. Each trial consists of a dichotic presentation of four pairs of monosyllabic numbers in word form. The two stimuli of a pair are presented simultaneously, one stimulus to the right ear and one to the left ear. The 10 Dutch language one-syllable numbers from one to twelve comprise the set of stimuli. The time interval within each trial between stimulus pairs is 0.5 sec. For each trial the subject is requested to repeat as many of the numbers heard. The number of stimuli presented to the right ear and the number of stimuli presented to the left ear which have been correctly recalled are noted. Total right- and left-ear scores are computed. A right-minus-left ear score is computed, called the right-ear advantage score. This score correlates near unity with the relative right-ear advantage score: (R − L)/(R + L). Reliability and validity of the dichotic-listening task have been reported by Bakker, et al. (1978) and van der Vlugt (1979); high vs low right-ear advantage has been shown to be associated with left- vs right-cerebral reliance in children submitted to an auditory evoked-potential procedure (Bakker, Licht, Kok, & Bouma, 1980). Bryden (1982) suggested that a greater right-ear advantage score for right-handed over left-handed subjects is evidence of a dichotic-listening task’s validity as a measure of lateralization. In this connection we note that our right-handed subjects had a slight but significant right-ear advantage over our left-handed subjects (t_{148} = 1.83, p = .03, one-tailed).

The personality questionnaires used in this study included three measures of dysphoria\(^5\), a measure of sensation seeking, and a psychopathology inventory. The tests were the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, 

\(^5\)Self-report depression measures appear not to be specific for depression (Gotlib, 1984; Schein, et al., 1985; Watson & Clark, 1984). Beck’s inventory, for example, is highly correlated with anxiety and neuroticism (Gotlib, 1984; Watson & Clark, 1984). According to Watson and Clark (1984) such measures may “essentially assess one construct, which might be labeled dysphoria, malaise or general distress” (p. 26).
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& Erlaugh, 1961; Hoevenaars & Van Son, 1984), Zung’s Self-rating Depression Scale (Zung, 1965; Hoevenaars & Van Son, 1984), Van Rooijen’s (1975) VROPSOM (Hoevenaars & Van Son, 1984), Zuckerman’s Sensation-seeking Scale Form V (Cohen, Driemans, Lennik-Oberstein, & Van der Vlugt, 1983; Zuckerman, 1979), and the Dutch Brief MMPI (Luteijn, Kok, & van der Ploeg, 1980). The three measures of dysphoria were highly intercorrelated (all correlations exceeded .5, p < .001). A mean of the standard scores for each of the depression scores, referred to as the dysphoria score, was computed for each subject. The Sensation-seeking Scale provides scores for four subscales—Thrill and Adventure Seeking, Experience Seeking, Disinhibition, and Boredom Susceptibility—in addition to a total score. The Dutch Brief MMPI provides scores for five factors: negativism, somatization, timidity, severe psychopathological disturbance, and extraversion.

RESULTS

We conducted four types of statistical analyses: (a) correlations between measures on the dichotic-listening task and the test measures, (b) t tests for differences in right-ear advantage between “extreme” high and “extreme” low-scoring subjects for each of the personality measures, (c) t tests for differences in personality measures between “extreme” high and “extreme” low right-ear-advantage scorers, and (d) stepwise regression analyses (Hull & Nie, 1981) with right-ear advantage as the dependent variable. The correlational analyses were conducted (a) for the full sample (N = 150), (b) for men (n = 65; Table 1), (c) for women (n = 85; Table 1), (d) for right-handed subjects (n = 128; Table 2), (e) for left-handed subjects (n = 20; Table 2), (f) for right-handed men (n = 52), (g) for left-handed men (n = 11), (h) for right-handed women (n = 76), and (i) for left-handed women (n = 9). The regression analyses were carried out for the above groups, (a) and (b).

By and large the statistical analyses gave little evidence to support expected relationships between right-ear advantage and personality. Of all the correlations computed between right-ear advantage and the personality variables in the nine subject groups, statistically significant correlations in the expected direction (p ≤ .05, one-tailed) were found only with somatization—in left-handed subjects (r = -.38, p = .05)—and with timidity—in left-handed subjects (r = .46, p = .02) and in left-handed women (r = .75, p = .01). Little significance, however, can be attached to these three positive results: with so many correlations computed, at least some can be expected to reach conventional levels by chance. The relatively high positive correlation between right-ear advantage and the timidity measure found among left-handed subjects

<table>
<thead>
<tr>
<th>Measure</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right-handed</td>
</tr>
<tr>
<td>Dysphoria Beck Depression Inventory</td>
<td>-0.10</td>
</tr>
<tr>
<td></td>
<td>Self-rating Depression Scale</td>
</tr>
<tr>
<td></td>
<td>VROPSOM</td>
</tr>
<tr>
<td></td>
<td>Dysphoria</td>
</tr>
<tr>
<td>Dutch Brief MMPI Negativism</td>
<td>-0.06</td>
</tr>
<tr>
<td>Somatization</td>
<td>0.04</td>
</tr>
<tr>
<td>Timidity</td>
<td>0.00</td>
</tr>
<tr>
<td>Severe Psychopathology</td>
<td>-0.02</td>
</tr>
<tr>
<td>Extraversion</td>
<td>-0.01</td>
</tr>
<tr>
<td>Sensation-seeking Thrill and Adventure Seeking</td>
<td>-0.09</td>
</tr>
<tr>
<td>Experience Seeking</td>
<td>-0.04</td>
</tr>
<tr>
<td>Disinhibition</td>
<td>-0.02</td>
</tr>
<tr>
<td>Boredom Susceptibility</td>
<td>0.06</td>
</tr>
<tr>
<td>Total</td>
<td>-0.01</td>
</tr>
</tbody>
</table>

