



Can Correctly Drawn Necker Cube-Copy Lines Predict Clinical Diagnosis among TheAlzCenter.org Memory Clinic Population?

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Abstract

The Necker cube test is a cognitive screening test used for the detection of dementias. We used a simple scoring method, where only the correctly drawn lines were scored, to predict dementia diagnoses at thealzcenter.org memory clinic. There was significant correlation between the number of correctly drawn cube lines, to age and diagnosis. Multivariate linear modeling showed this simple scoring differentiated Alzheimer dementia from other dementia diagnoses and mild cognitive impairment in thealzcenter.org patients. Quantifying Necker cube test can be a useful adjunct for diagnosis in a memory clinic.

Introduction

Copying a cube is a simple pen and paper test that is widely used for detecting dementia. It is used in well known screening batteries, such as the Short Test of Mental Status [1] and Bender Gestalt Test [2]. The shape used is an optical illusion of a cube; a wireframe drawing of a cube in isometric perspective that was first published by the Swiss crystallographer Louis Albert Necker in 1832. When the parallel lines in the cube cross, there is some ambiguity such that, it is unclear which is in front and which is behind. Additional information, required for visualizing the three dimensional perspective is supplied by cortex, such that most persons see one interpretation of the cube, and some even experience "flipping" of the perspective of the cube. [3] Most persons see the lower-left face as being in front, with the top side visible. [4]

One can imagine this task is much more difficult for a patient with dementia as the cortical information supplied may be less than those without dementia. [1] While the cube-copying test is useful for routine clinical dementia screening, it is unknown if more information could be accrued from it for utility in screening for earlier and preclinical stages of dementia. The test examines more than one aspect of cognitive function, such as line orientation, complicated parietal

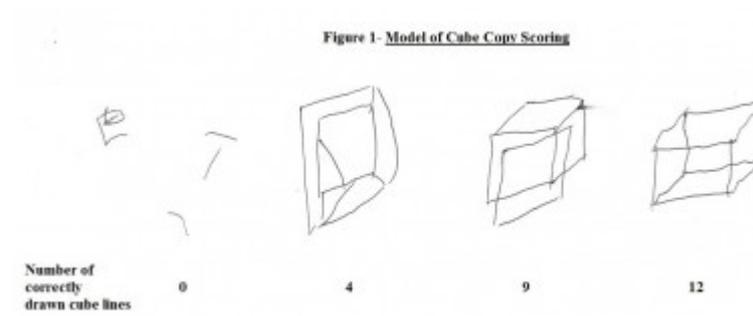
and occipital visual processing, and is easily quantified.

At thealzcenter.org we are interested in adapting existing neuropsychological tests for use in what is currently considered prodromal or pre-clinical dementia. In this study we set out to examine if counting the number of lines correctly drawn while copying the Necker cube can provide a rough estimate of cognitive dysfunction in our dementia patients. We wanted to clarify whether a simple quantitative scoring of the cube-copying test, used in isolation, could rapidly assess early dementia in patients by predicting cognitive test performance and diagnosis.

Illustrations

Illustration 1

Figure 1: Model of Cube Copy Scoring Using TheAlzCenter.org Scoring Method.



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