CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)

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Project Number

S0304

Project Title

Can You Handle It? A Study of How Stress Is Managed under Stressful Situations

Abstract

Objectives/Goals

This project will measure changes in physiology and intellectual performance due to stress. Stressed subjects will exhibit measurable physiological changes and decreased intellectual/manipulative performance when compared to an unstressed condition.

Methods/Materials

Subjects were tasked with finishing visual/kinesthetic games under time constraints. To measure the effect of stress on memory, subjects memorized a sentence prior to the test and were asked to recite it at the test's conclusion. Parameters including heart rate, blood pressure, and temperature that reflect physiological stress were measured before (baseline values), during, and post-test. Forty four students were tested and were equally represented between males and females and high school and grade school.

Results

All subjects exhibited increased heart rate and blood pressure during the test. However, there was little difference between baseline and post-test heart rates and blood pressures. During the tests, girls' and boys' heart rate increased 12.9% and 16.7% respectively. Post-test, girls' heart rate remained 4.3% above baseline. Boys' were 2.8% lower. The average high school student heart rate increased by 20.1% compared to the baseline. The grade school students' heart rate increased 9.6% . The high school group remained 2.8% above baseline but the grade school levels was -1.5%. Blood pressure in boys and girls increased during the test but returned nearly to baseline upon completion. Both groups' blood pressure dropped after testing but high school values remained slightly elevated above baseline. In contrast, grade school blood pressure decreased to below baseline. Temperature variation, was an insignificant 0.2%. Only 33% of the participants could recite the "tongue twister" after the test. Some students who said they felt calm yet exhibited elevated blood pressure and heart rates. Subjects who stated that they would performed better in the absence of time limitations, also exhibited physical manifestations of stress and negative effects on their performance.

Conclusions/Discussion

The data support the hypothesis: external stressors cause measurable physical responses in humans. However, the effect of stress on performance is mixed. With the exception of two tests, there is not a strong correlation between decreased performance and physical manifestations of stress. Results will be modified due to continued testing.

Summary Statement

To determine if external stressors affect physical and mental responses within a human.

Help Received

Patti Daws helped make charts used in board presentation and with the use of Microsoft Excel.