

# The Relationship Between Set-Shifting and Lexical Retrieval in Healthy Individuals

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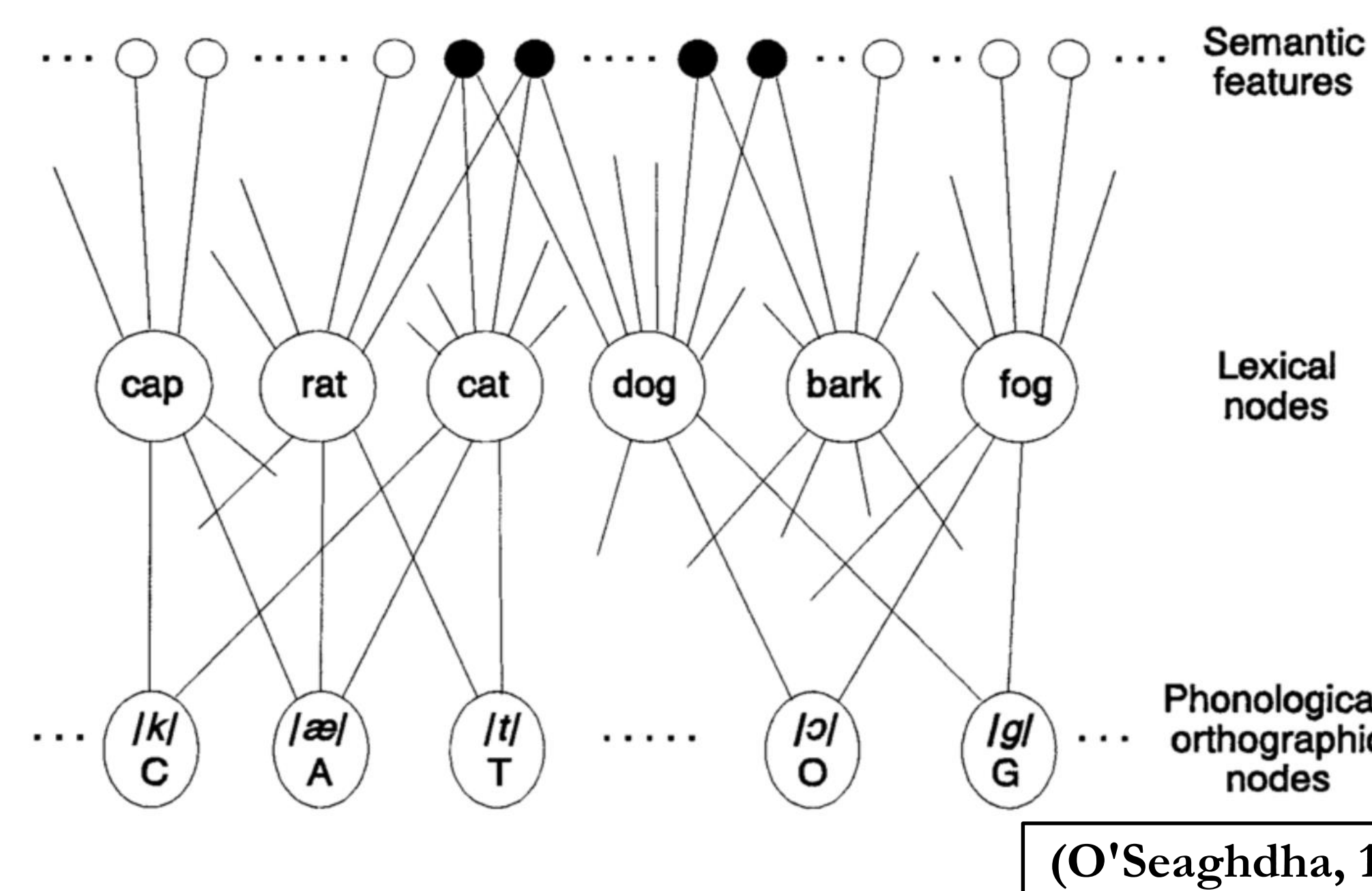


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## Background

- **Set-shifting** is the ability to change between items. Move from one item to the next.
- **Lexical retrieval** is the process of finding the spoken word associated with a desired concept
- Set-shifting is an important skill during lexical retrieval because it contributes to noun and verb finding speed and accuracy. Set-shifting aids in conversational dialogue to switch from word to word and between topics.



