Phonological Priming in Spontaneous Speech Production

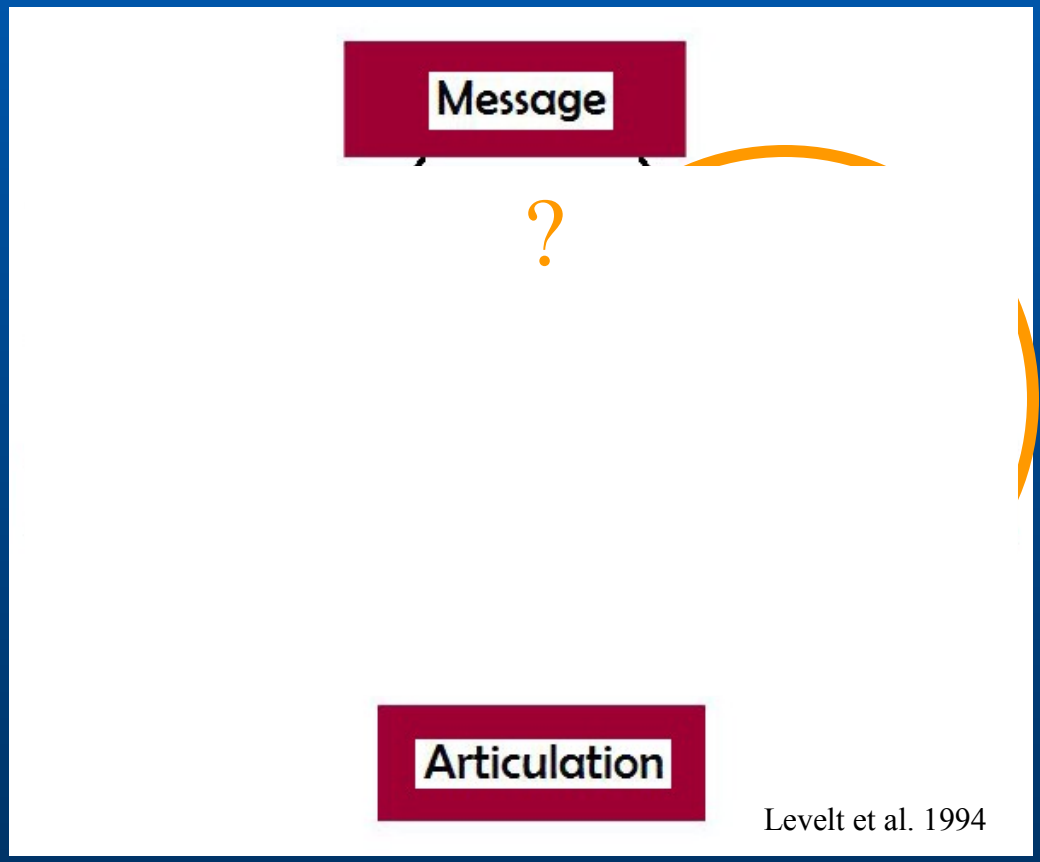
Katrina Housel

Human Language Processing Lab

Why study language production?

- It’s fast:
  - We speak about 150-180 words/minute (3 words/second)
- It’s effortless
- It's robust (we are generally fluent)
- We plan and speak incrementally and in parallel

