Clozing in on Predictions: Cloze Responses Reflect Various Underlying Processes

Jon Burnsky & Adrian Staub

jburnsky@umass.edu

UMass Amherst

Anomalous Predictions

Comprehenders sometimes generate anomalous predictions:

`The parent saw which lifeguard the child had …` **`saved`**

What mechanism(s) lead to these?

Kim & Osterhout (2005); Kuperberg (2007); Chow et al. (2016); Momma (2016); Burnsky & Staub (2020); Liao (2020)

Unsophisticated Mechanisms

Liao (2020) suggested there are two mechanisms that co-contribute to these anomalous predictions:

`The parent saw which lifeguard the child had …` **`saved`**

- Bag-of-Words

Unsophisticated Mechanisms

Liao (2020) suggested there are two mechanisms that co-contribute to these anomalous predictions:

`The parent saw which` **`lifeguard`** `the` **`child`** `had …` **`saved`**

- Bag-of-Words
- Bag-of-Arguments (“parent” is *invisible*)

Unsophisticated Mechanisms

Previous experiments have conflated argument-status and recency and have made all active (unpredicated) arguments arguments of the next verb.

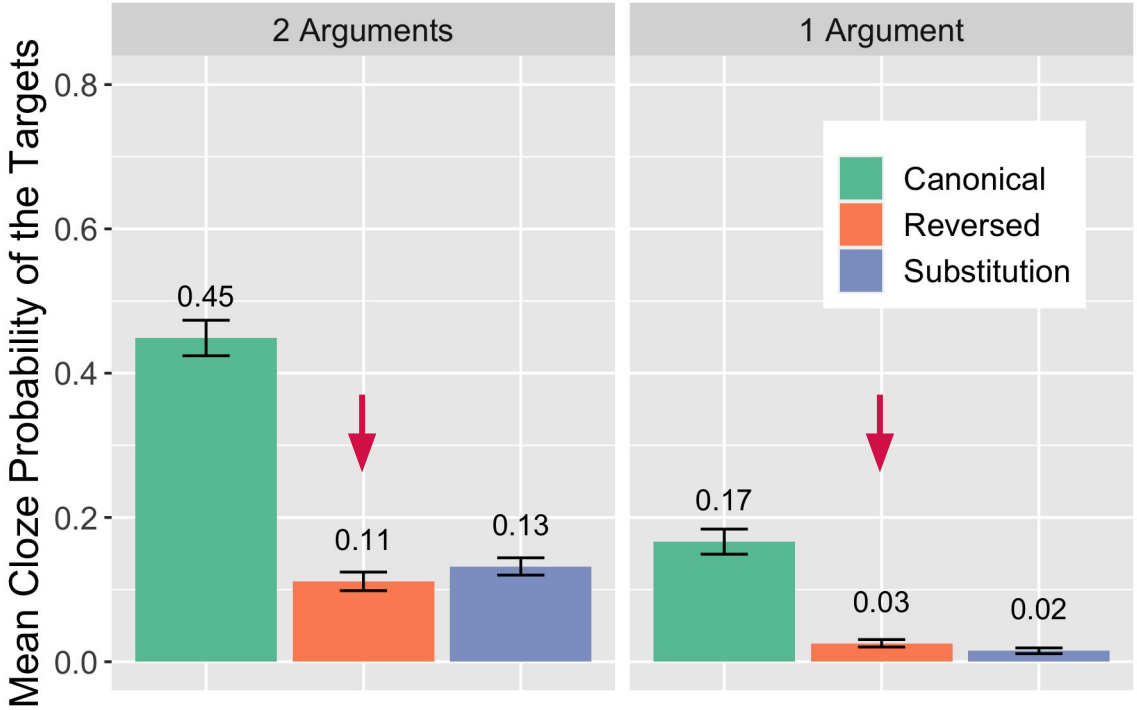
if we deconfounded these factors, are the mechanisms the best descriptions of what's going on?

I.e. Would "lifeguard" as a non-argument of the upcoming verb really not matter?

