

Executive function for agreement processing

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Background

Errors occur in subject-verb number agreement

- Production: Increased rate of (erroneous) plural verbs given plural local nouns (Attraction Error)¹
 - *The sentence on the posters...* [“are” production frequency increases]
- Comprehension: Reduced reading time on ungrammatical plural verbs given plural local nouns [“Illusion of Grammaticality”]²
 - *The sentence on the poster(s) are...* [are is read faster after posters]

Role of local noun irregularity in number agreement

- Production: Irregular plural local nouns impact attraction minimally³⁻⁴
- Comprehension: Unknown

Role of memory mechanisms in number agreement processing

- Cue-based memory retrieval⁵

Q1: How do irregular nouns & misleading orthography affect agreement comprehension?

Q2: Is there a direct role of executive function in agreement comprehension?

Methods

- Tasks:
1. Stroop (Cognitive Control)⁶
 2. Reading Span (Working Memory Maintenance)⁷
 3. Verb Generation (Retrieval & Selection Demands)⁸
 4. Self-Paced Reading of Relative Clauses (Agreement Attraction)

Sentence Stimuli:

- Local Noun Type (Depleted, Excessive, Reversed)
- Local Noun Number (Singular, Plural)
- Local Noun Regularity (Irregular, Regular)—*frequency-matched controls*
- Main Verb Number (Singular/Grammatical, Plural/Ungrammatical)

Depleted Orthography: *man* (-s/-s)

Irregular: The physician who cured the *man*/*men* occasionally *was*/*were* incorrect ...

Regular: The physician who cured the *boy*/*boys* occasionally *was*/*were* incorrect ...

Excessive Orthography: *dress* (+s/+s)

Irregular: The celebrity who promoted the *dress*/*dresses* seldom *was*/*were* seen... ..

Regular: The celebrity who promoted the *skirt*/*skirts* seldom *was*/*were* seen ...

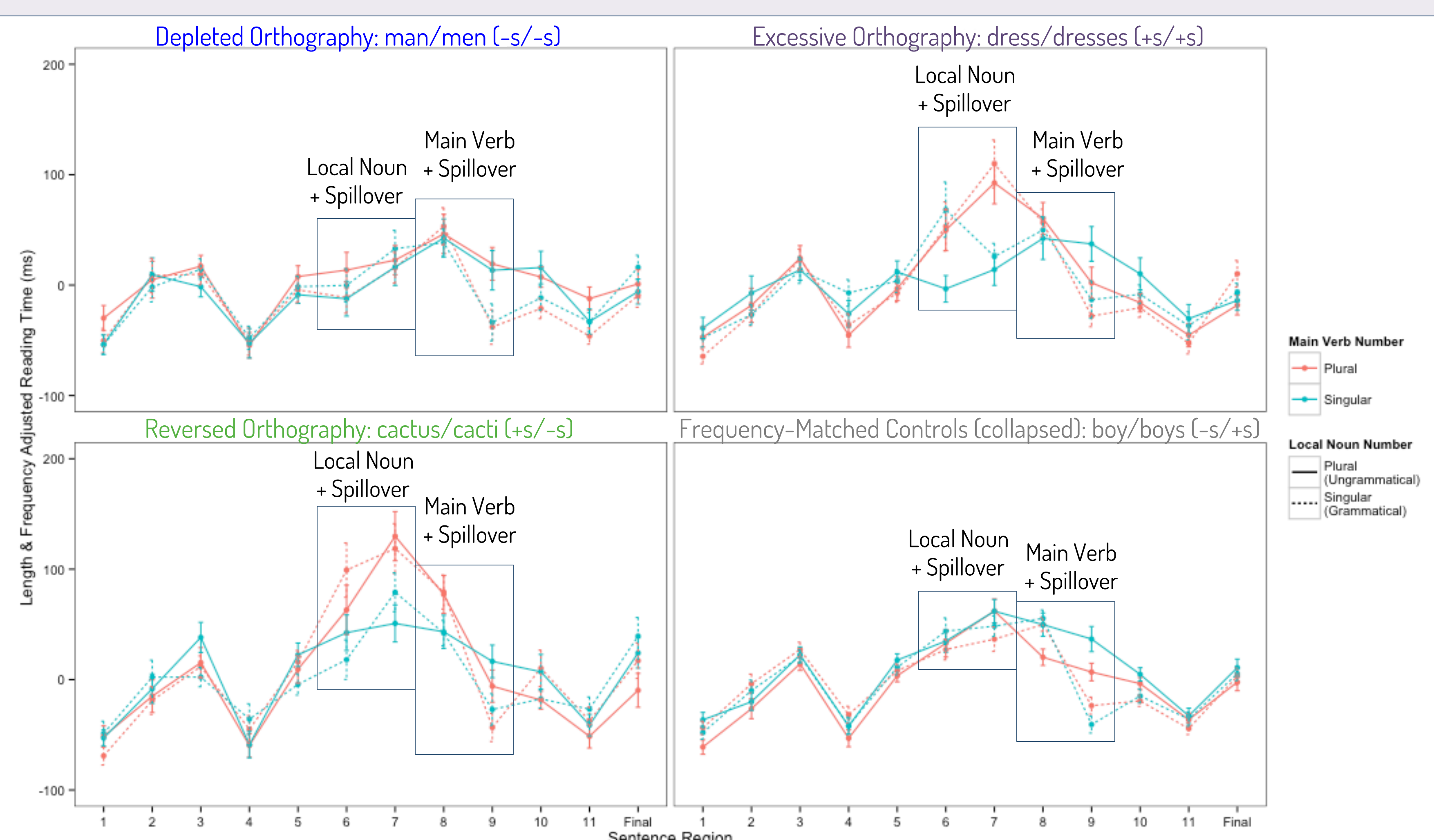
Reversed Orthography: *cactus* (+s/-s)