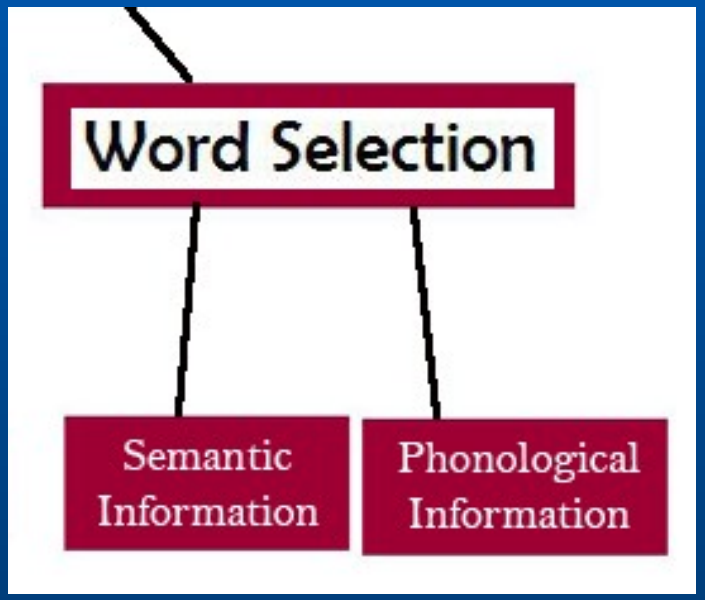
Sentence Production



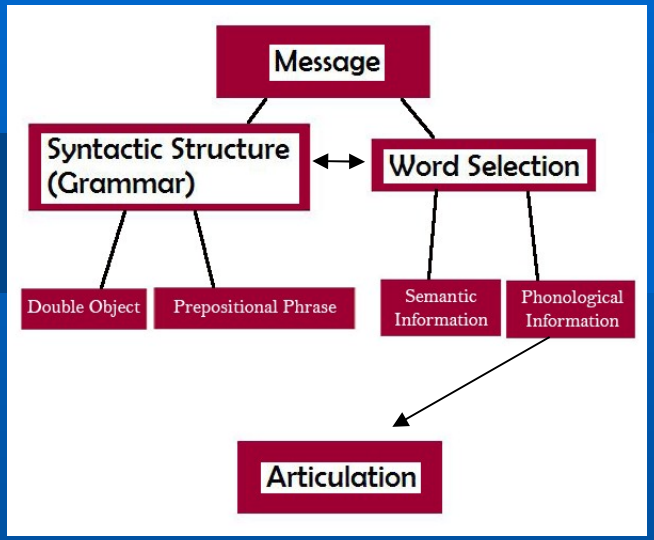
Levelt et al. 1994

Word Production

- **Two types of information:**
  - **Semantic: word meaning**
  - **Phonological: sounds in the word**



Sentence Production



Example: Hannah gave the game to the boy.

Possibility 1:

Complete each step in order.

Time

3. Pick a syntactic structure.
4. Pick nouns for the noun slots and verbs for the verb slots.
5. For each words pick out the sounds and place them in order.

Possibility 2:

Complete some steps at the same time.

Time

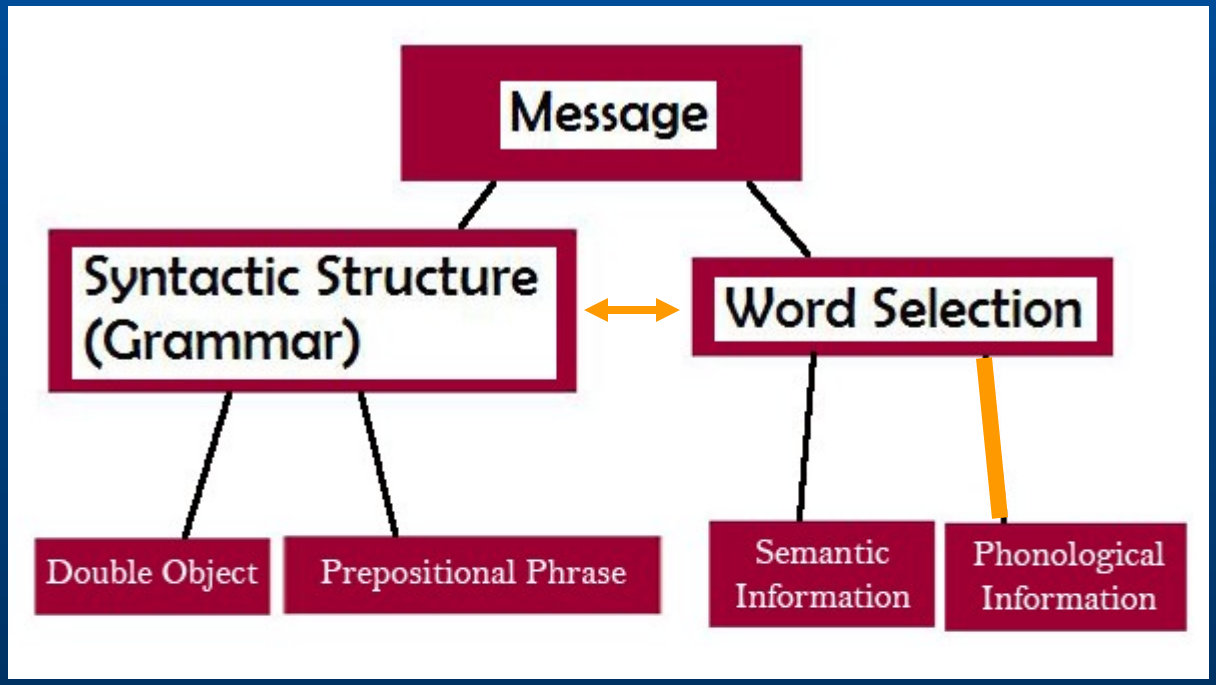
Pick a syntactic structure.

