ROBUST NEURAL ADAPTATION TO SYNTACTIC STRUCTURE

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INTRODUCTION

- We as humans are efficient information processors who quickly adapt to changes in the input statistics across domains
- Repeated presentations of a stimulus lead to adaptation effects, where the neural response is decreased

Our questions:

- Does repeated syntactic structure lead to similar effects
- Furthermore, does structure repetition facilitate comprehension?

Methods

Participants: 32 right-handed individuals (female = 18)

Stimuli: Sentence sets where 80% of the sentences (n=240) used one structure and 20% of the sentences used different and diverse structures (n=60) of the five remaining constructions. Every sentence was coupled with a yes-no comprehension question. Stimuli were presented word-for-word (350 ms/word). Participants saw an average of 4 runs, ranging from 2-5.

Construction	Sentence	WC	Question	WC	Answer
Object-related Cleft	Hannah was talking about the biologist that the surgeon antagonized.	10	Was Hannah talking about the biologist?	6	Yes
Pseudocleft	What Mary did was telephone her cousin in California.	9	Did Mary call her relative?	5	Yes
Topicalization	Soup, he doesn't like eating when he's feeling ill.	9	Does he like to eat soup when he's sick?	9	No
The Xer the Yer	The higher the plane rose, the smaller the city looked.	10	Did the city look the same size from the plane?	10	No
Sentential Subject	That the line was so long annoyed Jack greatly.	9	Is Jack bothered by the length of the line?	9	Yes
Name "verbed" that	Jane guessed that the weather channel wasn't accurate after all.	10	Did Jane have a hunch about something?	7	Yes

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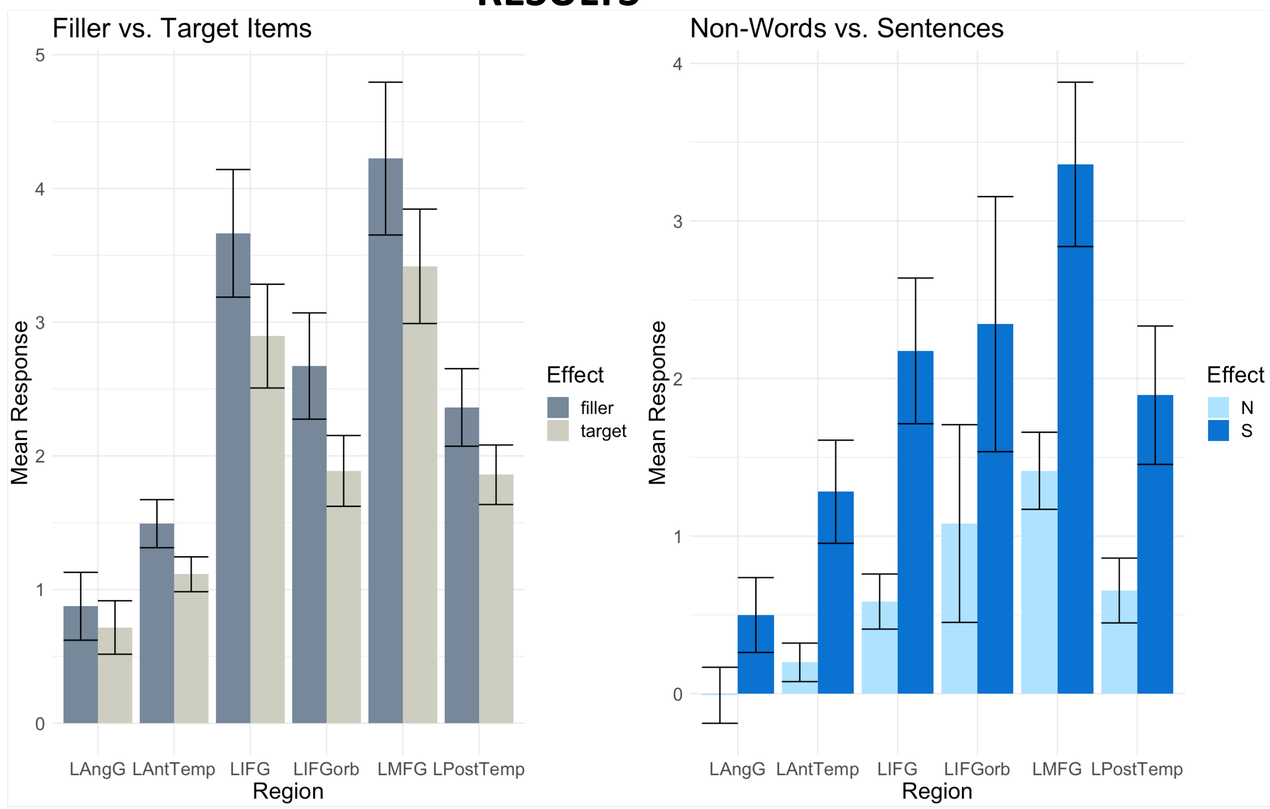
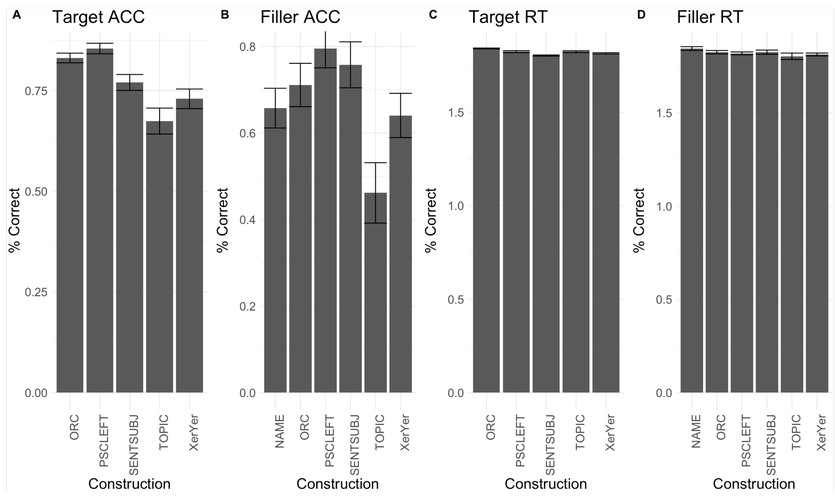
RESULTS



ROI	Effect	Effect	StdEffect
LAngG	filler	0.875	1.216
	target	0.716	0.958
LAntTemp	filler	1.492	0.861
	target	1.114	0.625
LIFG	filler	3.664	2.288
	target	2.895	1.861
LIFGorb	filler	2.672	1.906
	target	1.887	1.270
LMFG	filler	4.223	2.741
	target	3.417	2.051
LPostTemp	filler	2.362	1.390
	target	1.858	1.068

ROI	Effect	Effect	StdEffect
LAngG	S	0.498	1.139
	N	-0.0103	0.852
LAntTemp	S	1.281	1.569
	N	0.198	0.586
LIFG	S	2.175	2.217
	N	0.584	0.838
LIFGorb	S	2.345	3.882
	N	1.079	3.009
LMFG	S	3.359	2.501
	N	1.414	1.172
LPostTemp	S	1.894	2.105
	N	0.654	0.986



Conclusions

We observed reliable adaptation effects in the language-responsive areas. Furthermore, these effects were present across the frontal and temporal language areas, in line with other findings of distributed syntactic effects (e.g., Blank et al., 2016). This study establishes robust adaptation to syntactic structure in language processing.

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