

The goal of the CoVE project is to use the BP Visualization Center to build Immersive Virtual Reality scenes that help people with cognitive disabilities.

## Visual Cognition in Alzheimer Disease

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<http://www.cs.colorado.edu/~l3d/clever/projects/cove.html>

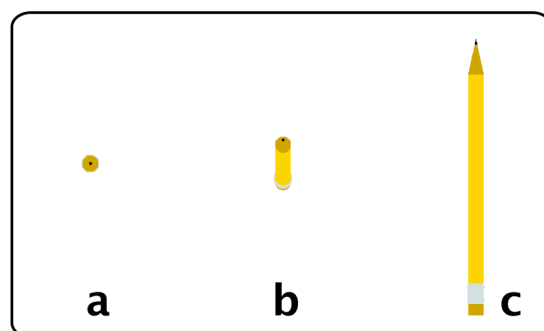
*A Cognitive Levers research project conducted at the Center for Lifelong Learning and Design. This project is sponsored by the Coleman Institute for Cognitive Disabilities.*

*Developed with the assistance of Audrey Vernon*

The long-term research goal of this project is to develop a visual cognitive test battery, using computer-based visual images, that will identify persons likely to progress to Alzheimer disease prior to their meeting conventional diagnostic criteria. Tests based on the ability to recognize objects visually are used because visual processing deficits occur early and frequently in patients with AD, and such visual dysfunction can progress independent of memory impairment.

In one type of test currently being developed, subjects are asked to view a 3D object displayed in the BP Center's virtual reality, Immersive Virtual Environment (IVE). Initially, the object is presented in an unfamiliar view and then slowly rotates into a more familiar view. The subject stops the rotation as soon as the object is recognized. Based on preliminary studies, the current hypothesis of this work is that

patients likely to progress to AD need to have more of the object revealed before they recognize it, than do age-matched normal controls. An illustration of such a test is shown in this figure of a pencil that would rotate continuously from the view in position (a) to position (c).



Further development of this work will include 3-dimensional images in which an object can only be identified based on its motion or color, but not its outline.

There are over 4000 patients with mild amnesic cognitive impairment involved in treatment trials aimed at prevention of AD or the slowing of its onset. However, not all patients with minimal memory impairment will develop AD, and **the ability to predict which patients will progress to AD is crucial for development of early drug treatments that prevent disability from the disease.**