According to most models of lexical processing (e.g., Dell et al., 1997; Levelt, Roelofs, & Meyer, 1999), semantic and phonological information are processed in separate stages; the level of interaction between stages remains debated.

Understanding whether lexical processing is discrete or interactive helps facilitate interpretation and treatment of different deficit profiles in persons with aphasia (PWA).

Certain psycholinguistic factors also impact processing at different stages in PWA.

Previous studies (e.g., Kiran & Thompson, 2003) have found item category and typicality impact semantic processing in PWA but no studies to date have examined these effects in both semantic and phonological tasks.

AIM: To further the understanding of the nature of semantic and phonological processing in PWA versus neurologically-intact controls by examining general processing differences as well as the effects of category and typicality on processing within each system.

RQ1: What are the differences between controls and PWA in processing across all tasks?

RQ2: How do task demands influence processing according to accuracy and RT within the semantic and phonological tasks in each participant group?

RQ3: What are the effects of category and typicality on processing across all tasks?

METHOD

Participants

32 PWA as a result of left MCA stroke(s) and 10 neurologically-intact controls participated.

PWA were administered a battery of standardized language assessments including the Western Aphasia Battery-Revised (WAB-R), Boston Naming Test (BNT) & Pyramids and Palm Trees Test (PAPT).

RESULTS

No significant differences between groups on the SEM tasks (F(3,37) = 2.09, p > .10) was observed.

PWA significantly less accurate than controls for PN (F(3,36) = 20.94, p < .001) and PN-P task types (F(3,36) = 14.56, p < .001) across all tasks (all at p < .001 level).

Overall, PWA were significantly less accurate than controls on the phonological but not semantic tasks while PWA were slower to respond than controls across all nine tasks.

Despite group differences in accuracy and RT, similar trends in task performance within each group can be observed.

No significant main effect of group on accuracy for PWA (F(3,14) = 5.66, p < .001) and controls (F(1,16) = 5.07, p < .01) for SEM tasks only.

No typicality effect was significant for PWA (F(3,14) = 4.37, p < .001) and approached significance for controls (F(3,16) = 3.18, p < .05) for SEM tasks only.

Item typicality significantly impacted reaction time for PWA (F(3,58) = 2.78, p < .05) for SEM tasks only.

No typicality effect observed in controls.

In each group, category and typicality effects were observed in SEM tasks only.

CONCLUSIONS

PWA experienced the most ease with tasks requiring semantic processing but struggled to successfully complete tasks that required any level of phonological processing.

For both groups, the semantic variables (i.e., category and typicality) impacted processing only in tasks that explicitly required a semantic judgment.

These results appear to align best with the framework of discrete serial models of lexical processing; however, the locus of PWA’s impairments and the nature of the experimental tasks must be considered:

PWA’s anomia rendered the PN tasks the most difficult of the three task types, but PWA also struggled with tasks that just required phonological manipulation and segmentation (i.e., PN-P tasks).

The challenge of segmenting the targets in the PN tasks may have overridden the effects of the inherently semantic variables of category and typicality.

Further study including a semantic (no-name) condition that also examines the effects of phonological factors on semantic processing may further elucidate the discrete or interactive processes involved with lexical processing in PWA.

SELECTED REFERENCES


ACKNOWLEDGEMENTS

This study was supported by the National Institutes of Health NIDCD NCIM grant R01DC011223 and NIDCR grant R01DC011517.

Understanding semantic and phonological processing deficits in adults with aphasia: Effects of category and typicality

Erin Meier1, Melody Lo2, & Swathi Kiran1

Boston University, Sargent College of Health and Rehabilitation Sciences1; South Shore Hospital, Weymouth, MA2

BACKGROUND

Types of Aphasia

Anomic Broca’s Wernicke’s Conductive Global

Anomic 17% 6% 50%

Broca’s 10% 17% 50%

Wernicke’s 17% 6% 50%

Conduction 10% 17% 50%

METHOD

Participants

32 PWA as a result of left MCA stroke(s) and 10 neurologically-intact controls participated.

PWA were administered a battery of standardized language assessments including the Western Aphasia Battery-Revised (WAB-R), Boston Naming Test (BNT) & Pyramids and Palm Trees Test (PAPT).

RESULTS

No significant differences between groups on the SEM tasks (F(3,37) = 2.09, p > .10) was observed.

PWA significantly less accurate than controls for PN (F(3,36) = 20.94, p < .001) and PN-P task types (F(3,36) = 14.56, p < .001) across all tasks (all at p < .001 level).

Overall, PWA were significantly less accurate than controls on the phonological but not semantic tasks while PWA were slower to respond than controls across all nine tasks.

Despite group differences in accuracy and RT, similar trends in task performance within each group can be observed.

No significant main effect of group on accuracy for PWA (F(3,14) = 5.66, p < .001) and controls (F(1,16) = 5.07, p < .01) for SEM tasks only.

No typicality effect was significant for PWA (F(3,14) = 4.37, p < .001) and approached significance for controls (F(3,16) = 3.18, p < .05) for SEM tasks only.

Item typicality significantly impacted reaction time for PWA (F(3,58) = 2.78, p < .05) for SEM tasks only.

No typicality effect observed in controls.

In each group, category and typicality effects were observed in SEM tasks only.

CONCLUSIONS

PWA experienced the most ease with tasks requiring semantic processing but struggled to successfully complete tasks that required any level of phonological processing.

For both groups, the semantic variables (i.e., category and typicality) impacted processing only in tasks that explicitly required a semantic judgment.

These results appear to align best with the framework of discrete serial models of lexical processing; however, the locus of PWA’s impairments and the nature of the experimental tasks must be considered:

PWA’s anomia rendered the PN tasks the most difficult of the three task types, but PWA also struggled with tasks that just required phonological manipulation and segmentation (i.e., PN-P tasks).

The challenge of segmenting the targets in the PN tasks may have overridden the effects of the inherently semantic variables of category and typicality.

Further study including a semantic (no-name) condition that also examines the effects of phonological factors on semantic processing may further elucidate the discrete or interactive processes involved with lexical processing in PWA.

SELECTED REFERENCES


ACKNOWLEDGEMENTS

This study was supported by the National Institutes of Health NIDCD NCIM grant R01DC011223 and NIDCR grant R01DC011517.