

The Relationship Between Resolution of Semantic Interference and Non-verbal Inhibition

Hypothesis: Individuals who have difficulty with nonverbal inhibition will also have difficulty with resolution of semantic interference.

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Background

Inhibition: The ability to stifle non target responses.

Semantics: The definition and qualities of a given word. The characteristics that are activated during lexical retrieval.

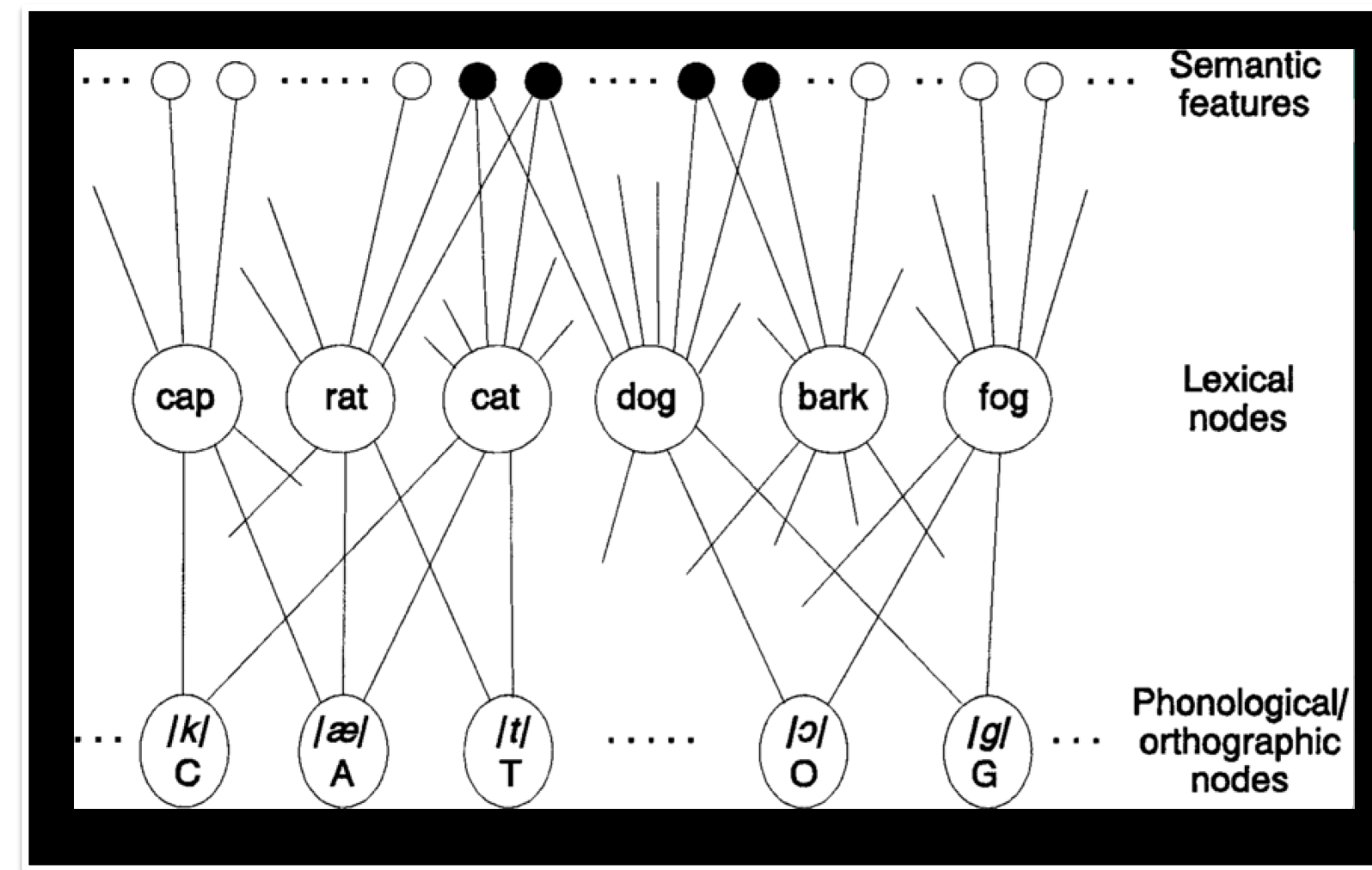


Figure 1: Lexical Interactive Activation Network

Relationship:

Many semantic characteristics are activated at once.

