

Semantic Memory and Language Learning in Alzheimers Disease and Semantic Dementi

<https://neurodegenerationresearch.eu/survey/semantic-memory-and-language-learning-in-alzheimers-disease-and-semantic-dementi/>

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Contact information of lead PI Country

USA

Title of project or programme

Semantic Memory and Language Learning in Alzheimers Disease and Semantic Dementi

Source of funding information

NIH (NIA)

Total sum awarded (Euro)

€ 2,216,700.92

Start date of award

01/02/2014

Total duration of award in years

4

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Semantic memory, Language Development, Semantics, Semantic Dementias, visual search

Research Abstract

DESCRIPTION (provided by applicant): One of the most significant public health challenges facing much of the industrialized world today involves the management of Alzheimer's Disease

and associated dementias. Although advances in molecular biology hold promise for identifying drug targets that will slow the progression of several forms of dementia, our healthcare system remains limited in its capacity to effectively treat macro-scale deficits in cognition and language. This is especially true with respect to progressive disorders of language and human communication, many of which reflect the loss of conceptual knowledge (i.e., semantic memory). To date, the development of theoretically-principled language interventions for dementia has been limited by two factors. First, neuroscience lacks a cohesive understanding of how regional brain damage impacts the organization and integrity of human semantic memory. Second, traditional neuropsychological rehabilitation approaches assume that learning is not possible in the context of progressive memory disorders. We seek to overcome these limitations through two specific aims. In Specific Aim 1, we will examine the potential for language maintenance over a two year period as we train patients with Alzheimer's Disease and Semantic Dementia on a carefully-crafted, personalized micro-lexicon consisting of approximately 100 words. Patients will train on this highly constrained vocabulary via a combination of repeated naming and semantic feature generation. This treatment approach is unique in that it protects a finite lexicon against loss rather than training forgotten concepts ad hoc as disease severity worsens. We will examine correlations between regional cerebral gray matter, neuropsychological performance, and language retention across time via pre/post structural neuroimaging and repeated administration of a comprehensive cognitive battery. Specific Aim 2 represents a complementary investigation of the nature of the mechanisms underlying naming impairment in Alzheimer's Disease and Semantic Dementia. We will investigate several aspects of visual search organization as participants name trained and untrained pictures. The high temporal resolution of eyetracking will yield essential insights into the relationships between visual search patterns, naming accuracy, and potential effect of treatment in these patient populations. We will also correlate these observed patterns of visual search with regional gray matter atrophy. We will contextualize these aims within the context of a broader model of semantic organization that correlates patterns of semantic impairment and learning in these clinical populations.

Lay Summary

PUBLIC HEALTH RELEVANCE: Dementia represents one of the most significant public health challenges facing society today, and language impairment is among its most functionally debilitating symptoms. We propose a treatment that targets preservation of personalized, highly functional vocabulary in two major dementia subtypes (i.e., Alzheimer's Disease and Semantic Dementia). We will examine cognitive and neurological predictors of a positive treatment response in these populations. This work offers an essential step forward in managing communication impairments and prolonging functional independence for millions of Americans.

Further information available at:

Types:

Investments > €500k

Member States:

United States of America

Diseases:

Alzheimer's disease & other dementias

Years:

2016

Database Categories:

N/A

Database Tags:

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