DGfS 2016
AG2: The syntax of argument structure

Syntactic priming as a test of argument structure: A self-paced reading experiment

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GOALS

- Test two theoretical approaches to argument structure:
  - Hale & Keyser (1993, 2002) as developed in Mateu (2002), Acedo-Matellán (2010), Acedo-Matellán & Mateu (2011, 2013). [AM&M]
  - Marantz (2005, 2011)
- Study their claims about the relationship between:
  - Unergative structures
  - Transitive structures
  - Small clause structures

METHODOLOGY

- Self-paced reading language comprehension study to 500 subjects over Mechanical Turk.
- Structural priming experiment within and across sentence types.
- Analyses:
  - 6 x 6 within-subjects ANOVA
  - Mixed effects Analysis of Covariance (ANCOVA)
  - Linear regression

PRELIMINARY RESULTS

- Major headline: Syntactic priming effects.
- Suggest a stronger predictive contribution of the Marantz model:
  - Significant effect of the interaction between conditions and priming in trials preceded by two trials of the same category in the Marantz model.

OVERVIEW OF THE TALK

- Two syntactic models. Review of main claims
  - H&K / AM&M
  - Marantz
- Predictions of each model
- Structural priming in comprehension. Review
- Experiment. Design and implementation
- Analyses of the data
  - ANCOVA 1.0
  - ANCOVA 2.0
  - Linear mixed effects regression model

TWO SYNTACTIC MODELS

- Two representational models of argument structure:
  - Hale & Keyser (1993, 2002) as developed in Mateu (2002), Acedo-Matellán (2010), Acedo-Matellán & Mateu (2011, 2013). [AM&M]
  - Marantz (2005, 2011)

TWO COMPETING HYPOTHESES

VERB TYPE
UNERGATIVE VERB
The dog barked in quiet parks at night.
COGNATE OBJECT
The man dozed a restful doze on the train.
CREATION VERBS
He baked a delicious cake with spelt flour.
LOCATION/LOCATUM
They saddled a wild horse in the farm.
STRONG TRANSITIVES
He ignored a slight niggle in his knee.
WITH-SMALL CLAUSE
They sprayed a cookie sheet with vegetable oil.

- Attribute different structures to transitive structures.
- Make different claims about the relationship between transitive structures and unergatives.
- Make different predictions about priming relations between sentence types.

H&K (1993, 1998, 2002)

- Theory of the lexicon-syntax interface
- Main questions:
  - Why are there so few (syntactically relevant) thematic roles?
  - Why are there so few lexical-syntactic categories?

H&K (1993, 1998, 2002)

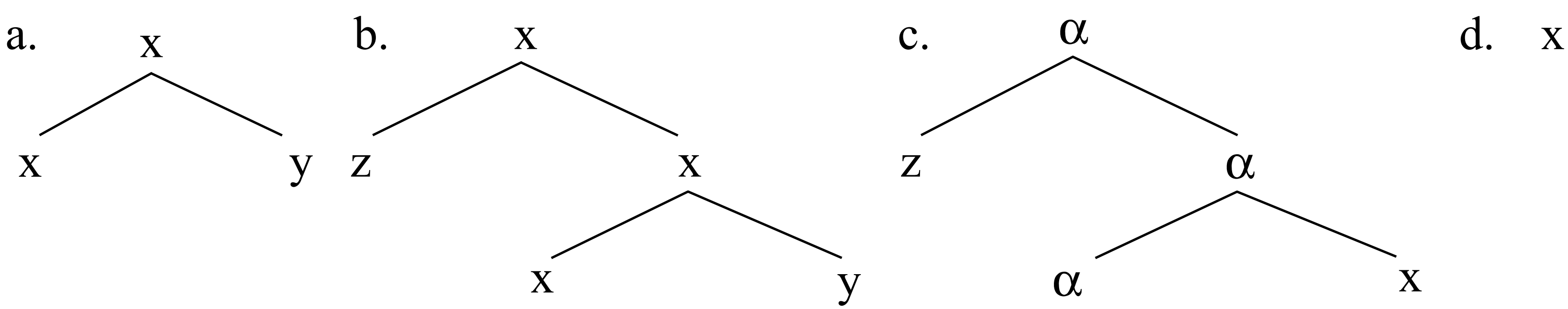
- Through independently established principles of syntax, they seek to constrain
  - range of argument structures
  - number of θ-roles
  - verb meanings
  - lexical categories

H&K (1993, 1998, 2002)

- θ-roles and categories are limited in number because the potential structural positions are also reduced: head, complement, specifier.
- Argument structure is "the syntactic configuration projected by a lexical item", i.e. "the system of structural relations holding between heads (nuclei) and their arguments" (2002:1).

