CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
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Project Number
J0622

Project Title
Does Number Sense Develop with Age?

Abstract

Objectives/Goals
My objective was to learn if humans can improve their own automatic number sense, or if the ability is innate and set at birth. In addition, I wanted to determine if there is a gender difference in automatic number sense.

Methods/Materials
After researching characteristics of automatic number sense, I created a math test with problems testing estimating, logical reasoning, and proportional reasoning at a level that could be challenging but answerable at all age levels (if good number sense is present). I tested 52 2nd-grade students, 66 4rh-graders, 56 6th-graders, 61 8th-graders, and 54 10-11th graders; using the same subjects, I also compared results of 146 males and 143 females. I analyzed the results for accuracy estimating items, answering logic and proportion questions, and time in completion.

Results
My results determined that number sense does improve with age and there is a difference in automatic number sense between males and females. The 8th grade average correct (57.83%) and 10-11 grade (58.33%) was significantly higher than the second grade average (32.5%). Fourth and 6th-grade averages were better than 2nd and similar in significance (44.83% and 49.64% respectively) to each other, but not as accurate as the older two subgroups. In addition, when comparing males to females (regardless of age), males did average higher at 49.25%, compared to females at 47.65%. Estimation abilities and time completion resulted in similar conclusions for age and gender.

Conclusions/Discussion
Researchers are currently debating the innate vs. learned issue with regards to automatic number sense. My experiment showed, using a significant number of students, that number sense does improve with age, and therefore can and is learned through academic and life experiences. The importance of this finding is in identifying children with a weak number sense early in development so activities can be structured to improve the child#s skills and enhance his or her understanding quickly and easily. The experiment further indicates a natural difference in males vs. females, which validates one theory of brain differences in the genders set through the evolutionary process generations ago.

Summary Statement
I tested 289 students to determine that automatic number sense can be taught and does improve with age.

Help Received
Mother helped edit my text and tested her 8th grade students. My sister tested high school students.