## Limitations

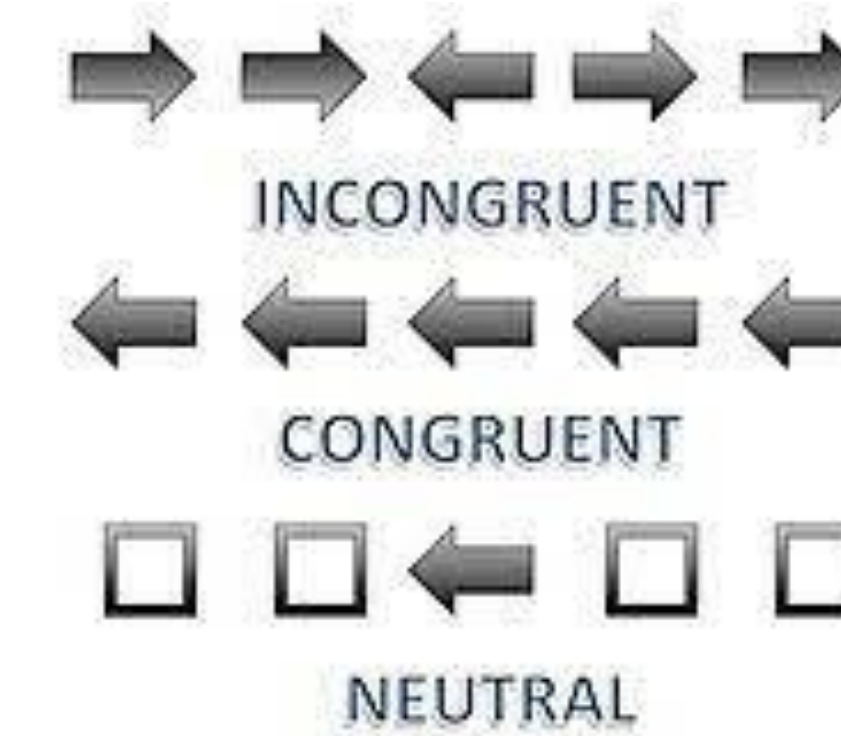
- Tasks inconsistencies between using verbal and non-verbal tasks.
- When looking at if cognition impacts lexical retrieval, specifically set-shifting, we have to make sure the tasks are non-verbal.
- The bilingual study was prompted and answered verbally (Hernandez et al., 1999).
- All but one task (the Trail Making Test) was done verbally when testing older adults on their shifting abilities related to noun and verb naming (Higby et al., 2019).
- Task inconsistencies between noun and verb retrieval tasks.
- The bilingual study presented line drawings of nouns (Hernandez et al., 1999).
- Category fluency tasks require participants to alternate between pieces of furniture and fruit (Higby et al., 2019).
- We need to look at both noun and verb retrieval.
- Most research has been done on healthy individuals.
- Therefore, it is important to look at set-shifting and lexical retrieval in a non-verbal way and focusing on the time and accuracy of both noun and verb retrieval in people with Alzheimer's Disease.

## Objectives

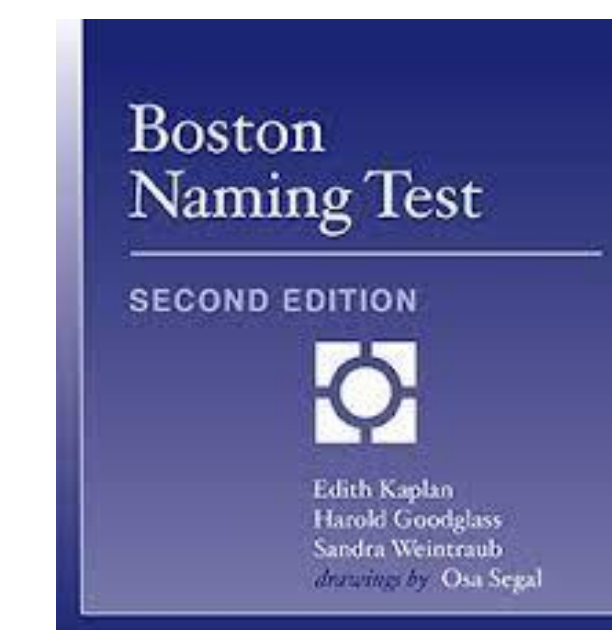
- Is set-shifting correlated with noun and verb retrieval in healthy individuals?
- Is set shifting correlated with noun and verb retrieval in adults in various stages of dementia?
- Hypothesis 1: Set-shifting abilities are correlated with time and accuracy of noun retrieval.
  - Rationale: Individuals with good set-shifting abilities are faster and more accurate when naming objects.
  - Rationale: Older individuals have better set-shifting abilities than younger individuals. However, they show slower response time, but better accuracy.
- Hypothesis 2: Adults in various stages of dementia have ↓ accuracy and ↑ (slower) RT.
  - Rationale: When performing the Stroop Test, adults with Alzheimer's Disease took longer to respond and produced more errors compared to elderly controls (Amieva et al., 2004).