Pick nouns and verbs to fill in the slots.

Pick out the sounds and place them in order.

Today

We will look at how phonological encoding interacts with other parts of sentence planning



Spreading activation in phonological encoding

- **As the phonology of the intended word is retrieved, activation spreads to similar sounding words**
- **Ex: See a cat --> start retrieving /cat/**

also activates:

/cap/, /can/, /bat/, /fat/, etc.

What do we know?

- **For a pair of phonologically similar objects:**

→

Delay

  - **Delay < 300ms → *facilitation* of naming of the second object.**
  - **Delay > 300ms or concurrent display → *inhibition* of naming of the second object.**

Roelofs, 1992; Starreveld, 2000; Damian & Martin, 1999.

What do we know?

- **Previous results mostly found by forcing people to produce words in isolation ...**
- **... but that's not what we do when we talk!**

Research Question

- **During *real language production*,**
  - **H*ow* does phonological similarity affect *what we say***
  - ***and how we say it?***
- ***Is sounding similar good (=easy) or bad?***

My Experiment

- **Participants describe short animations**
- **The animations involve scenes that are compatible with several verbs**

- **E.g. giving events**

  GIVE(***giver*** **,** ***object*****,** ***recipient*** **)**

My Experiment

- ***givers'*** **names**
  - ***Gabe, Hannah, Patty***
- **Similar to one of the verbs compatible with the scene**
  - ***gave, handed, passed***

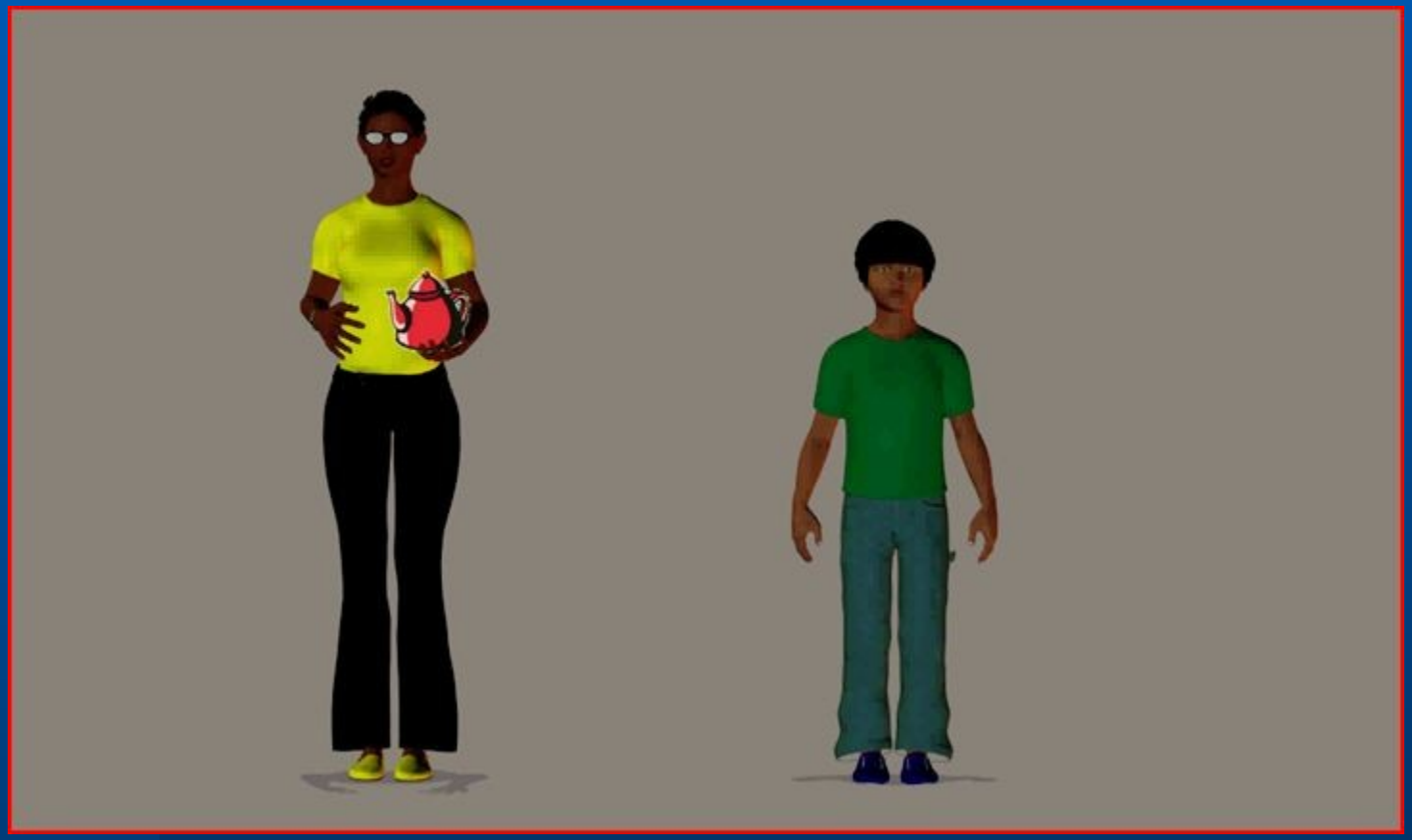
→ **Do *givers'* names facilitate or inhibit the similar sounding verb?**