Experiment 1: Dropped Associate (Baseline)

	2 Arguments	1 Argument
Canonical	The parent saw which **child** the **lifeguard** had … {*saved* | *rescued* }	The parent saw which **lifeguard** had …
Reversed	The parent saw which **lifeguard** the **child** had …	The parent saw which **child** had …
Substitution	The parent saw which **child** the **woman** had …	The parent saw which **woman** had …

Experiment 1: Dropped Associate (Baseline)



Experiment 1: Dropped Associate (Baseline)

Removing “lifeguard” brings down the number of “saved” cloze responses

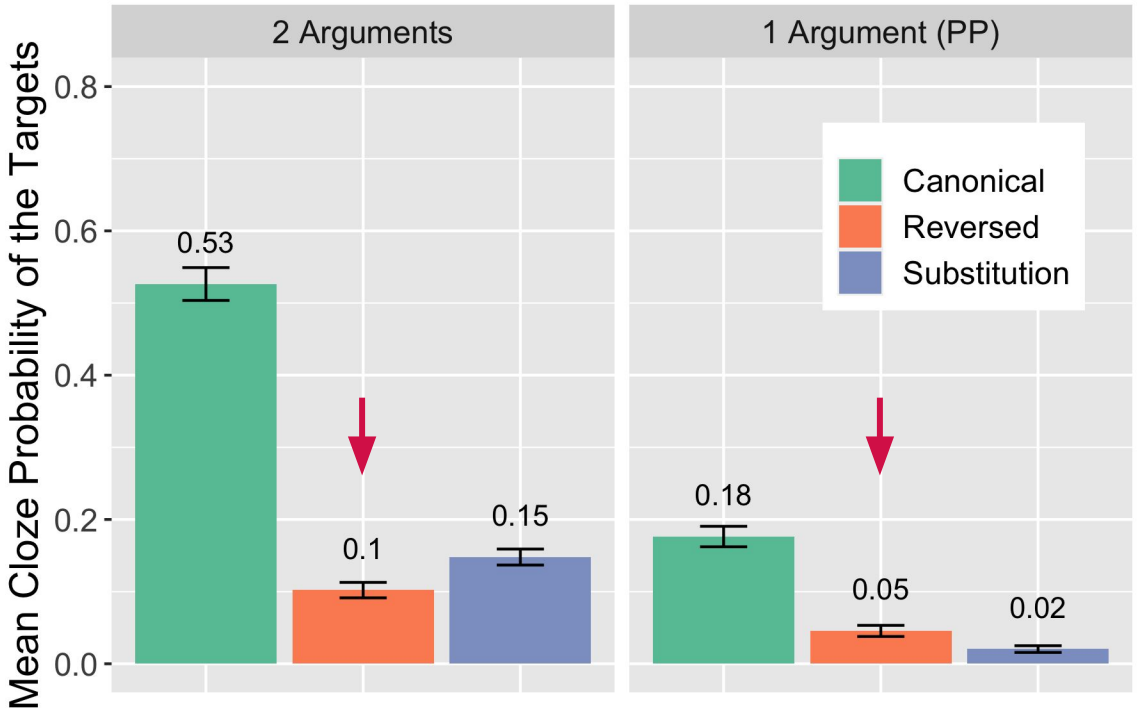
Now, we can **bring “lifeguard” back in non-argument positions** and see if it’s *invisible* as the Bag-of-Arguments hypothesis predicts

Experiment 2 uses PPs
Experiment 3 uses RC Islands

Experiment 2: PPs

	2 Arguments	1 Argument (PP)
Canonical	The parent saw which **child** the **lifeguard** had … {*saved* | *rescued* }	The parent saw which **lifeguard** beside the child had …
Reversed	The parent saw which **lifeguard** the **child** had …	The parent saw which **child** beside the lifeguard had …
Substitution	The parent saw which **child** the **woman** had …	The parent saw which **child** beside the woman had …