Basic structural relations

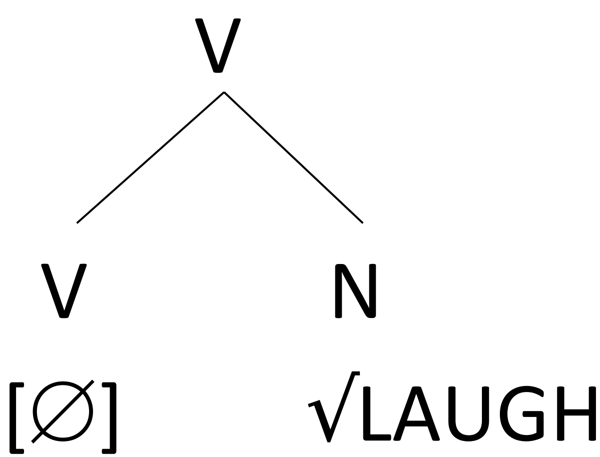
- Neutral w.r.t. morphosyntactic category of the head.



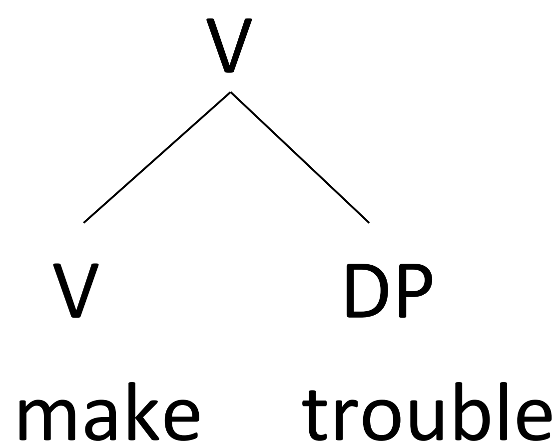
H&K: Unergatives and V of creation

- Empirical evidence: e.g. Basque

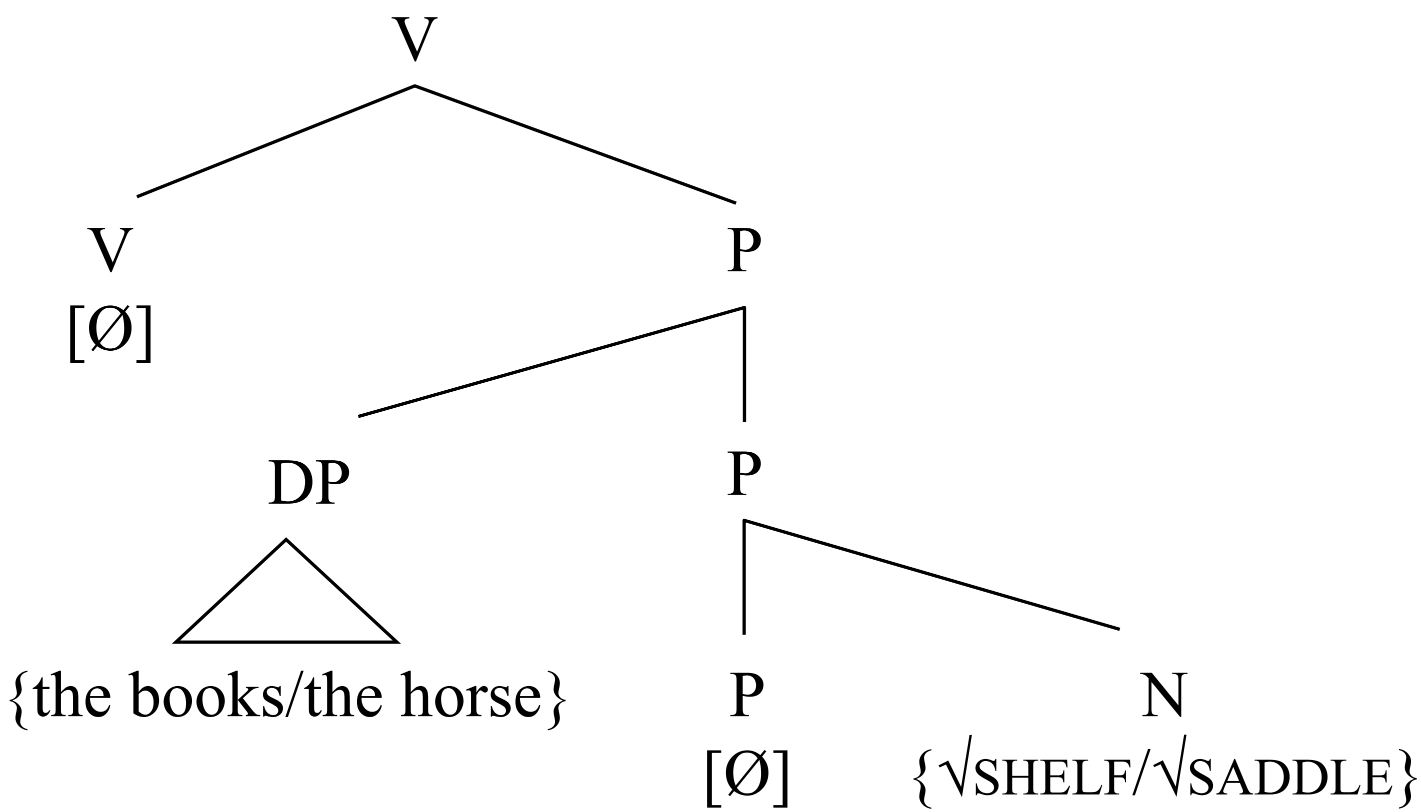
Unergatives



V of creation



Transitive location/locatum verbs



Acedo-Matellán (2010: 53-54)

- Strict configurational model of argument structure: compositional semantics directly read off the syntactic structure.
- Five basic structure configurations:
  - unergative and transitive verbs of creation and consumption
  - atelic transitive events
  - atelic unaccusative events
  - unaccusative events of change of state or location
  - transitive events of change of state or location

Acedo-Matellán (2010)

- Decomposition of P and adposition particles in syntax into PathP and PlaceP (e.g. Cinque & Rizzi 2010).
- Jackendoff's (1973) conceptual decomposition of PPs into PATH and PLACE and functions such as TO, VIA, ON, etc.
- Talmy's (1975) semantic concepts of Figure and Ground for arguments of P.

Acedo-Matellán (2010)

- Figure is the entity that moves with respect to a potential Ground.
- Relational functional head *p*