Theoretically, for effective lexical retrieval you must inhibit non-target items.

Therefore, inhibition is an important component of lexical retrieval.

Expansion of Previous Studies

Previous studies have looked at:

1. Semantic control
2. Nonverbal control

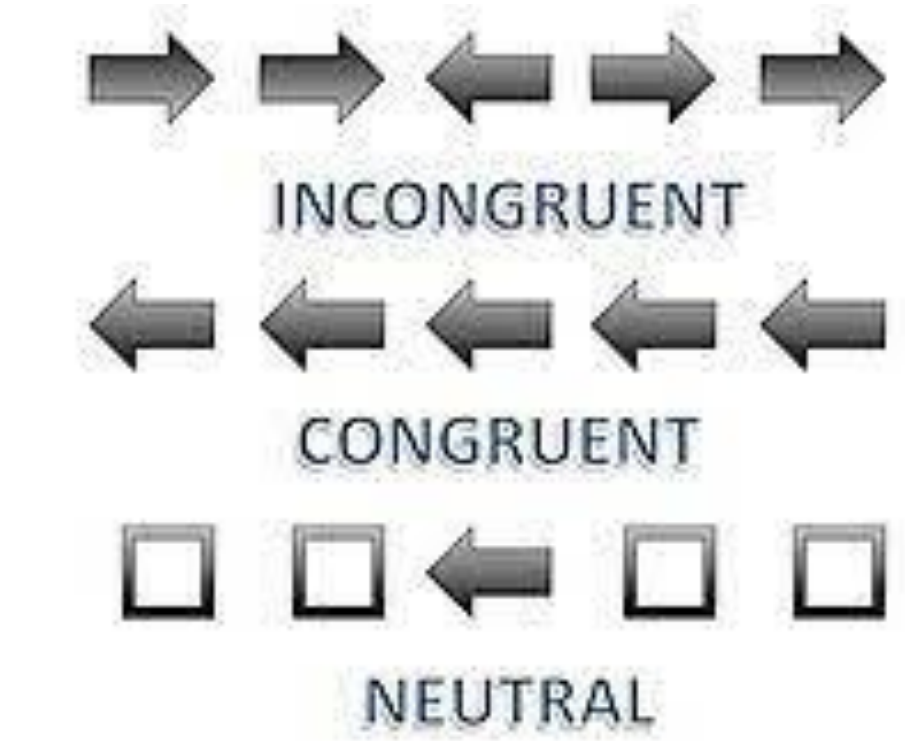
In populations of:

1. Healthy college aged controls
2. Older adults
3. Individuals with aphasia
4. Bilinguals

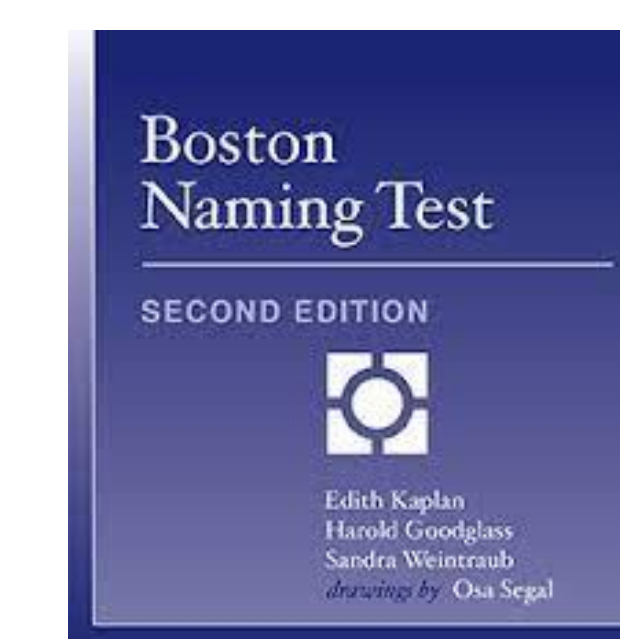
The present study looks directly at the relationship between resolution of semantic interference and non-verbal inhibition ability in healthy controls and individuals with Alzheimer's.