Irregular: The landscaper who planted the *cactus*/*cacti* already *was*/*were* excited...

Regular: The landscaper who planted the *yucca*/*yuccas* already *was*/*were* excited...

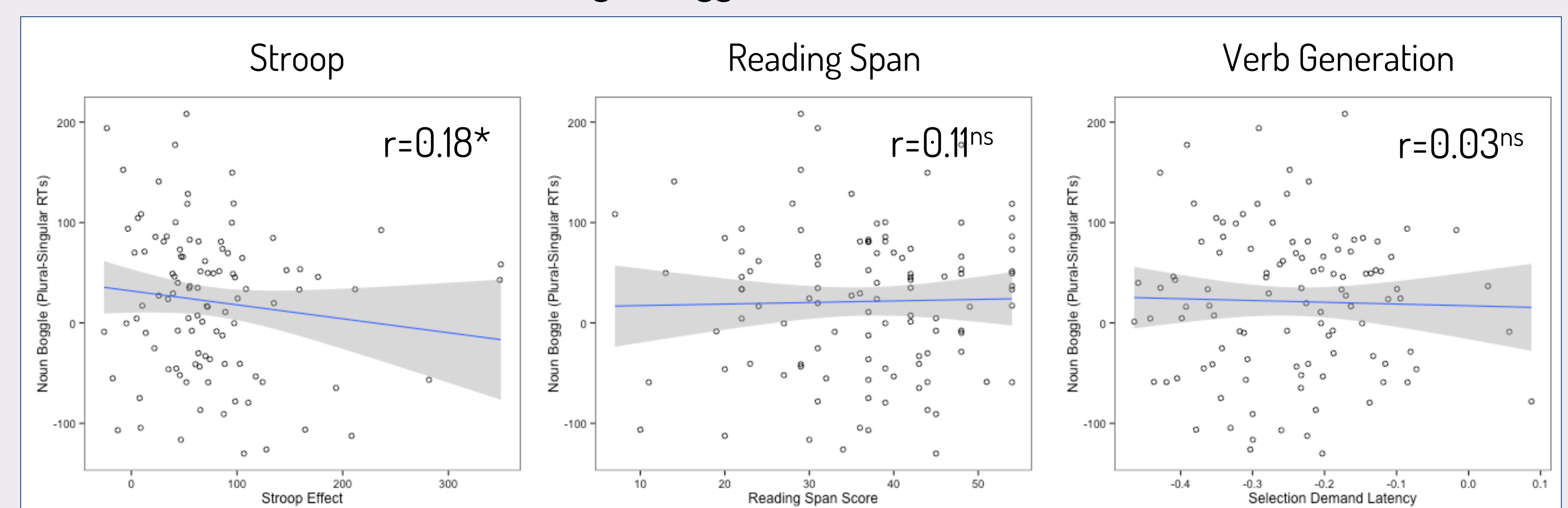
Self-Paced Reading

- At the **local noun** (and spillover), reading time slowdown on plural items for irregular nouns
 - Highest effect for reversed orthography condition (cactus/cacti)
- At the **main verb** (and spillover), attraction observed for both regular and irregulars (reading time slowdown on singular nouns with ungrammatical verbs)
 - Smallest effect for frequent, depleted orthography items (man/men)



