Do You Have a Left Brain or a Right Brain Personality? An Elementary School Lesson in a College Classroom

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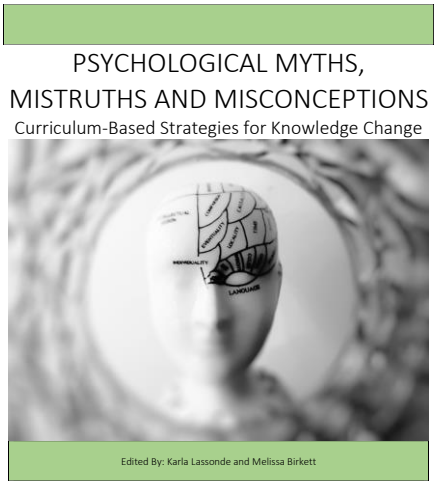

Abstract:

Is it really true people have either a left brain or a right brain personality corresponding with their dominant brain hemisphere? Prior to class, students complete a short reliable survey to identify brain hemispheric dominance and another short survey to identify brain hemisphere personality. During class, we introduce important topics in neuropsychology and challenge a popular myth about left versus right brain personality. With personally relevant data, we reinforce or preview lessons on graph interpretation, correlation, reliability, validity, and hypothesis testing. By guiding students through common-sense leaps built on grains of truth from science, we experience an example of foregoing our critical thinking skills, leading us astray to a false conclusion. From here faculty may emphasize the hallmark of critical thinking and scientific inquiry. We do not accept ideas simply because they sound reasonable. We accept ideas because of evidence.

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Do You Have a Left Brain or a Right Brain Personality? An Elementary School Lesson in a College Classroom (Chapter 5)

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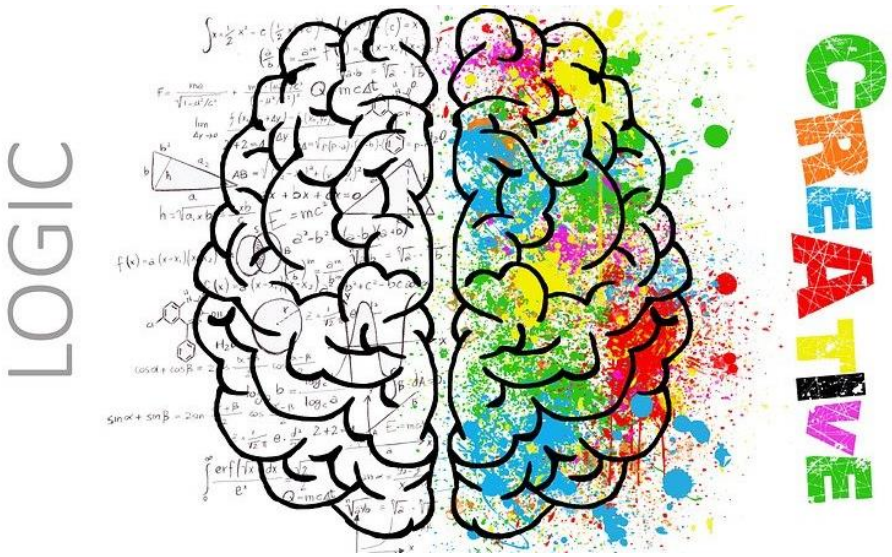
Abstract

Is it really true people have either a left brain or a right brain personality corresponding with their dominant brain hemisphere? Prior to class, students complete a short reliable survey to identify brain hemispheric dominance and another short survey to identify brain hemisphere personality. During class, we introduce important topics in neuropsychology and challenge a popular myth about left versus right brain personality. With personally relevant data, we reinforce or preview lessons on graph interpretation, correlation, reliability, validity, and hypothesis testing. By guiding students through common-sense leaps built on grains of truth from science, we experience an example of foregoing our critical thinking skills, leading us astray to a false conclusion. From here faculty may emphasize the hallmark of critical thinking and scientific inquiry. We do not accept ideas simply because they sound reasonable. We accept ideas because of evidence.

Introduction

In an elementary school class, my teacher decided we would find out which of us is "left brained" and which is "right brained," so we sat completing a checklist. "I like art." I do, so a check for right brain! "I like math." I do, so check for left brain! I had an equal sum for each and seemed to be the only child in class not sure what group I belong in. So I asked my teacher about my brain. "Stop disrupting the educational process," she said with a lamenting sigh. Actually, maybe she did not say that since, in retrospect, it's odd phrasing to use with a little kid. I'd hear a version of that phrase repeatedly throughout high school whenever I raised a question teachers didn't like, so there is likely interference in my memory. But, "memories are accurate recordings" is another myth for another chapter. For now let's consider the myth embedded in my elementary school class activity. Is it really true people have either a left brain or a right brain personality corresponding with their dominant brain hemisphere? The internet has a plethora of pages and beautiful images suggesting so.