## Methodology

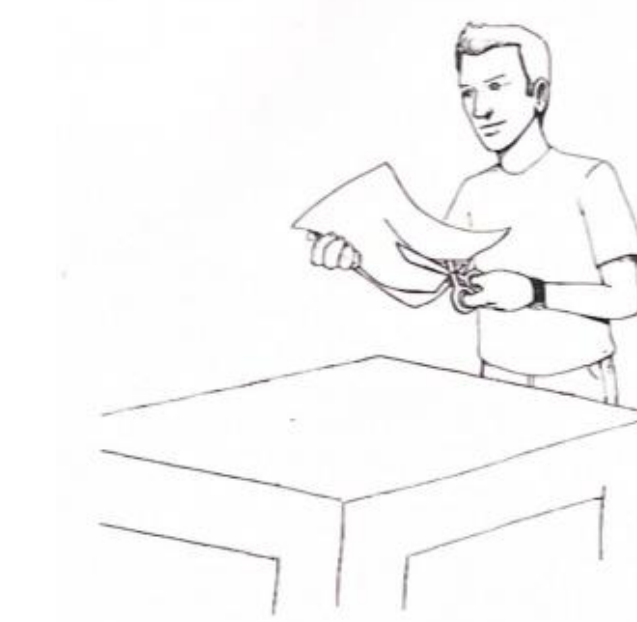
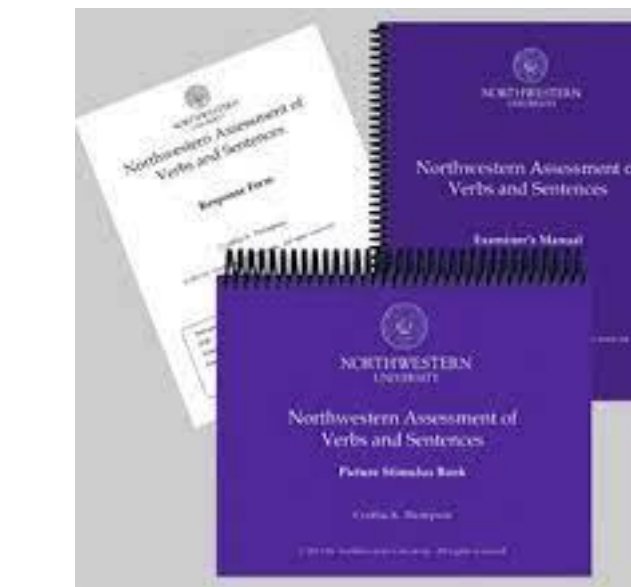
### Test of Set Shifting: Flanker Task



Set Shifting: The difference in both accuracy and response time between switch and no-switch trials



Accuracy and response time for nouns  
BNT= 60 items



Accuracy and response time for verbs  
VNT= 24 items

### Participants:

N=60 HC  
N=30 Individuals with Alzheimer's Disease  
  
Matched for age, education, and SES

### Tasks:

Flanker Task  
BNT  
VNT  
  
Randomized Blocks

### Analysis:

Paired T-test  
Within Subjects Design  
Comparing performance on tasks for both accuracy and response time.

## Literature Review

- Set-shifting has been tested in numerous studies that suggest it is correlated with lexical retrieval.
- Who: Older adults 55-84 y.o.
- What: Shifting ability as measured by the trail making tasks and alternating verbal fluency AND accuracy/RT for nouns and verbs.
- Results: ↑ shifting ability correlated with ↑ accuracy and ↓ (faster) RT (Higby et al., 2019).
- Who: Adolescents 8-30 y.o.
- What: Shifting ability measured by non-verbal (trail making tasks, design fluency tasks) and verbal (verbal fluency tasks, color-word interference tasks) tasks.
- Results: Adolescents 13+ performed better on verbal and non-verbal tasks than younger participants (Kalkut et al., 2009).
- There is evidence to suggest set-shifting is only correlated with noun retrieval.
- Who: Older adults 55-84 y.o.
- What: Shifting ability as measured by the trail making tasks and alternating verbal fluency AND accuracy/RT for nouns and verbs.
- Results: Shifting ability has impact on speed of lexical retrieval only for objects (Higby et al., 2019).
- Who: Spanish-English bilingual adults (mean age of 70.9 y.o.) and college aged controls
- What: Verbal noun naming black line drawings.
- Results: Older adults had higher error rates the more times they had to switch between languages (Hernandez et al., 1999).

## Clinical Implications

- This will help us understand the underlying components that may impact lexical retrieval in different groups.
- Lexical retrieval is a complex process that includes semantics and phonology, but also involves executive functions like set-shifting.
- Understanding each area that can impact lexical retrieval will aid in selecting appropriate therapies for lexical retrieval deficits
- If hypothesis 1 is correct, this means that shifting abilities are related to both noun and verb retrieval for healthy individuals.
- If hypothesis 2 is correct, this means adults in various stages of dementia have difficulties with shifting abilities which impacts their lexical retrieval abilities.

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### Conflict of interest

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