Methodology

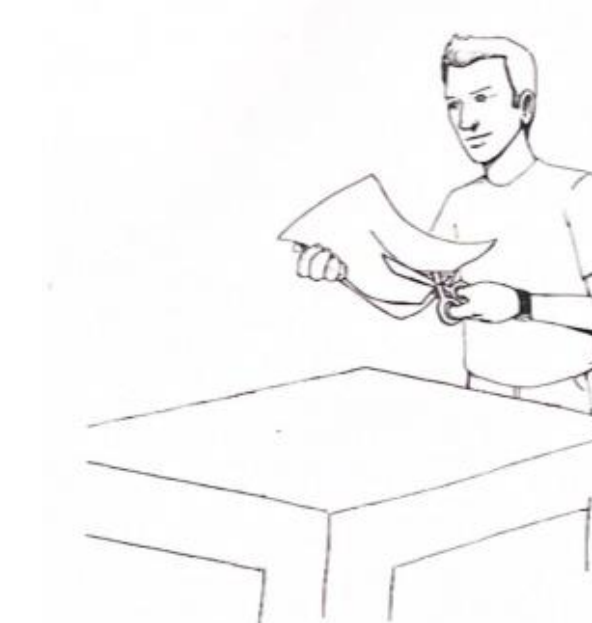
Test of Inhibition:
Flanker Task



Non-Verbal Inhibition: The difference in both accuracy and response time on congruent and incongruent trials



Accuracy and response time for nouns
BNT= 60 items



Accuracy and response time for verbs
VNT= 24 items



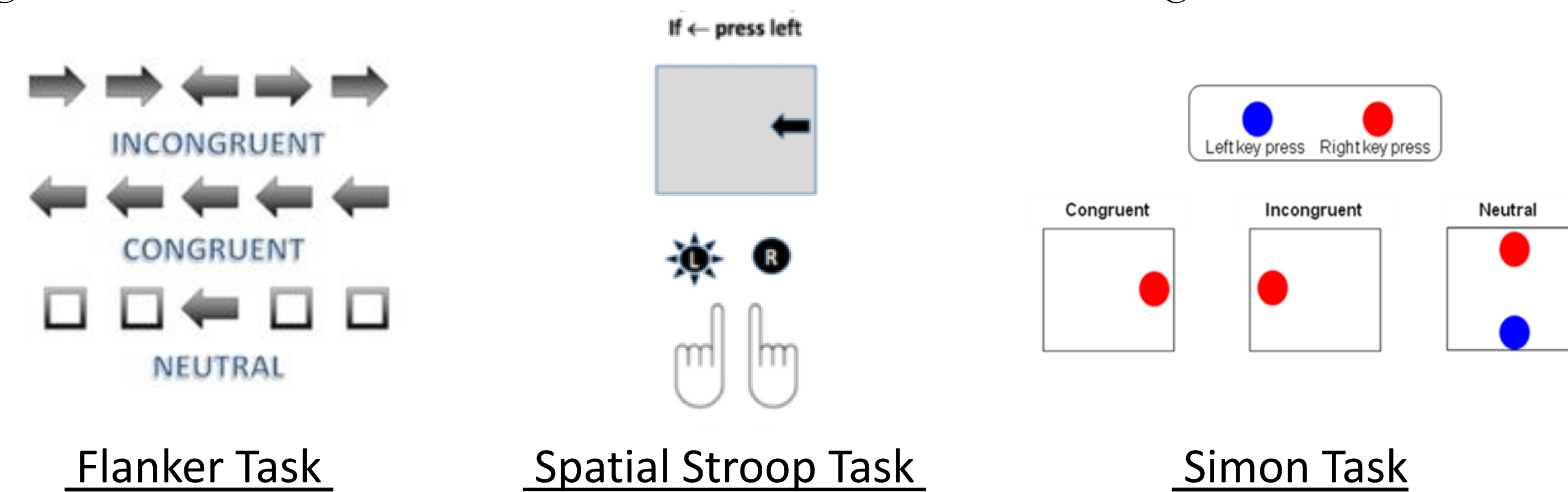
Accuracy and response time for semantic decisions
PPT Test: 52 items

