CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
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Project Number
J0702

Project Title
The Effect of Age and External Stimuli on Reaction Latency

Abstract

Objectives/Goals
Distractions have caused many car crashes because people cannot react fast enough when distracted. The objective of this study is to determine if age and distractions affect reaction times.

Methods/Materials
I wrote a computer program in C++ to determine reaction time. The program was designed to measure the length of time it takes for a person to touch a key after the computer screen turns yellow. The screen would go through one to four random color changes at random time intervals before it turned yellow so the color change could not be anticipated. A total of 60 people divided equally into three age groups were tested: under 20 (young), 20-39 (middle), and over 39 years (old). Each subject was tested ten times with no distraction to determine baseline reaction time, then ten times while talking on a cell phone when asked open-ended questions according to a written script, and ten times while listening to loud music. After all data were recorded, statistical analyses were performed.

Results
At baseline, the young group had an average reaction time of 0.40996 seconds, the middle group had an average reaction time of 0.41501 seconds, and the old group had an average reaction time of 0.479445 seconds ($p=0.03$). The cell phone conversation lengthened reaction times by 44.7% in the young group ($p=0.008$), 25.6% in the middle group ($p=0.002$), and 24.3% in the old group ($p=0.0005$). Listening to music shortened reaction times by 2.7% in the young group ($p=0.5$), 2.4% in the middle group ($p=0.3$), and 5.7% in the old group ($p=0.1$); however, these results were not statistically significant.

Conclusions/Discussion
People should not talk on their cell phones while participating in activities requiring fast responses, but listening to music is acceptable. Because older people have slower reaction times than younger people, older people may be less capable when they need to complete tasks requiring quicker reactions.

Summary Statement
I wrote a computer program to determine reaction time and measured the effects of age and distractions on reaction times.

Help Received
Cell phone conversation speaking: Safia Abou-Zamzam; recording data: Aida Abou-Zamzam, Ahmed Abou-Zamzam, Sharon Lum; debugging program advice: Albin Gasiewski; statistical software advice: Sharon Lum