"Patty … passed/handed/gave … a book to the woman"

Meet the cast (*givers*)

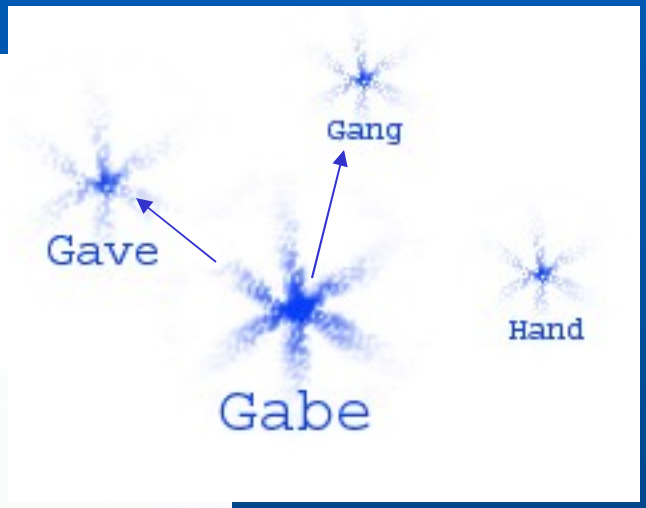
Experimental set up

Experimental set up

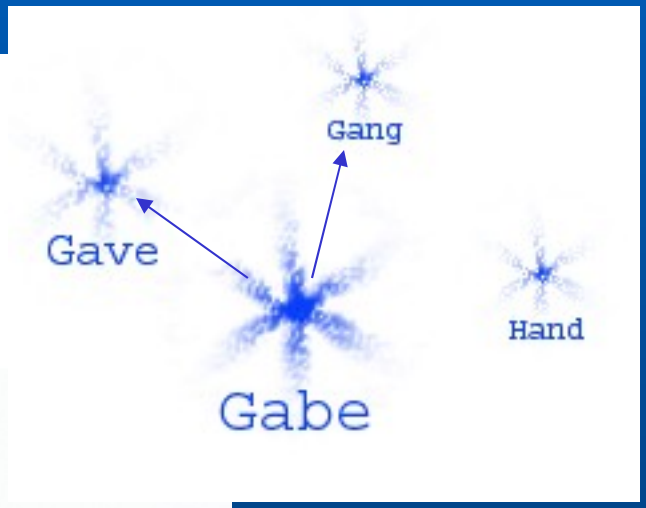