Literature Review

The relationship between inhibition and semantic interference:

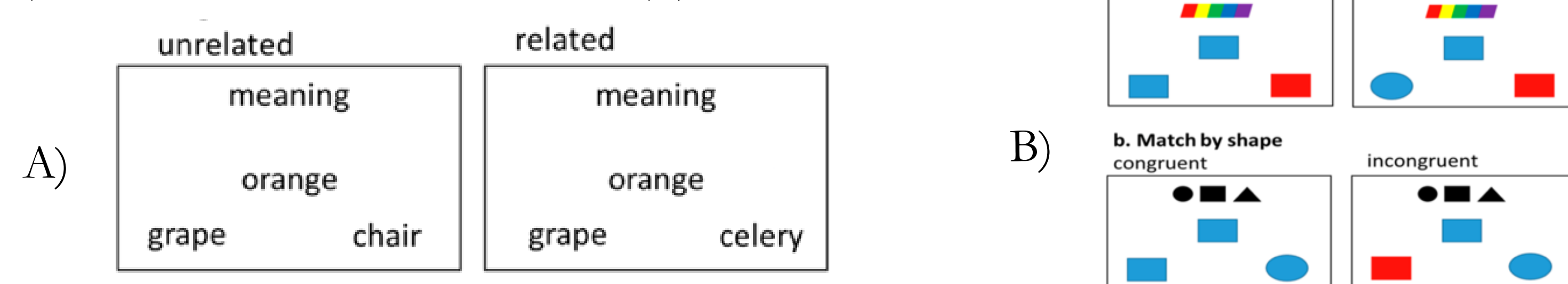
1. The importance of nonverbal inhibition has been noted in the comparison of monolinguals and bilinguals.

Bilinguals were faster on nonverbal inhibition tasks than monolinguals.



Bilinguals practice more inhibition because they have to suppress/control a second language.

2. The importance of inhibition has also been explored between semantic interference tasks (A) and nonverbal inhibition tasks (B).



Nonverbal inhibition and semantic control was highly correlated in bilinguals. Both bilingual individuals with and without aphasia exhibited significant effects of control across verbal semantic tasks as well as nonverbal tasks.

3. When examining semantic control in healthy individuals, the ability to identify semantic associations between concepts in picture was slower in older individuals. While the ability to identify semantic associations between concepts in words was similar between younger and older adults.

(C) Test of semantic control (picture)



Research Question

Research Question: Is difficulty with resolution of semantic interference correlated with non-verbal inhibition ability in healthy controls and individuals with Alzheimer's?

Hypothesis: Individuals who have difficulty with nonverbal inhibition will also have difficulty with resolution of semantic interference.

Clinical Implications

Understanding the relationship between the resolution of semantic interference and non-verbal inhibition will help with tailoring treatments for those who struggle with the resolution of semantic interference.



If this hypothesis is correct, it means that refining nonverbal inhibition skills can help to improve deficits in the resolution of semantic interference.



If this hypothesis is incorrect, it means that focusing on refining nonverbal inhibition skills will not help to improve deficits in the resolution of semantic interference.

Acknowledgements

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References

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- Wu, W., Lohani, S., Homan, T., Krieger-Redwood, K., & Hoffman, P. (2022). Healthy ageing has divergent effects on verbal and non-verbal semantic cognition.
- Zhou, B., & Krott, A. (2018). Bilingualism enhances attentional control in non-verbal conflict tasks—evidence from ex-Gaussian analyses. *Bilingualism: Language and Cognition, 21*(1), 162-180.
- Figure 1: Lexical Interactive Activation Network based on Dell and ... - researchgate. (n.d.). Retrieved April 23, 2023.

Participants:

N=60 HC
N=30 AD

Matched for age,
education, and SES

Tasks:

Flanker Task
BNT
VNT
PPT
Randomized Blocks

Analysis:

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