



California Science Center
CALIFORNIA STATE SCIENCE FAIR
2001 PROJECT SUMMARY

Your Name (List all student names if multiple authors.)

Connor W. McCarty

Science Fair Use Only

J1521

Project Title (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9)

**Recovery of Visual Acuity Following Vestiblo-Ocular
 Relfex Stimulation in Aviators vs. Non-Aviators**

Division

X **Junior (6-8)** _ **Senior (9-12)**

Preferred Category (See page 5 for descriptions.)

15 - Physiology

Abstract (Include Objective, Methods, Results, Conclusion. See samples on page 14.)

Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.

This project was done to see if there was a difference between military aviators and non-aviators in visual acuity recovery time after vestibulo-ocular reflex (VOR) stimulation provided by chair rotation. The influence of age, subjective history of motion sickness, and experience in tactical vs. non-tactical (i.e., highly-maneuverable vs. less maneuverable) aircraft on visual acuity recovery after VOR stimulation was also studied. Aviators were expected to have shorter recovery times than non-aviators. The study was done using an office chair with a headrest to perform whole-body rotations with the head immobilized. Prior to rotations, the test subject read a Snellen eye chart from a distance of ten feet. Then the subject was rotated manually twenty times at one rotation per second (one hertz). After spinning, the test subjects' eyes would quiver back and forth quite rapidly (a condition called nystagmus), which decreased visual acuity. The test subject then read two words that were posted ten feet away, one with a font size corresponding to 20/50 visual acuity and one with a font size corresponding to 20/30 visual acuity. The subject was timed as he or she tried to read the words. The average time for visual acuity to recover to 20/50 and 20/30 was less for aviators. Age and subjective history of motion sickness were also correlated with visual acuity recovery time. Visual acuity recovery time was shown to increase with non-aviators' increasing age. Aviators, however, apparently adapted to VOR stimulation over time, as they demonstrated a quicker recovery time with increasing age. Finally, there appeared to be no significant difference in visual acuity recovery times between tactical and non-tactical military aviators.

Recovery of visual acuity following VOR stimulation can be different in different populations. Studies such as this could be useful in screening or training potential aviators.

Summary Statement (In one sentence, state what your project is about.)

This project was done to see if there was a difference in visual acuity recvoery time in aviators vs. non-aviators following vestiblo-ocular reflex stimulation provided by chair rotation.

Help Received in Doing Project (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4.

My mother helped me find references for background research and helped with vocabulary. My father contacted Point Mugu Naval Base so I could test aviators and other personnel.