Illustrator: Elisa Riva https://cdn.pixabay.com/photo/2017/02/13/08/54/brain-2062057_1280.jpg

I decided to turn the activity I completed as a student in elementary school into an activity I use when teaching college students. Prior to an Introductory Psychology class about the brain, students complete two short surveys, one to identify brain hemispheric dominance and one to identify brain hemisphere personality. Most students complete both surveys in 5 to 10 minutes. During class they receive a slip of paper with their scores. Our class discussion of the surveys brings personal relevance to the psychology concepts as we review our results in the context of the broader lesson.

Brain Lateralization & Hemispheric Dominance

The brain is divided symmetrically into left and right hemispheres each connecting with afferent and efferent neurons to receive sensory information and control actions from the opposite half of the body. For example, persons writing with their right hand are doing so with feedback to and instruction from their left brain hemisphere. Aspects of different cognitive functions such as language, reasoning, spatial processing, facial processing, and music are lateralized more to one hemisphere or the other (e.g., Springer & Deutsch, 1998). The most startling results illustrating this lateralization began with Sperry's studies of split-brain patients whose corpus callosum, bridging the hemispheres, was severed surgically as a last-ditch effort to help people suffering from severe epilepsy (e.g., Gazzaniga et al., 2009).

Prior to class, students complete a 17 item scale I designed to estimate brain hemispheric dominance through students' self-reported use of their left or right hand, leg, foot, or eye in various contexts (Figure 1).

Figure 1. Brain Lateralization Hemispheric Dominance Scale

Describe which hand, leg, or foot you normally use for the following activities using the following scale:

1. always or almost always use my **left** hand / leg / foot / eye
2. typically my **left** hand / leg / foot / eye, but sometimes the other
3. about **equally** often with each hand / leg / foot / eye
4. typically my **right** hand / leg / foot / eye, but sometimes the other hand
5. always or almost always my **right** hand / leg / foot / eye

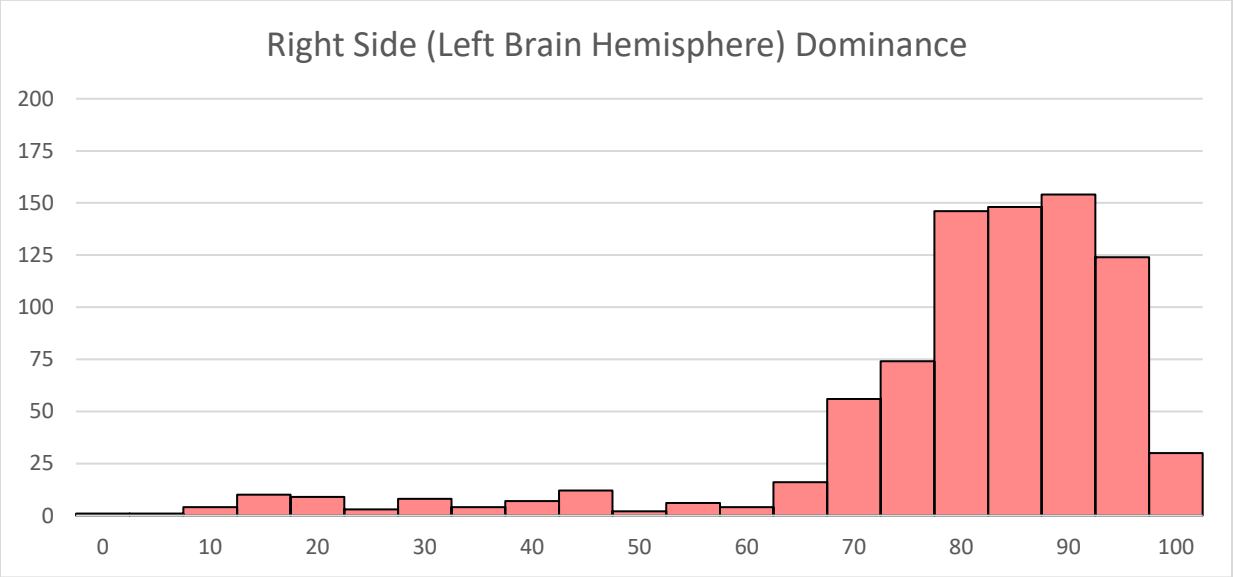
a. Writing
b. Drawing
c. Throwing
d. Cutting with scissors
e. Brushing teeth
f. Cutting with a knife (but without fork)
g. Using a spoon
h. Striking a match (hand holding the match)
i. Opening a box (hand on lid)
j. Moving a computer mouse
k. Moving a cursor with a laptop trackpad
l. Unlocking a door with a key
m. Crossing your arms over your chest (arm on top)
n. Kicking a ball (the foot used)
o. Crossing legs (leg on top)
p. Make a thumbs up with your dominant hand. Look around. Pick a distant, but clearly visible, distinct object (e.g., clock, stop sign). Now quickly move your thumb to cover the distant object. Your vision will be fuzzy, but that's okay. Keep your thumb there and close one eye while you keep the other open. Now close the other eye while you open the former. Alternate the eye you open. You should be able to see both your thumb and the object clearly with one eye. Notice that in one case your thumb and object are closer together. Describe the comparison between your eyes.
    1. When my left eye is open & right closed, my thumb nearly covers the object.
    2. When my left eye is open & right closed, my thumb is closer to the object than when I alternate open & closed eyes.
    3. Regardless of which eye I have open, my thumb and the object are about the same distance apart.
    4. When my right eye is open & left closed, my thumb is closer to the object than when I alternate open & closed eyes.
    5. When my right eye is open & left closed, my thumb nearly covers the object.
q. Hold your hands like saying hi and bring your thumbs and index fingers together making a triangle. Extend your arms straight out in front of you and make it so that you see a distant object through the triangle. Now slowly move your hands to your face. Describe the eye you still see through.

