Asymmetrical drawing patterns on the temples by left-handers

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Summary—Twenty-three Japanese genuine left-handers were selected by a Laterality Quotient scale (Maehara, 1989) and asked to draw letter S on their own temples and foreheads. The way they drew on the temples showed an asymmetry that was the mirror reversal of that of right-handers, as found in the previous study. Left-handers drew a reversed letter S on their right temple much more often than on the left temple, whereas right-handers drew reversely more often on the left temple. They also drew it in a reversed way on the forehead irrespective of their handedness.

Parsons and Shimojo (1987) asked participants to identify a letter drawn on various parts of their body and found that they cutaneously perceived it in reverse on the forehead, although they perceived it normally elsewhere. They interpreted this result to indicate that “people are able to imagine viewing through the forehead” (Shimojo, Sasaki, Parsons, & Torii, 1989; p.145). Mori (1991) found that right-handed Japanese participants tended to draw letters in a reversed way on the left temple as well as on the forehead, but not on the right temple. From this asymmetrical pattern, Mori (1991) extended the Shimojo et al. interpretation to conclude that people can imaginarily view through the left temple as well as the forehead.

The participants in Mori (1991) were all right-handers. We should expect a reversed asymmetrical pattern in left-handers. The present study aimed to replicate Mori (1991) with left-handed participants to examine the hypothesis that left-handers can imagine as if they ‘look’ through a transparent forehead and right temple.

In a classic review on left-handedness, Hardyck and Petrinovich (1977) reported that left-handedness, ranging from moderate through strongly left-handed, was found in approximately 10% of the population, although there seem to be

Acknowledgments. The author is indebted to Rika Yokoyama who conducted this experiment under the supervision of the author while working at Shinshu University in Nagano, Japan, and to Rebecca Ann Marck for her help in editing the English manuscript.
somewhat fewer left-handers in Japan. According to Maehara (1989; p.47), the percentage of left-handers is about 5% in Japanese adults. However, we cannot judge easily whether a person is left-handed or not in Japan, because Japanese culture has traditionally discouraged left-handedness, so many Japanese children have been switched to make them right-handers. Some left-handers hold a pen in the left hand but use chopsticks with the right hand. Maehara (1989) invented a scale (LQ: Laterality Quotient) to measure the degree of left-handedness of Japanese that comprises 13 critical behavior checklists such as writing, using chopsticks, drawing, throwing, etc. The LQ varies from +100 to -100: A positive LQ score indicates right-handedness, while a negative value denotes left-handedness. If a person uses the left hand for all 13 critical behaviors, or 13/13, the LQ is -100.

Method
We found 32 volunteer participants who identified themselves as left-handers among undergraduates on our campus and nearby colleges, and among citizens in Nagano City, and measured their LQ using Maehara’s scale. All of them were native Japanese from the middle class. Eventually, we selected 23 of them (14 men and 9 women; 19-25 years old) with LQ scores from -100 to -7.7 (Average LQ, -46.7; SD, 25.7) as genuine left-handers. These 23 authentic left-handers were asked to draw the letter S on their own left and right temples and their foreheads with both the left and right hand. The drawing order was counterbalanced among the participants. Before drawing, they put a strip of white paper (a 18 cm x 79 cm strip folded into a 9 cm x 79 cm band) around their head, and they drew an S six times, each in a different way, using a blue pen for the right hand and red for the left hand. The letters drawn on the forehead and temples were judged to be either “normal” or “reversed” depending on how they appear on the paper strip as judged in Mori (1991).

Results
The results showed an asymmetrical pattern, as expected (see Table 1). The left-handers drew reversed letters significantly more often on the right temple (18 times out of 23 by the right hand, p = .0106, probability calculated directly) as well as on the forehead (20 times out of 23 by the right hand, and 21/23, by the left hand, p = .00024 and .00007, respectively with the direct probability calculation), but almost half and half on the left temple (only 13 times out of 23 by the left hand, p = .677). Although they drew more in reversal way on the left temple but less frequently compared with the right temple.
Table 1
Drawing patterns appearing on the temples along with those of Mori (1991)

<table>
<thead>
<tr>
<th></th>
<th>Left-handers (N = 23)</th>
<th>Right-handers (N = 32)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>Reversal</td>
</tr>
<tr>
<td>Right Temple by Right Hand</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td>Left Temple by Left Hand</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Forehead by Right Hand</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Forehead by Left Hand</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Forehead 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left Temple by Right Hand</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Right Temple by Left Hand</td>
<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

1) Mori (1991) only reported the combined frequencies written by both hands.

It should be noted that there was a correlation between the drawing sites, either the left or right temple, and the hands they used to draw, left or right. When they drew a letter on the temple with the opposite hand, e.g., drawing on the left temple with the right hand, they tended to turn their head toward the side of the drawing hand. Mori (1991) found that this way of drawing on the remote temple evoked more reversed Ss than normal ones. The present results also showed this tendency showing extremely high frequency of reversal drawings (21 times out of 23 for both on the left-temple-by-right-hand and the other way around, p = .00007).

Therefore, we focused on the results obtained from the normal drawing procedure, drawing on the temple with the same-side hand. The present results showed that left-handers tended to draw letters reversely on the right temple but less often on the left temple. Interestingly, this asymmetrical pattern is just the mirror reversal of the results obtained from the right-handers in Mori (1991) where right-handers found to draw reversely more often on the left temple than on the right. These results can be interpreted to show that left-handers perceive the outside world as if they were looking through a transparent forehead and right temple while right-handers were looking through the forehead and the left temple.

Women seem to spend more time in front of mirrors preoccupied with how they look on a daily basis. If so, it would make gender differences in the drawing patterns. Owing to the small sample size, it was not possible to test this interesting hypothesis. It should be needed to examine further the differences found between asymmetrical patterns of perception of the left- and right-handers.
REFERENCES


