HANDEDNESS, SYMPTOM REPORTING, AND ACCIDENT SUSCEPTIBILITY

HARALD MERCKELBACH
Limburg University

PETER MURIS
University of Amsterdam, The Netherlands

WILLEM JOHAN KOP
Limburg University

A cross-sectional design was used to examine the relationship among handedness, self-reported symptoms, and accident susceptibility in a nonclinical sample \((N = 285)\). Left-handedness was not found to be associated with elevated symptom reporting (and, consequently, health problems) and accident susceptibility. Thus, the present findings do not support the hypothesis that left-handedness is accompanied by reduced physical fitness or accident proneness.

Two recent lines of research have suggested that there is a close connection between left-handedness and reduced physical fitness. First, according to the influential theory of Geschwind and Galaburda (1987), exposure to high levels of fetal testosterone may give rise to a variety of effects, among them a compromised immune development (which may lead to various immune disorders) and a delayed development of the left hemisphere (which presumably is associated with left-handedness and dysfunctions such as dyslexia and stuttering). Several studies have sought to validate Geschwind and Galaburda’s hypothesis, and though there is evidence for an overrepresentation of left-handedness in certain clinical groups (e.g., allergic diseases; J. Smith, 1987), the association between left-handedness and immune or immune-related disorders is, at best, a weak one (Betancur, Velez, Gabanieu, Le Moal, & Neveu, 1990; Bishop, 1986; McKeever & Rich, 1990; van Strien, Bouma, & Bakker, 1987).

The second line of research is more empirically oriented and was initiated by Coren and Halpern (1991). Based on archival and retrospective data, these authors claim to have shown that left-handers are more likely to die at a younger age than right-handers. For example, in a study of Halpern and Coren (1991), data about handedness of deceased subjects was collected by asking family members which hand the deceased had used for writing, drawing, and throwing. Mean age at death for left-handers and right-handers was 66 and 75 years, respectively. Coren and Halpern (1991) offer two explanations for this dramatic difference. In the first place, they suggest an explanation in terms of accident susceptibility. Because they live in a technological environment that is designed by right-handers, it is hypothesized that left-handers have a higher risk of accidents (and, consequently, of accident-related injuries). Studies concerned with handedness and accident proneness are relatively scarce, but those that have been carried out do, indeed, sustain the idea that non-right-handers are more frequently involved in accidents than are right handers (e.g., Coren, 1989; Daniel & Yeo, 1991; but see Peters & Perry, 1991). In the second place, Coren and Halpern refer to the Geschwind and Galaburda hypothesis on the detrimental effects of high fetal testosterone and to theories that stress the connection between birth-related problems (e.g., premature birth, hypoxia, etc.), left-hemisphere pathology, and left-handedness (e.g., Ross, Lipper, & Auld, 1987).

Correspondence should be addressed to Dr. Harald Merckelbach, Department of Mental Health Sciences, Limburg University, Maastricht, The Netherlands, PO Box 616, 6200 MD.
Halpern and Coren's (1991) finding that left-handers die 9 years before right handers has not gone unchallenged. (See, e.g., New England Journal of Medicine, 1991, pp. 1041-1043.) A number of critics have drawn attention to the methodological shortcomings (i.e., low response rate, retrospective nature of the study, etc.) of the Halpern and Coren (1991) study. Other critics have referred to epidemiological survival data that fail to support the findings of Halpern and Coren (e.g., Kuhlemeyer, 1991). With this controversy in mind, the present study was carried out. More specifically, a cross-sectional design was employed to examine whether there was a relationship among handedness, health complaints, and accident susceptibility in a nonclinical sample.

**Method**

**Subjects**

The sample consisted of 285 subjects (192 women). Subjects were undergraduate students or university employees. Mean age was 22.5 years, range = 17-42 years.

**Assessment and Procedure**

Subjects were asked to complete three questionnaires: the Edinburgh Handedness Inventory (EHI; Oldfield, 1971), the Pennebaker Inventory of Limbic Languidness (PILL; Pennebaker, 1982), and a short accident-susceptibility questionnaire (ACC) constructed by the authors. The EHI asks subjects to indicate their handedness (left or right) in 10 everyday acts (e.g., writing, throwing, etc.). On the basis of the subject's responses to these items, a handedness score can be calculated. This score has a range from +100 ("pure" right-handed) to −100 ("pure left-handed). Thus, the EHI treats handedness as a continuous variable.

The PILL is a self-report symptom inventory that consists of 54 items. These items refer to common symptoms (coughing, dizziness, etc.) rather than to diagnoses that require medical knowledge. The PILL not only encompasses immune or immune-related symptoms (e.g., asthma, strong reactions to insect bites), but also other health problems (e.g., headaches, diarrhea, insomnia). The PILL requires subjects to evaluate the frequency of each symptom on a 5-point scale (1 = "have never or almost never experienced the symptom"; 5 = "more than once a week"). In the present study, the 54 items were summed to obtain a total PILL score (range = 54-270). Pennebaker (1982) summarizes evidence that suggests that the PILL taps a trait, i.e., a stable characteristic. Furthermore, the PILL correlates positively with the presence of health problems and the frequency of physician visits.