*Right-ear advantage score = (R - L)/(R + L), where R = Right-ear score and L = Left-ear score.
Beck Depression Inventory (Beck, et al., 1961).
*Self-rating Depression Scale (Zung, 1965).
*VROPSOM = a Dutch Adjective Checklist for Depression (van Rooijen, 1977).
*Mean standard dysphoria score for the Beck Depression Inventory, Self-rating Depression Scale, and VROPSOM.
*Dutch Brief MMPI (Lucijn, et al., 1980).
*p ≤ .05, one-tailed.

appeared to be largely attributable to the presence of a strong association within a small group (n = 9) of left-handed women.

$t$-test analyses indicate no significant associations between high and low personality scores and right-ear advantage or between high and low right-ear advantage and personality scores: extreme personality scores were not predictive of the hemisphere-reliance measure and extremes on the hemisphere-reliance measure were not associated with differences in the personality measures. The stepwise regression analyses produced no significant prediction equations for right-ear advantage.

These results provide scant support for Levy's model. We consider it worthy of note that some of the correlations between right-ear advantage and the other variables were in directions opposite to those predicted on the basis
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TABLE 2
PRODUCT-MOMENT CORRELATIONS BETWEEN RIGHT-EAR ADVANTAGE SCORES* FOR A DIGIT DICHTIC LISTENING TASK AND MEASURES OF SENSATION SEEKING AND EXTRAVERSION FOR 65 DUTCH MALE AND 83 DUTCH FEMALE UNIVERSITY STUDENTS

<table>
<thead>
<tr>
<th>Measure</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensation Seeking†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thrill and Adventure Seeking</td>
<td>-.06</td>
<td>-.11</td>
</tr>
<tr>
<td>Experience Seeking</td>
<td>.12</td>
<td>-.15</td>
</tr>
<tr>
<td>Disinhibition</td>
<td>.19</td>
<td>-.13</td>
</tr>
<tr>
<td>Boredom Susceptibility</td>
<td>.05</td>
<td>.08</td>
</tr>
<tr>
<td>Total</td>
<td>.16</td>
<td>-.12</td>
</tr>
<tr>
<td>Extraversion‡</td>
<td>.14</td>
<td>-.11</td>
</tr>
</tbody>
</table>

*Right-ear advantage score = (R - L)/(R + L), where R = Right-ear score and L = Left-ear score.
‡EX scale of the Dutch Brief MMPI (Lamijn, et al., 1980).

of Levy's model: (1) dysphoria scores were correlated negatively rather than positively with right-ear advantage, e.g., for dysphoria in the full sample r = -.11 (the right-ear advantage correlation with the VROPSOM dysphoria measure, -.17 was the greatest in magnitude) and (2) for men, extraversion and all but one of the sensation-seeking scores, in particular disinhibition, were positively rather than negatively associated with right-ear advantage, see Table 2.

DISCUSSION

Our results do not support Levy's (1983) hypothesis that hemispheric reliance is related to such aspects of personality as dysphoria, negativism, sensation-seeking, extraversion, tidility, somatization, and the presence of serious psychopathology in the general population. It might be argued that (1) the dichotic-listening task we used is not a valid measure of hemispheric reliance. As we have noted above, there is evidence, however, to support the idea that this dichotic-listening task does reflect hemispheric reliance. It might also be argued that (2) the concept of hemispheric reliance as developed by Levy refers to different aspects of hemispheric reliance than those tapped by our dichotic-listening task. Levy's (1983) model dealt primarily with activation. With regard to hemispheric reliance it may be meaningful to distinguish between activation and performance. The right-ear advantage scores of the dichotic-listening task would then be a measure of performance rather than of activation. The implication would be that personality measures are correlated with activation measures of hemispheric reliance but not with performance measures, and the results of our study would have little or no bearing on Levy's model. A problem with this argument is that Levy's model is based, in part,
on the results obtained with other dichotic-listening tasks which would also be measuring performance. If the two above-mentioned arguments against the validity of our results do not hold, our study can be interpreted as a failure to provide confirming evidence for Levy’s model.

In a study with male subjects, Charman (1979) found that extraverts process iconic information more efficiently in the right hemisphere than in the left hemisphere, whereas introverts do the opposite (p. 657). Charman’s results point to the possibility that introverts exhibit a left-hemisphere-reliant style and that extraverts exhibit a right-hemisphere-reliant style. For the male subjects of this study we noted no evidence to support this idea. Our results suggest, rather, that if extraversion and sensation seeking in men are at all correlated with cerebral asymmetries, they are more likely associated with left-hemisphere activity than with right-hemisphere activity. Finally, we found no support for the hypothesized association between right-hemisphere reliance and somatization, except among the few left-handed respondents in the study.

REFERENCES


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