Experimental set up

Predictions: Spreading activation

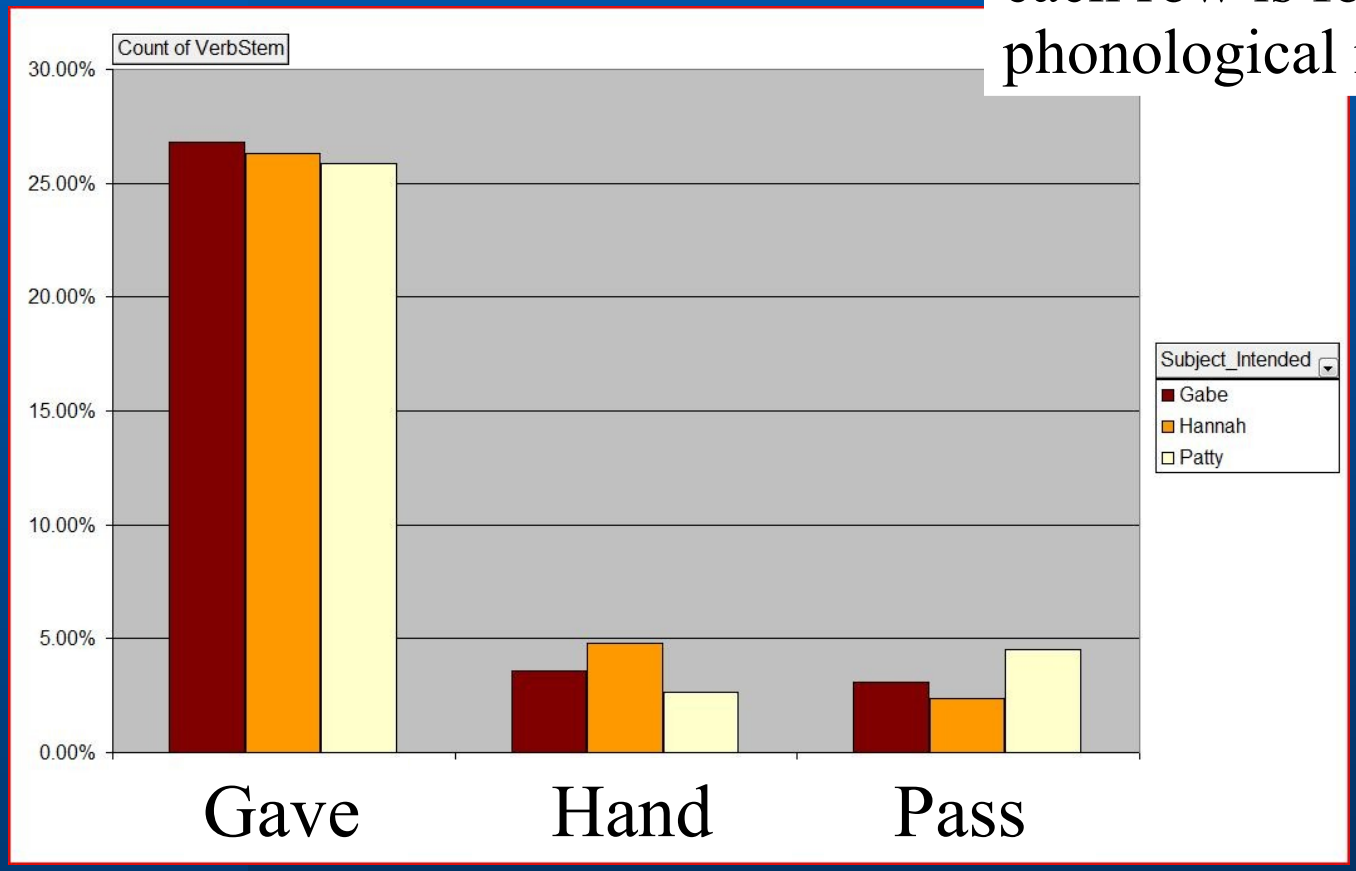


Predictions: Spreading activation



Results (preliminary)

The highest bar in each row is for the phonological match!

