Inhibitory control, word retrieval and bilingual aphasia: Is there a relationship?

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RESEARCH QUESTIONS
1. Is inhibitory control generally impaired in persons with aphasia (PWA)?
2. Do bilingual and monolingual PWA differ in inhibitory control?
   • Is there a bilingual inhibitory advantage?
3. Is inhibitory control (deficit) associated with word retrieval success in PWA?

BACKGROUND
• Word retrieval difficulty is the most prominent symptom of aphasia
• Word Retrieval involves activation and competition of multiple word candidates (e.g., Dell, 1986)
• Non-target words are either actively inhibited or decay (Schade & Berg, 1992)
• Hence word retrieval and inhibitory control could be associated (Shao et al., 2013)
• Yet, the connection between inhibitory control to word retrieval in aphasia is unclear

• Lexical Competition and ensuing Inhibition is greater for bilingual speakers (words activated in both languages, Green, 1998)
• Evidence for an Inhibitory advantage in healthy bilinguals (Bialystok et al., 2008; but see Paap & Greenberg, 2013)
  • It is unclear if a “bilingual inhibitory advantage” is found in aphasia.

EXPERIMENTAL TASKS
Word Retrieval:
Object Naming1 & Category Fluency1 (Animals)
Inhibition:
Linguistic
(Stroop color-word)2
• In English, and
• In Tamil for Tamil-English bilinguals
Nonlinguistic
(Spatial Stroop)3,4 or,
(Flanker)5

Data analysis:
• Accuracy for both word retrieval tasks
• Response speed of inhibitory tasks to calculate:
  − Stroop effect = Incongruent − Congruent
  − Conflict Ratio6 = (Incongruent − Congruent)/Congruent
  − Conflict ratio controls for overall slower responses of PWA relative to healthy controls
• Correlation of Word retrieval and Inhibitory measures

REFERENCES
Costa et al. (2006) Bilingualism: Language and Cognition
Dell, G. (1986). Psychological Review
Green, D. W. et al. (2010). Aphasiology
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RESULTS & DISCUSSION
1. Inhibitory control (deficit) in aphasia - NH vs. PWA
   • No difference between NH and PWA
   • All PWA showed the typical Stroop Effect (slower response for incongruent)
2. Bilingual inhibitory advantage in aphasia - MPWA vs. BPWA
   • No difference in any measure (overall RT, linguistic or non-linguistic inhibition) (contra Green et al., 2010)
   • NH showed bilingual advantage (Bialystok et al., 2008)
3. Inhibitory control and word retrieval
   Only in BPWA- L1,
   • Word fluency strongly correlated with linguistic inhibition (both r > .6)
   • Object naming’s correlations approached significance (both r > .4)
   • BPWA show a definite connection between inhibitory control and word retrieval in L1

CONCLUSIONS
• Inhibitory deficits are not pervasive in aphasia
  • LIFG damage may be an exception (e.g., Novick et al., 2010)
• BPWA show no advantage in inhibition
• Word retrieval is strongly associated with linguistic inhibition in BPWA (L1)