1. Seeing with my left eye
3. I can't see with either eye because the opening is in the spot between my eyes.
5. Seeing with my right eye.

Scoring: Average all the items, then subtract 1, then multiply by 25. Results range from 0 (entirely left side / right brain hemisphere dominance) to 100 (entirely right side / left brain hemisphere dominance)

To introduce brain lateralization, the class discusses a histogram of their own data from the activity (Figure 2). I report the class data only in aggregate and use myself as a data point; my score is 40. The class interprets the histogram, revealing common knowledge; the vast majority of students have a right-side bias. Our histogram also provides an opportunity to reinforce or preview a lesson from research methods. The Brain Lateralization Hemispheric Dominance Scale has very high inter-item reliability (alpha = .908). While the items look different on the surface (e.g., writing, kicking ball, thumb in front of eyes), the high consistency suggests they may all be measuring a meaningful underlying theoretical construct.

Figure 2.



Note. 819 Introductory Psychology students over 6 semesters. Chronbach's Alpha = .908.

Left Brain & Right Brain Personality – Taking Students a Leap too Far?

Though students are often surprised by split brain research, our class histogram of brain lateralization is mundane to them. We can take common sense further. If particular processes are lateralized, we might expect related abilities and preferences - like art, music, and math – are lateralized. This is an all-too-natural leap to make as research findings become sharpened and levelled for the general public. For example, musical ability is not unitary, but many inter-

related cognitive processes, only some of which show small effects of lateralization to the right hemisphere (Hines, 1987). But I do not highlight this research yet. Instead I continue pontificating. It's easy to take our thinking further. Entire clusters of preferences and abilities might form a broadly linear, analytical left-brain personality and a holistic, intuitive right-brain personality. Indeed, we could go even further with best-selling books (e.g., Lilienfeld et al., 2010) and expensive training workshops (e.g., Hines, 1987) to help people use the less dominant half of their brain. Though it may seem counter-intuitive to present arguments we know are false, it's ultimately helpful to lead students through these ideas nonchalantly. They nod along without at first realizing each of these leaps is a hypothesis that – no matter how plausible – is still in need of evidence.

Figure 3. Left Brain versus Right-Brain Personality Scale

Rate how closely each of the following describes you from 1 (not at all like me) to 5 (quite a bit like me). You may choose 2, 3, or 4 in between with 3 meaning somewhat like me, but also somewhat unlike me.