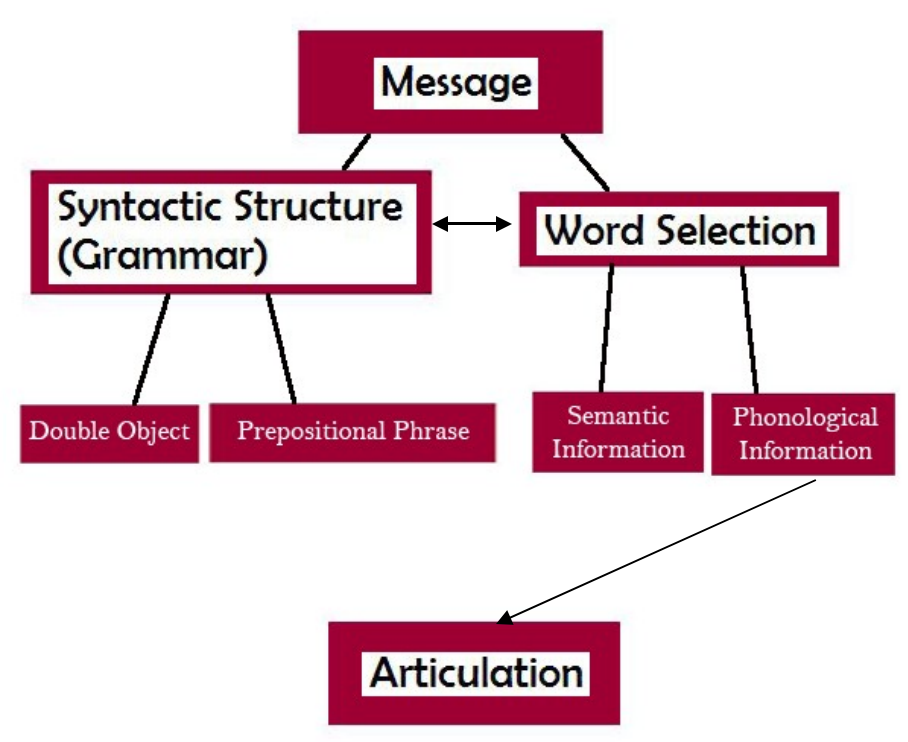


% of verb usage across all utterances

People are more likely to use the verb that matches the subject phonologically.

This means:

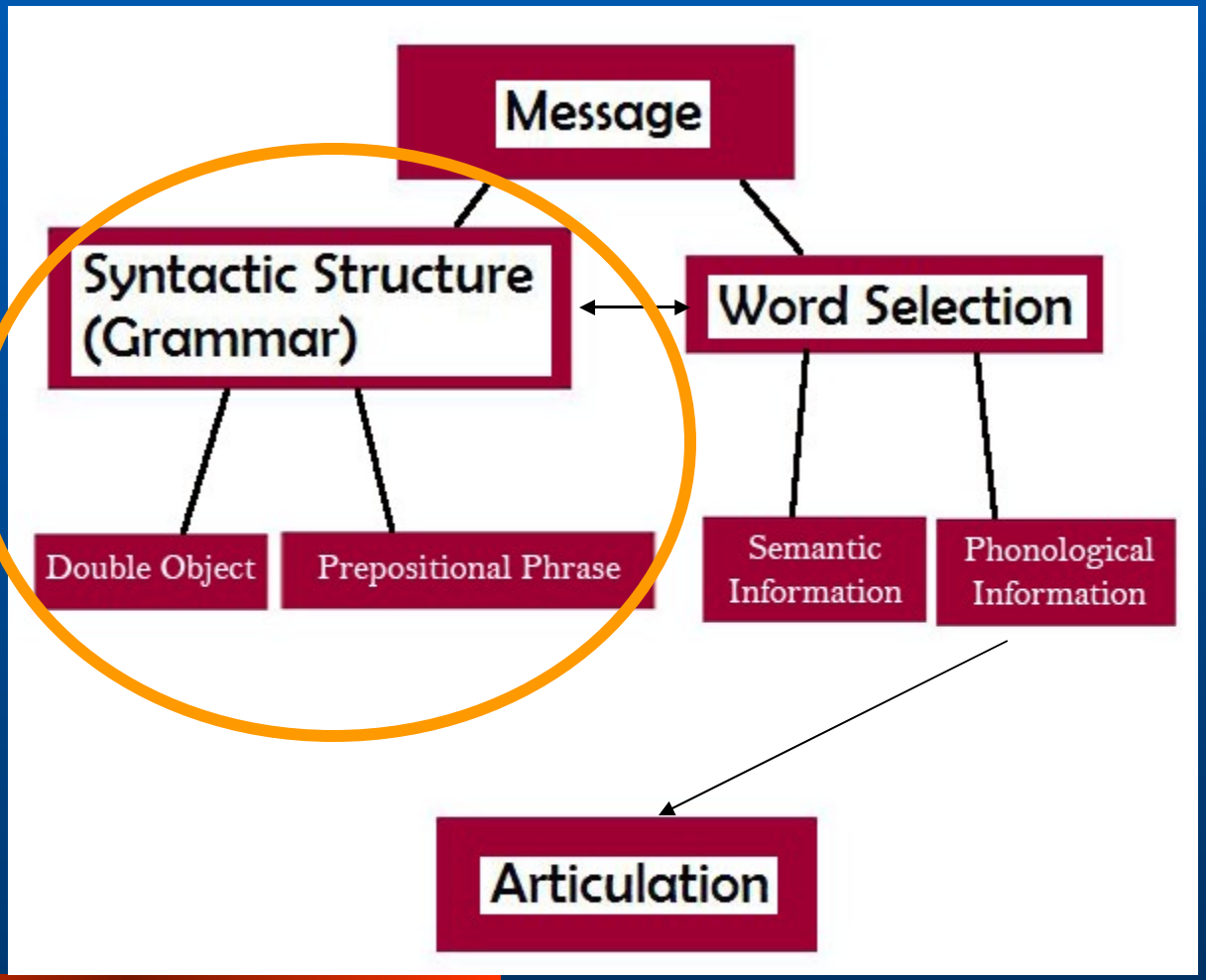
Phonological facilitation in spontaneous speech (rather than in isolated production)



