



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) Joseph S. Levenson	Project Number S1410
Project Title Psychometric Comparison of the ADAS with a Computerized Measure of Reaction Time among Alzheimer's Disease Patients	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Alzheimer's Disease can only be diagnosed clinically by documenting the presence of dementia. The Alzheimer's Disease Assessment Scale (ADAS) has become the de facto gold-standard for assessing the efficacy of anti-dementia treatments. Another test is the Perception-Response Evaluation (PRE), which was essentially developed by CMINDS as a warm-up test to the ADAS. Importantly, the PRE provides a measure of simple nonverbal reaction time (RT), simple verbal RT, and reversed verbal RT. This study set out to discover, Is the PRE test more sensitive to decline in cognitive function in Alzheimer's patients than the traditional ADAS test?</p> <p>Methods/Materials The purpose of the current investigation was to conduct a longitudinal, psychometric comparison of the ADAS with the administration of the Perception Response Evaluation Test (PRE), among a representative sample of nineteen patients with Alzheimer's disease. The data to be analyzed in the current project included participants' scores on the computerized ADAS and the reaction time (RT) measures from the PRE. These data were compared for longitudinal trends across a study period of roughly 12 months in duration. Specifically, the experimental hypothesis was tested by comparing the slopes of these respective measures across time.</p> <p>Results The study showed that both the ADAS and the Reversed Verbal (RV) Measure of Reaction Time (RT) have similar reliability, but the RV showed more sensitivity to decline. Test-Retest Reliability was measured, using Pearson's R Correlation. The R for the ADAS was 0.77 and 0.79 for the RV test with both p values less than 0.001. However, when correlation was measured between the two tests, it was shown that there was no significant correlation between performance on the ADAS and performance on the Reaction Time test, which may indicate that these two tests may measure fundamentally distinct cognitive processes.</p> <p>Conclusions/Discussion The study has shown that both the ADAS and the RV-RT task are reliable and sensitive measures of decline, but that the RV-RT may provide a more sensitive measure of executive functions. Based on the current results, it may be reasonable to suggest that the RV-RT task may have potential for supplementing current best practices for evaluating cognitive decline associated with AD, and for assessing the putative efficacy of experimental treatments for this disorder</p>	
Summary Statement My project determined that a measure of reaction time can supplement current best practices of assessing Alzheimer's disease.	
Help Received Mother/Father helped drive me to Irvine; Aaron S. Kemp taught me about different methods of statistical analysis	