



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Zlatko K. Minev	Project Number S0320
Project Title The Effect of Alzheimer's Disease on Visual Perception	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Alzheimer's disease (AD) is one of the most socially significant diseases in older people. The goal of this project is to establish the effect of Alzheimer's disease on visual perception (in particular, on static and dynamic stereoscopic vision and on figure-ground segregation). I hypothesize that AD subjects have a significantly higher reaction time (RT) to the above mentioned categories of visual perception. If the hypothesis is supported, the next goal is to establish whether my stimuli can be a basis for developing a non-invasive visual test for the early diagnosis of Alzheimer's disease.</p> <p>Methods/Materials Informed consent was obtained for each participant in the AD-group and in the control group of same average age non-dementia subjects. I developed a novel experimental paradigm and programmed an original set of visual stimuli. To generate the stereoscopic stimulation I used anaglyphic techniques. RTs of the AD-group to each of the visual stimuli was measured and compared to those of the control group. The experimental procedure was absolutely non-invasive: the subject pressed a button once they perceived the stimulus and the reaction time was automatically measured and saved in a data base on the computer.</p> <p>Results The hypothesis was strongly supported: The AD group showed much higher reaction times (~500% on average) to my set of visual stimuli in comparison to the control group. The t-test for each experiment confirmed the statistical significance of the difference between the two groups. The results showed that 100% of RTs for AD subjects were beyond the normal RT-range (as determined by the 1% confidence limit).</p> <p>Conclusions/Discussion Could my stimuli be useful for AD diagnostics? To my knowledge, this project is the first study evaluating RT in Alzheimer's for the categories of visual stimulation I examined. My hypothesis, that AD subjects will have significantly increased RT under the experimental paradigm I developed, was strongly supported. The results suggest that AD affects those specific kinds of visual perception. Moreover, based on 1% confidence limit for the age-matched control group, I found that all AD cases were successfully classified as being outside the response range for the controls. This indicates that the visual stimuli I designed are a very effective basis for early diagnostic test for AD.</p>	
Summary Statement To establish the effect of Alzheimer's disease on visual perception (stereoscopic vision and figure-ground segregation) and to determine whether my stimuli could be an effective basis for a non-invasive visual test for early diagnosis of AD	
Help Received A consultation about the anaglyphic technique.	