Contribution to Psycholinguistics

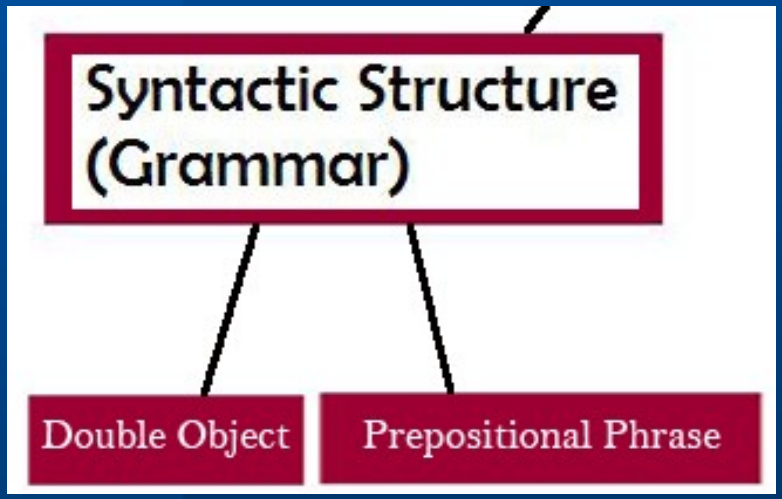
- This is the first time we have ever seen phonological priming in a sentence elicitation task.
- Most experiments look at phonological choices at the noun, but this looks at verb choice.

Now what?


Message
Syntactic Structure (Grammar)
Word Selection
Double Object
Prepositional Phrase
Semantic Information
Phonological Information
Articulation

A sentence full of choices

- Verbs like ‘give’, ‘hand’, and ‘pass’ are ditransitive



- There are 2 forms:
  - Object first
    - “Gabe gave the book to the woman.”
  - Recipient first
    - “Gabe gave the woman the book.”

Is it easy for speakers to produce these alliterations?

- **So, there is facilitation at the word level, but does that make things harder at the sentence level?**
- **We also included trials where the *object* matches the verb phonologically.**
  - **Will the participants be just as *fluent*?**
  - **Will the participants use a *structure* strategically to put more space between phonologically similar words?**

What might we expect?

- Tongue twisters trip people up.
- Other experiments show that people try to put space between similar sounding words.
- We have just seen phonological priming… perhaps similar words will be readily available.

