



**CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY**

Name(s) Connor W. McCarty	Project Number J1017
Project Title Twirl Training: Can You Keep Your Balance?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The goal of this project was to determine if ice skaters have faster recovery of visual acuity following full-body rotation than non-ice skaters due to an adaptation of the vestibulo-ocular reflex (VOR).</p> <p>Methods/Materials A swivel chair with a headrest was positioned 10 feet from a wall onto which was affixed a Snellen eye chart. A large black fixation dot was also posted on the wall. The subject (an ice skater or control subject) was seated with head secured and had distance visual acuity tested. Next, the chair was rotated at 1 Hz for 20 seconds while the subject attempted to focus on the fixation dot. During spinning, two words were posted 10 feet away, correlating to 20/30 and 20/50 visual acuity. Subjects were timed after spinning to determine how quickly they could read the words.</p> <p>Results The results showed that more experienced ice skaters demonstrated faster recovery of visual acuity after rotation than same-aged controls. This effect was most significant in their first two years of ice skating. The average ice skater had a recovery time of 6.3 seconds to 20/50 visual acuity, and 10.9 seconds to 20/30, while the average non-ice skater recovered to 20/50 in 10.7 seconds and to 20/30 in 15.8 seconds.</p> <p>Conclusions/Discussion These results suggest that recovery of visual acuity after VOR stimulation is a learned adaptation. This information could potentially be useful for people with abnormalities in their balance systems or VOR. Instead of having their inner ear removed or disabled surgically, as is sometimes done, patients could possibly simply "train" their inner ear through multiple stimulations of the vestibulo-ocular reflex in a type of therapy to avoid dizziness.</p>	
Summary Statement The purpose of this project was to investigate whether faster recovery of visual acuity following full-body rotation can be a learned response.	
Help Received My mother helped me in revising and editing my results and conclusion. My father helped me construct the graphs in this project. Used volunteer skaters at the Oxnard Ice Skating Rink and volunteer control subjects at Mesa Union School.	