



# CALIFORNIA STATE SCIENCE FAIR 2012 PROJECT SUMMARY

<b>Name(s)</b> Caitlin E. Takeda	<b>Project Number</b> <b>J0729</b>
<b>Project Title</b> <b>Does Brain Hemispheric Dominance Affect Visuospatial Ability?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> The goal of this project was to determine if brain hemispheric dominance affects a person's visuospatial ability. I became interested in this topic because I am left-handed and the other three members of my family are also left-handed and we all enjoy art and creative projects. I have heard that left-handers are supposed to be more artistic and creative because the right hemisphere of their brain is dominant. I wanted to find out if this myth was true.</p> <p><b>Methods/Materials</b> 400 people were given a 5-part, timed questionnaire I developed to test several visuospatial skills. In doing so, I hoped to obtain a measure of a person's artistic ability. The questionnaire was designed to test a subject's ability to 1) draw a 3-dimensional object, 2) determine the orientation of an object in space, 3) visualize "white" or "empty" space, 4) perform "mirror writing", and 5) see a pattern in a series of visual images and predict the next image. I analyzed the data using independent variables of age, gender, and hand, foot, and eye dominance. Also, hemispheric dominance, defined by the degree of either left or right-sided dominance, was considered. The dependent variable was their score on the questionnaire.</p> <p><b>Results</b> Left-handers scored significantly higher on the questionnaire than right-handers (<math>p = .0006</math>). Also, left-foot and left-eye dominant subjects scored significantly higher than right dominant subjects (<math>p = .0006</math>, <math>p = .005</math>). When brain hemispheric dominance was considered, Major Right Brain Dominant (LLL) subjects scored significantly higher than Major Left Brain Dominant (RRR) subjects (<math>p = .006</math>). And the greater the degree of right brain dominance, the higher the score. When age was considered, the older the subject, the higher their score. The "older than 8th grade" group scored higher than the 8th, 7th and 6th grade groups but the difference was not significant (<math>p = .281</math>, <math>.063</math>, <math>.053</math>). Females scored slightly higher than males, but the difference was not significant (<math>p = .345</math>).</p> <p><b>Conclusions/Discussion</b> My hypothesis was correct. Brain hemispheric dominance does have a significant effect on visuospatial ability. And, if accurately drawing a 3D cube is a measure of artistic ability, the more right brain dominant you are, the greater your artistic skills. In other words, left-handers are more artistic than right-handers.</p>	
<b>Summary Statement</b> This study evaluates the relationship between brain hemispheric dominance and visuospatial skills, which are components of artistic ability.	
<b>Help Received</b> My mother assisted me in scoring some of the questionnaires and editing my report. My father taught me how to use Adobe Photoshop and Microsoft Excel. Several teachers at Medea Creek Middle School allowed me to administer the questionnaire to students in their classes.	