Example video

Predictions: Reduce phonological similarity

Predictions: Reduce phonological similarity

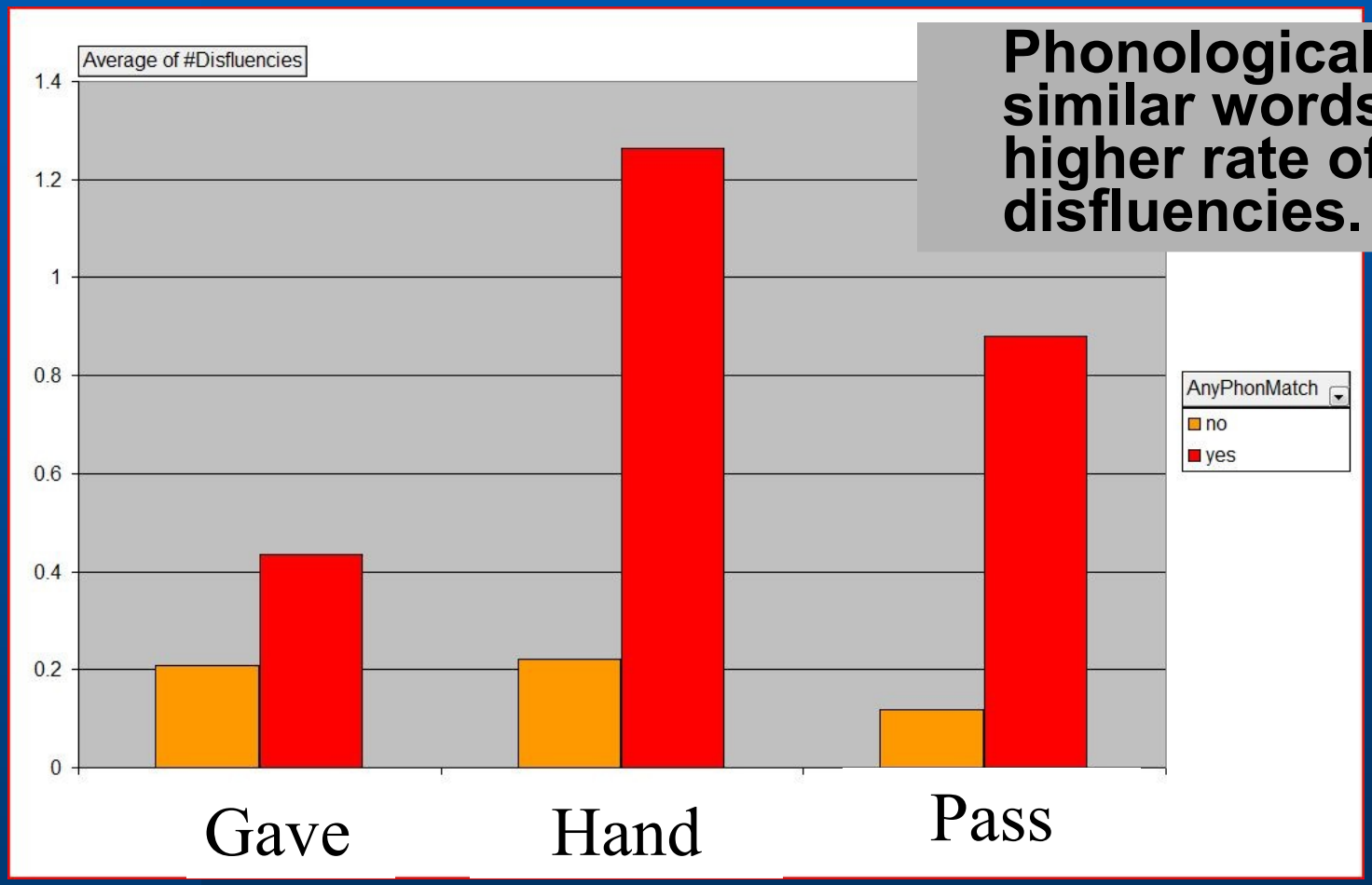
Predictions: Reduce phonological similarity

Preliminary Results

- But… the exact opposite happened!
- Participants said the object first more often for the phonologically similar verb and object.

  "Patty passed the pan to the woman."
- This means that the people put less space between similar sounding words.

Phonetic matches trip people up!



Phonologically similar words → higher rate of disfluencies.

Conclusions (preliminary)

- **In (relatively) spontaneously produced sentences:**
  - **Saying one word seems to make it *more* likely to use similar words in the remainder of the sentence**
  - **But this very fact seems to be somewhat disruptive for production**

Future directions

- In progress:
  - Collect data from more participants.
  - Start looking at the amount of time people put between phonologically similar words.
  - Start looking for a relationship between objects and verbs. Will the object “pan” make the verb “pass” more likely?

Thank you!

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