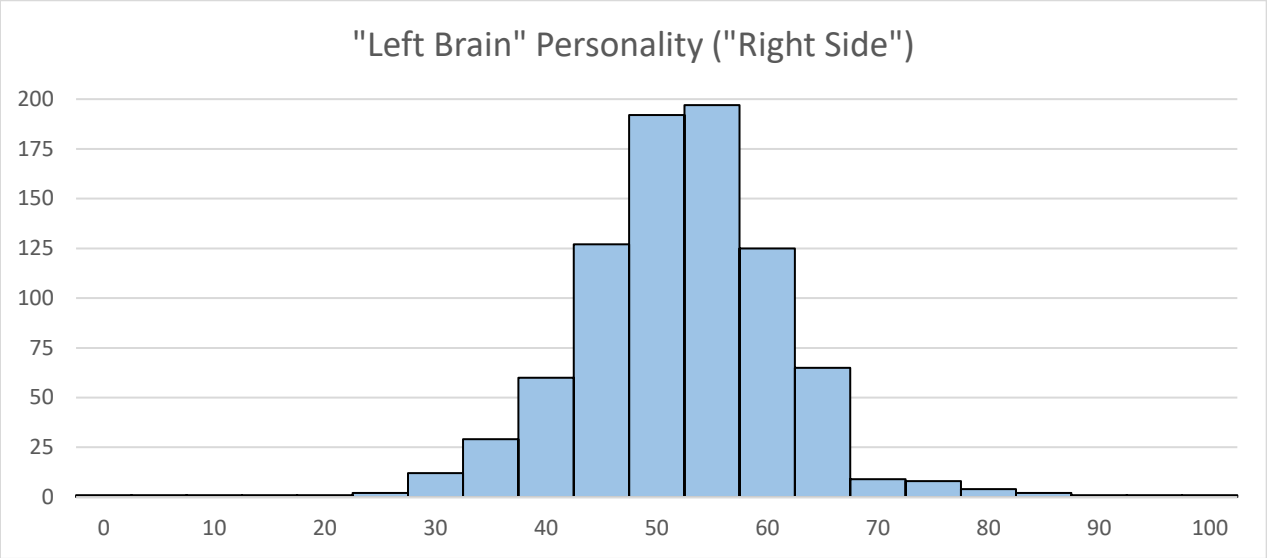
a. I'm organized.
b. I'm intuitive.
c. I'm logical.
d. I'm a risk-taker.
e. I'm punctual (on time).
f. I'm creative.
g. I'm good at critical thinking.
h. I'm good at knowing what other people are feeling
i. To really understand something, I consider it good to look at all the details closely.
j. To really understand something, I consider it good to step back and see the whole situation.

Scoring: Reverse score items b, d, f, h, and j. Average the items, then subtract 1, then multiply by 25. Results range from 0 (entirely left-brain personality) to 100 (entirely right-brain personality).

Now that students nodded along, it's time to review our results from a 10-item left- versus right-brain personality scale I constructed (Figure 3). Class discusses a histogram of their own data (Figure 4). I report the class data only in aggregate and use myself as a sample data point; my score is 65. The class interprets the histogram. Here students might start to become puzzled. If our class is overwhelmingly lateralized to the right side, shouldn't our class be mostly people with left brain personalities? Some semesters students notice this with no prompting, but other semesters it takes a nudge from my non-verbal puzzled looks. Moreover, we can once again consider reliability. Reliability of this scale is low (Chronbach's Alpha = .554). Even though all the items were generated to measure one dimension (i.e., left-versus-right brain personality), the low reliability shows the items have much less consistency with one

another than you would expect. Without reliability, we might be skeptical about if we are actually measuring a real one-dimensional individual difference.

Figure 4.



