

Verb Transitivity Bias & Aphasia

- Verb transitivity bias is the verb's preference for either a transitive or intransitive sentence
- A mismatch between the verb's preference and sentence impacts speech and accuracy of comprehension and production of language in healthy speakers
- Previous research has yielded conflicting results as to whether people with aphasia (PWA) are sensitive to verb transitivity bias
 - **Sentence comprehension**
 - Online methodologies:
 - Russo et al. (1998): **fluent PWA are not sensitive** to verb transitivity bias
 - DeDe (2013): **fluent and nonfluent PWA are sensitive** to verb transitivity bias
 - Offline methodology
 - Gahl, 2002: **fluent PWA are sensitive**, but **nonfluent PWA are not sensitive** to verb transitivity bias
 - **Sentence production**: Online methodology:
 - DiLallo et al., 2015: both **fluent and nonfluent PWA are sensitive** to verb transitivity bias

Objective

To investigate **verb transitivity bias in the discourse production of PWA using a novel online method, i.e., speech pause time.**

Methods

- Language samples of 30 participants (10 fluent PWA, 10 nonfluent PWA, 10 healthy controls) obtained from AphasiaBank
- Participants ranged from 51 to 78.5 years old, had 12 to 21 years of education, and were 0.70 to 25.75 years time post cerebrovascular accident with an average of 6.75 years.
- Common verbs produced by at least 3 of 10 participants in each group identified (*come, make, tell, say, take, put*)
- Bias assigned to each verb based on 60% or greater usage in healthy controls (intransitive or transitive sentence)
- Verbs in sentences matching bias coded as *match* or *mismatch*
- 4 frequently occurring verbs unique to each group also selected
- Pre-verb and post-verb pause times were measured

Results

- A **mixed analysis of variance** was computed with one between subjects factor (participant group) and two within-subjects factors (pre-verb vs. post-verb pause times, transitive vs. intransitive verbs).
- Mean pre-verb pause times for both verb types were approximately equal for the control speakers, while the **mean pre-verb pause times for transitive verbs were approximately double that observed for intransitive verbs** in both groups of aphasic speakers.
- Post-verb pause times varied widely between the two aphasia groups.

Group	Transitive		Intransitive	
	Pre-Verb	Post-Verb	Pre-Verb	Post-Verb
Control	606.0 (203.0)	825.3 (460.1)	684.0 (698.0)	-
Fluent	647.7 (331.6)	457.3 (394.3)	306.3 (207.2)	523.5 (434.1)
Nonfluent	853.2 (394.3)	1399.0 (710.9)*	451.8 (237.4)	91.0 (75.0)

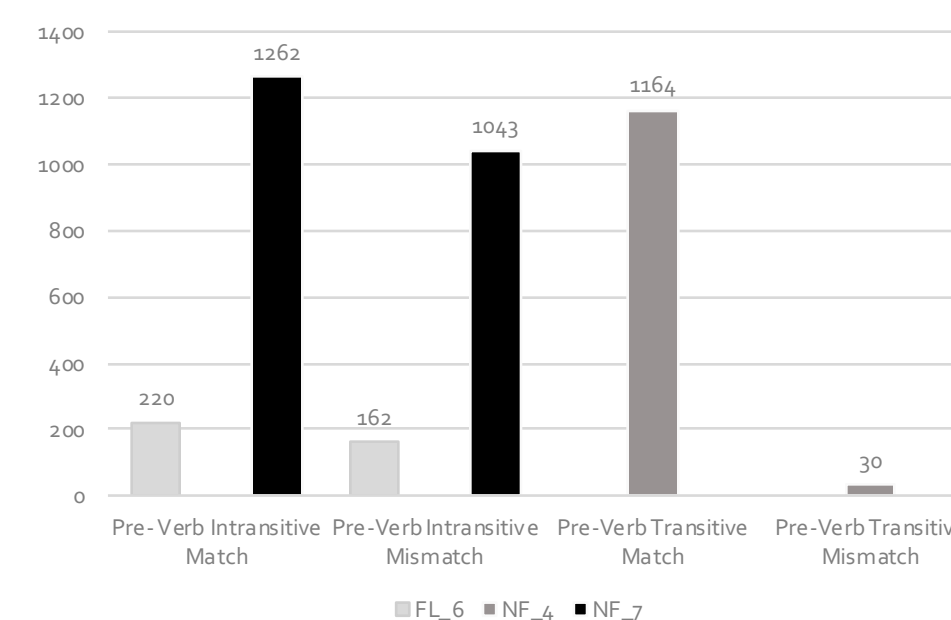
*p = .002

- No participant with aphasia demonstrated a transitivity bias that differed from that of the healthy controls or, in the case of the verb *make*, from the other group of PWA.

Verb	HC ^a		FL ^b		NF ^c	
	Transitive	Intransitive	Transitive	Intransitive	Transitive	Intransitive
Come		X		X		X
Tell	X		X		X	
Put	X		X		X	
Make	-	-	X		X	
Say		X				X
Take	X		X			

^a HC = healthy control participants; ^b FL = participants with fluent aphasia; ^c NF = participants with nonfluent aphasia

- Visual analyses were conducted to determine differences across groups for average pause times related to verb production in matched and mismatched transitivity conditions.
- 3 participants exhibited longer pauses in matched versus mismatched conditions.



Discussion

- The findings suggest that PWA **generally are sensitive** to the transitivity biases of verbs and access this information prior to production (see below).
- The increased pause times for transitive versus intransitive verbs in PWA suggests **activation of the more complex argument structure associated with transitive verbs and an increased cognitive load** for these speakers; no such differential pattern was observed for healthy control speakers.
- **Pause time appears to be responsive to the properties of verbs and therefore, offers a useful tool for investigating verb processing in people with aphasia.**
- The similarities between the assignment of transitivity bias in the healthy control speakers and the PWA suggests that PWA assign transitivity biases in discourse similarly to healthy speakers.
- In the few occasions where PWA produced sentences that did not match the transitivity bias of the verb, **pause times were greater for the matched production versus the mismatched production.** This suggests that **PWA occasionally do not activate the transitivity biases of verbs resulting in ill-formed sentences.**
- In summary, PWA are sensitive to the transitivity biases of verbs in discourse production. Occasional failures to activate this information result in sentence production impairments.

Selected References

- DeDe, G. (2013). Verb transitivity bias affects on-line sentence reading in people with aphasia. *Aphasiology*, 27(3), 326-343.
- DiLallo, J., Mettler, H., & DeDe, G. (2017). Corpus-based transitivity biases in individuals with aphasia. *Aphasiology*, 31(4), 447-464.
- Gahl, S. (2002). Lexical biases in aphasic sentence comprehension: An experimental and corpus linguistic study. *Aphasiology*, 16(12), 1173-1198.
- MacWhinney, B. (2007). The TalkBank Project. In J. C. Beal, K. P. Corrigan & H. L. Moisl (Eds.), *Creating and Digitizing Language Corpora: Synchronic Databases, Vol.1.*(pp.163-180). Houndmills: Palgrave-Macmillan.
- Russo, K. D., Peach, R. K., & Shapiro, L. P. (1998). Verb preference effects in the sentence comprehension of fluent aphasic individuals. *Aphasiology*, 12(7-8), 537-545.