

NEUROPSYCHOLOGY: HEMISPHERIC ASYMMETRY

There is much research demonstrating the differences in functions between the left and right halves of the human brain (e.g., Springer and Deutsch, 1989). The left hemisphere (LH) is clearly involved in verbal tasks and the right hemisphere (RH) is clearly involved in spatial tasks and face processing in most right-handed people, also known as *dextrals*. Left-handed people, known as *sinistrals*, usually handle most verbal tasks with their left hemispheres, but show a less clear pattern of hemispheric asymmetry for many other tasks. In general, sinistrals show less of a difference in functions of the two halves of the brain than dextrals. Many studies also suggest that there is less of a difference between the two halves of the brain in women than in men.

Faces are very important in communication. Facial expression can tell us if a person is happy, sad, or angry even when the person's language tells us something else. The right hemisphere cannot understand much language, but is more adept than the left hemisphere at "reading" facial emotion. The right hemisphere is also better than the left hemisphere at remembering and recognizing faces, and seems to produce stronger facial expressions on the half of the face it has most control over when emotions are spontaneous (vs. posed).

The LH controls and receives input more from the right half of the body and the RH controls and receives input more from the left half of the body. This means that the RH has more control over the expression in the left half of your face, and the LH has more control over the expression in the right half of your face.

In this lab, we will investigate our own asymmetries in terms of perceptual biases for viewing faces.

Method

Materials

Sheets of paper
LHBB Face Book

Procedure

LHBB Face Book. This is the Face Book designed by Levy, Heller, Banich and Burton (1983). The instructions are on the cover sheet of the book itself. The answer sheet is the last page of this lab and should be removed. **DO NOT WRITE ON THE TEST BOOKLET.**

In order to assure anonymity, each person in the class should assign himself or herself a five digit subject number (make any number up) and write this at the top of the FACE BOOK answer sheet; be sure that your name is *not* on this answer sheet. Give this sheet to the Instructor after you collect the data.

sub R L

Cut in class

The Instructor can fill in Appendix C, the Data Summary Sheet and either make copies for the students or let students copy the information onto their own summary sheets from the Instructor's Data Summary Sheet.

Results

LHBB Face Book. Appendix B contains a scoring key. On your answer sheet, circle all of your responses which match the key. For example, if you wrote "T" for item 1, circle this item. Now total the number of items you have circled. This is your "L" score, the number of items you chose with the smile on the left. To obtain your "R" score, count the items that you did not circle. Your total FACE BOOK SCORE is R - L.

The authors of the Face Book (Levy, Heller, Banich, and Burton, 1983) found that their group as a whole showed a significant bias for choosing the face with the smile on the left as looking happier than the face with the smile on the right. Thus, our hypothesis that we will test statistically is: People choose the face with the smile on the left as happier than the smile on the right.

For most students, the L score is not the same as the R score. The question: Is the difference due to whether the smile was processed by the RH (on the left in photo) or processed by the LH (on the right in photo), or is it due to chance? We will again use a Chi-Square to calculate the probability that this outcome was due to chance. If chance produces this outcome less than 1 in 20 times, we conclude that is it not due to chance, but due to whether the RH or LH processed the smile. If students do not have any basis for choosing the left or right face as looking happier, then we would expect a 50-50 chance of each outcome (like flipping a coin). Thus, since there are 36 pairs of faces in the book, we expect each student to pick 18 faces with the smile on the left, and 18 with the smile on the right as looking happier. Thus, if there are N students in the class, then $18 * N$ will be our expected number of left face choices for the total class, and $18 * N$ will also be our expected number of right face choices for the entire

N = number of students in the class =

Class L = the class total of the "L scores" from the Data Summary Sheet =

Class R = the class total of the "R scores" from the Data Summary Sheet =

$$\text{Chi square} = \frac{(\text{Class L} - 18 * N)^2}{18 * N} + \frac{(\text{Class R} - 18 * N)^2}{18 * N} =$$

If your Chi Square is greater than or equal to 3.84, then the results would be produced by chance less than once out of 20 repetitions of this experiment, thus, you can reject the idea that the class is only randomly choosing faces with left or right smiles. If

the Class L is larger than the Class R, then the class as a whole is showing a bias to choose faces with the smile on the left as looking happier.

General Discussion

If your FACE BOOK SCORE is negative, this means that you chose more faces with the smile on the left as looking happier than faces with the smile on the right. This is consistent with the ideas discussed in the introduction that your right hemisphere is more involved in affecting facial expression than your verbal left hemisphere. We have demonstrated how the different halves of our brains control different functions to different extents.

"Left" and "Right" are not emotionally neutral terms in our culture and most other cultures. In general, things associated with "Right" seem to be more favorable. We see this in language, for example,

"right" vs. wrong

gauche (French for left, but meaning improper in English)

Left vs. Right in politics

"Sinistral" shares a Latin root with "sinister"

Also,

Left-handed children are often taught to write with their right hand

Can you think of any other examples?

What are your hypotheses about these attitudes?

Many everyday tools are made for right handers. For example, how many left-handed desks are in this classroom (if there are 30 desks, about 4 should be left-handed). Scissors are also usually made for right handers.

Can you think of other right-handed tools?

ADDITIONAL EXERCISE

Spend a day doing tasks with your left hand (if you are right handed) - this will help you see how many things are designed for right handers! For example, hold a glass, open a door, or use scissors with your opposite hand.

References

Annett, M. (1967). The binomial distribution of right, left, and mixed handedness. Quarterly Journal of Experimental Psychology, 19, 327-33.

Briggs, G. and Nebes, R. (1975). Patterns of hand preference in a student population. Cortex, 11, 230-38.

Levy, J., Heller, W., Banich, M., and Burton, L. (1983). Asymmetry of perception in free viewing of chimeric faces, Brain and Cognition, 2, 404-19.

Springer, S. and Deutsch, G. (1989). Left brain, right brain. New York: W.H. Freeman.

LHBB Face Book
Answer Sheet

Subject # _____
Sex _____
Age _____
Date _____
Eye Dominance _____
Writing Hand _____
Handedness Score _____

1	19
2	20
3	21
4	22
5	23
6	24
7	25
8	26
9	27
10	28
11	29
12	30
13	31
14	32
15	33
16	34
17	35
18	36

R score = _____
L score = _____
R - L = _____