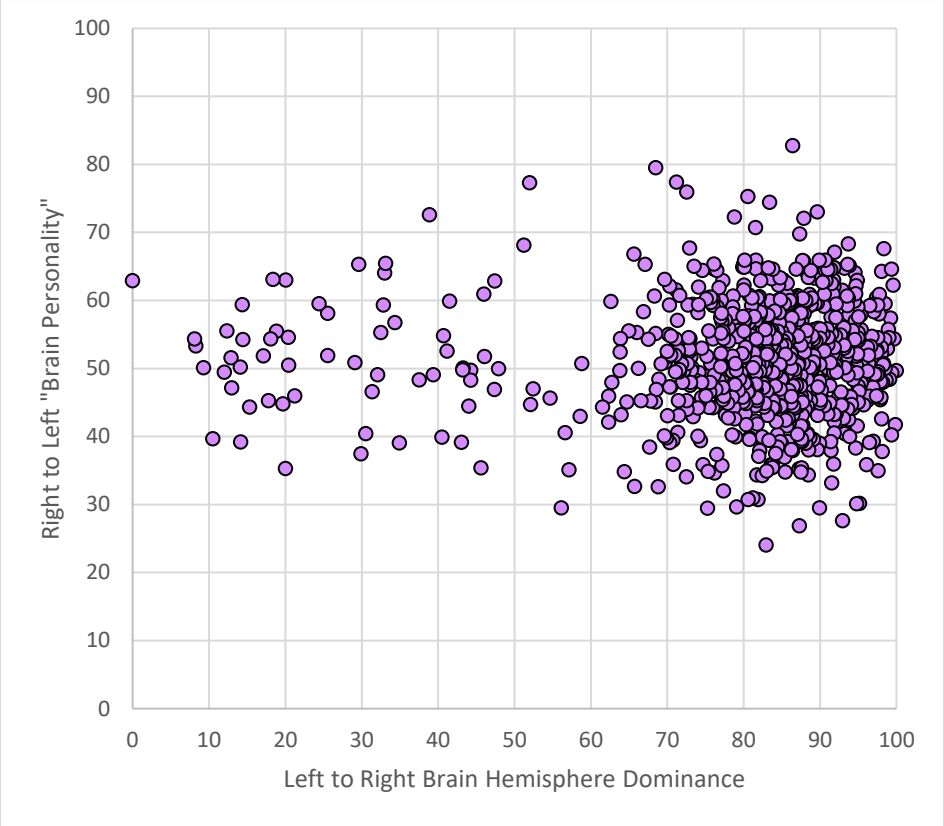
Note. 819 Introductory Psychology students over 6 semesters. Chronbach's Alpha = .554. 35 of 854 students (4%) were excluded for careless responses based on extra items like, "please choose two for this item."

Brain Lateralization and Personality

Now that students have interpreted their results and histograms for both scales, it is time to consider our hypothesis. If hemispheric dominance due to brain lateralization corresponds with a left or right brain personality, then how do we hypothesize the two measures are related? Here we can either preview or reinforce a lesson on correlation. We would hypothesize that those with greater left hemisphere brain dominance (i.e., right side bias) would have more of a left-brain personality. That is, we hypothesize a positive correlation between the measures. Now I reveal the scatterplot (Figure 5). Even without statistical analysis, it is obvious there is no statistically significant correlation.

Interestingly, the zero correlation may be *less* obvious to your students enrolled in statistics. The data clearly are not random, as zero correlations are normally shown in statistics classes. Instead there is a cluster of dots to the right. With some thought and nudging, students realize it's because most people have a right side bias. Seeing a clear pattern in data with no correlation helps crystalize for students the concept of correlation.

Figure 5.



r = .010

p = .784

N = 819

What are Students Learning?

Building on this short class activity, we introduce important topics in neuropsychology and challenge a popular myth about left versus right brain personality (APA Learning Goal 1). With personally relevant data, we reinforce or preview lessons on graph interpretation, correlation, reliability, validity, and hypothesis testing (APA Learning Goal 2). Yet possibly the most important lesson is critical thinking. People are not silly for thinking there could be left versus right brain personalities. The idea is built on some truths, and each step toward the conclusion seems reasonable. How many of your "crazy uncle's" beliefs are sensible in that they contain a grain of truth and each step seems like only a small leap? Yet your uncle's conclusions may be wrong. Worse, how many of our own beliefs are like his? Indeed, if we as faculty present left versus right brain ideas to students with a confident erudite tone, students will probably just accept it. We need to conclude the lesson on a more emphatic note. As scientists, we do not merely think. We find out. And when we put the left-versus-right brain hypothesis to the test, it fails.

I remember sitting in my elementary school class completing the left-versus-right brain activity, puzzled I had both a "left brain" and a "right brain." I remember being dismissed for having a "wrong" answer, and I remember contemplating it. Which brain do I *really* have? I always got

high marks in math easily, and spent free time designing math puzzles well beyond our grade level. But I also really loved art, had adults compliment my artwork, took art lessons outside school, and had artwork in a student showcase. I remember reaching the conclusion that I must really be good at math, and bad at art, because unless adults are angry, they say nice things they don't really mean.

It would be another year or two before I started considering how schools could teach something as true even if it's false. That is why, at the age of nine or so, I gave up what might have been a magnificent career as a painter. I had been disheartened. So I chose another profession and learned to be a sensible grown up scientist. Sharing my personal story about art helps engage students since embedding personal stories into lessons facilitates learning (Grobman, 2015). Claiming to have knowledge we do not have as grownups, can have real world consequences. But then again, I did return to my interest in art during college and I am happy to be a scientist who can share this chapter with you today.

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