The accident-susceptibility questionnaire consisted of five items. Subjects were asked whether they ever had any serious accidents in five different domains (work, traffic, sports, when using tools, at home). Answers were given in a yes/no format and then were summed.

**Results and Discussion**

In accordance with the criteria of earlier studies (e.g., Merckelbach & de Ruiter, 1989), subjects were classified as left-handers (EHI ≤ −50), mixed-handers (EHI between −50 and +50), or right-handers (EHI ≥ +50). With these criteria, there were 18 left-handers (11 women), 18 mixed-handers (12 women), and 249 right-handers (169 women). The frequency of women did not significantly differ among the groups, χ² (2) = .3. PILL and ACC scores then were subjected to one-way analyses of variance in which handedness was the independent factor. Table 1 shows the mean PILL and ACC scores. Left-handers, mixed-handers, and right-handers did not differ with regard to PILL scores, F(2,282) = .08, p = .92. Thus, no evidence was found to suggest that
symptom reporting is elevated in left-handed or non-right-handed subjects. Neither was there an indication that left-handedness is associated with higher accident proneness: The ANOVA performed on the ACC scores yielded no significant result, $F(2,282) = .49, p = .60$. When subjects who never had experienced an accident (ACC = 0) were compared to those who reported at least one accident (ACC $\geq 1$), it was found that absence of accidents was more frequently observed in right-handers (33%) and left-handers (27%) than in mixed-handers (11%). Although this finding fell short of statistical significance ($\chi^2[2] = 2.7, p = .27$), it is in line with the results presented by Daniel and Yeo (1991). These authors concluded that it is mixed-handers rather than left-handers who report more accidents than right-handers.

Table 1
Mean PILL and ACC Scores in Left-handers, Mixed-handers, and Right-handers

<table>
<thead>
<tr>
<th></th>
<th>Left-handers $(n = 18)$</th>
<th>Mixed-handers $(n = 18)$</th>
<th>Right-handers $(n = 249)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PILL</td>
<td>93 (22)</td>
<td>96 (19)</td>
<td>94 (22)</td>
</tr>
<tr>
<td>ACC</td>
<td>1.2 (1.2)</td>
<td>1.4 (1.0)</td>
<td>1.1 (0.9)</td>
</tr>
</tbody>
</table>

Note.—Standard deviations are given in parentheses.

In accordance with previous reports (Oldfield, 1971; Pennebaker, 1982), women were found to be somewhat more (often) right-handed than men ($M$ EHI scores: +76 and +70, respectively; $t[283] = 1.2, p = .17$) and had higher PILL scores than men ($M$s: 97 and 88, respectively; $t[283] = 3.0, p > .01$). These findings lend credit to the quality of the data on which the present study relied.

The findings presented above do not support Coren and Halpern's (1991) claim that left-handedness is associated with reduced physical fitness and greater susceptibility to accidents. One could argue that the size of the present sample was too small to permit evaluation of this claim. However, the effect sizes reported by Coren and Halpern were so large (e.g., a mean reduction in life expectancy of 9 years in left-handers) that even in relatively small samples, differences in symptom reporting and accident proneness are expected. Meanwhile, our failure to observe a significant relationship between handedness and self-reported health problems is by no means unique. For example, Bryden, McManus, and Steenhuis (1991) did not obtain evidence for a connection between left-handedness and self-reported immune disorders in a sample of 743 undergraduate students. Similarly, in a nonclinical sample of 422 students, van Strien et al. (1987) found no indications that autoimmune disorders, allergies, and/or migraine do occur more frequently in left-handers than in right-handers. (See also B. Smith, Meyers, & Kline, 1989, and McKeever & Rich, 1990, for comparable, i.e., null, results.)

Taken together, the studies of van Strien et al. (1987) and Bryden et al. (1991), as well as the present findings, cast doubts on the notion that left-handedness is related to reduced physical fitness (and eventually to reduced life expectancy). Although the possibility that left-handedness is related to direct biological markers of disease rather than self-reported symptoms deserves further study, the null results cited above encourage a reinterpretation of the Coren and Halpern (1991) findings in terms of birth-cohort effects. That is to say, the decrease of left-handedness as a function of age and the over-representation of left-handers in groups that die at a younger age may reflect the relaxed social pressures against left-handedness in the past decades. Recent findings do, indeed, show that the decrease of left-handedness across the age span is accompanied by a corresponding increase in the frequency of subjects who switch from the left to the right hand in writing (Dellatolas et al., 1991; Hugdahl, Satz, Mitrushina, & Miller, 1992).
REFERENCES