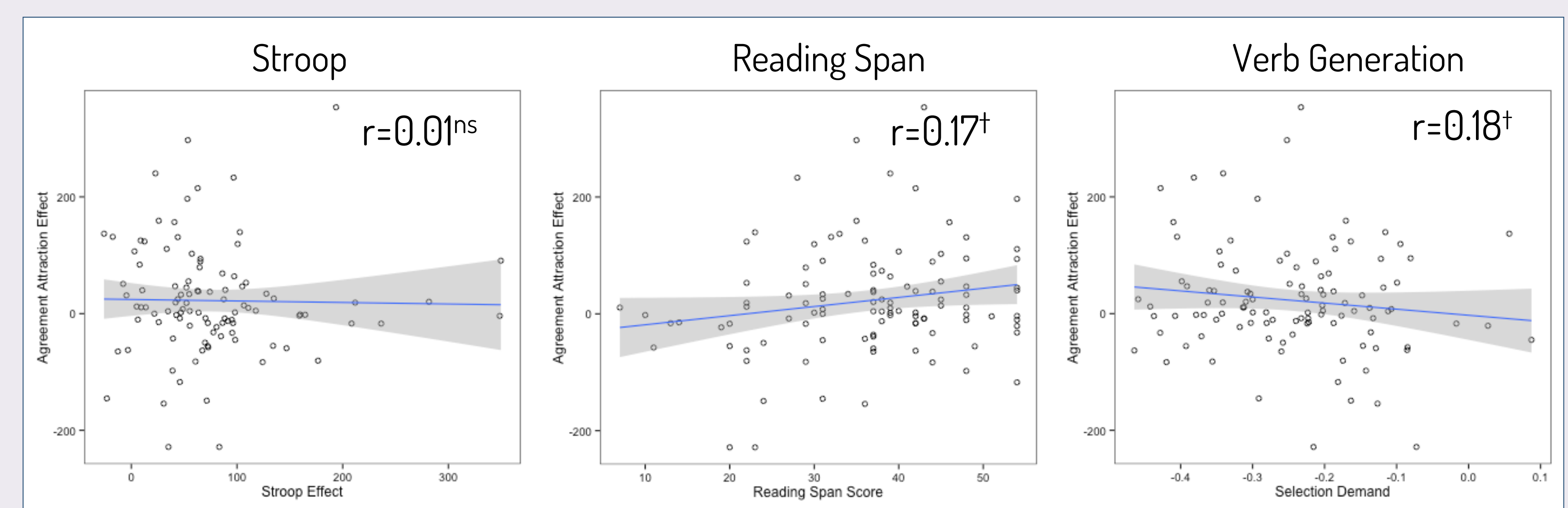
Executive Function and Local Noun Boggle

- Individual differences in cognitive control (as measured by Stroop) predict reading time slowdown on plural local nouns:
More Control → Larger Boggle



Executive Function and Agreement Attraction

- Attraction predicted by working memory (as measured by Reading Span):
High WM → Larger Attraction Effects
- Attraction predicted by selection demands (as measured by Verb Generation):
Larger Selection Demands → Larger Attraction Effects



Concluding Remarks

- Irregular nouns cause processing difficulty, but do not consistently impact agreement attraction.
 - Production and comprehension behave similarly
- Role for working memory and lexical selection in attraction
 - Supports cue-based retrieval model

References & Acknowledgments

(1) Bock & Miller, 1991 (2) Wagers, Lau, & Phillips, 2009 (3) Bock & Eberhard, 1993 (4) Haskell & MacDonald, 2003 (5) Dillon, Mishler, Sloggett, & Phillips, 2013 (6) January, Trueswell, & Thompson-Schill, 2009 (7) Redick et al., 2012 (8) Snyder & Munakata, 2008

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