Experiment 2: PPs



Experiment 2: PPs

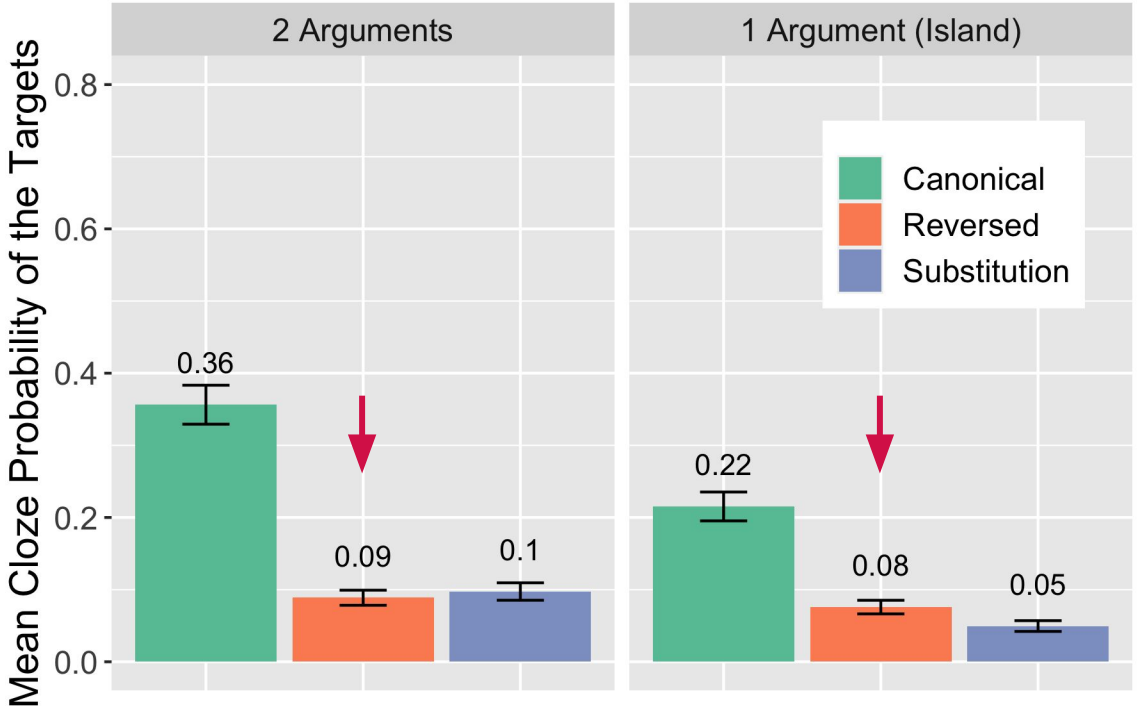
“lifeguard” embedded in a PP yields less “saved” responses than when it is an argument ⇒ Bag-of-Arguments

But more than when it is absent (Experiment x Argumenthood interaction) ⇒ Bag-of-Words

Experiment 3: Islands

	2 Arguments	1 Argument (Island)
Canonical	The parent saw which **child** the **lifeguard** had … {*saved* | *rescued* }	The parent saw which child the **lifeguard** who …
Reversed	The parent saw which **lifeguard** the **child** had …	The parent saw which lifeguard the **child** who …
Substitution	The parent saw which **child** the **woman** had …	The parent saw which child the **woman** who …

Experiment 3: Islands



Experiment 3: Islands

No significant effect of argumenthood

“lifeguard” as a non-argument of the upcoming verb still influences it to same degree as when it is an argument

Bag of not yet Saturated Arguments

Why is Experiment 3 different?

“lifeguard” must be an argument of *some* predicate, it just can’t be an argument of the next verb (bc island extraction)

We postulate that **arguments that haven’t yet found their predicate are prioritized when preactivating verbs** as a refinement to Bag-of-Arguments hypothesis

Conclusions

Role appropriate cloze completions are more common than inappropriate ones

But some cloze completions come about via unsophisticated means

We find a small influence for a Bag-of-Words mechanism and a somewhat larger influence for a Bag-of-not-yet-Saturated-Arguments mechanism

Thank you!!

Special Thanks to:

Brian Dillon, Shota Momma, Wing-Yee Chow, Kyle Johnson and the UMass Psycholinguistics community for helpful discussion

This was supported through a UMass Predissertation Award to JB

This Google Slides theme is from slidesgo.com