  - PathP introduces a transition that encodes the change (H&K's Terminal Coincidence P).
  - PlaceP introduces a Figure/Ground configuration that establishes a location or state (H&K's Central Coincidence P).
- Eventive head *v*
  - with specifier: causative configuration.
  - without specifier: unaccusative configuration.

AM&M

- Unergative and transitive verbs of creation and consumption

(1) Sue danced.

$[_{vP}$ $[_{DP}$ Sue] $[_{v'}$ v √DANCE]]

(2) Sue did a dance.

$[_{vP}$ $[_{DP}$ Sue] $[_{v'}$ v $[_{DP}$ a dance]]]

AM&M

- Atelic transitive events

(3) Sue pushed the car.

$[_{vP}\ [_{DP}$ Sue $]\ [_{v'}\ v\ [_{PlaceP}\ [_{DP}$ the car $]\ [_{Place'}$ Place √PUSH]]]]

(4) Sue lengthened the rope (for five minutes).

$[_{vP}\ [_{DP}$ Sue $]\ [_{v'}\ v$ (=-en) $[_{PlaceP}\ [_{DP}$ the rope $]\ [_{Place'}$ Place √LONG]]]]

AM&M

- Transitive events of change of state or location

(5) The strong winds cleared the sky.

$[_{vP}$ $[_{DP}$ The strong winds] $[_{v'}$ v $[_{PathP}$ $[_{DP}$ the sky] $[_{Path'}$ Path $[_{PlaceP}$ $[_{DP}$ the sky] $[_{Place'}$ Place √CLEAR]]]]

(6) Sue shelved the books.

$[_{vP}$ $[_{DP}$ Sue] $[_{v'}$ v $[_{PathP}$ $[_{DP}$ the books] $[_{Path'}$ Path $[_{PlaceP}$ $[_{DP}$ the books] $[_{Place'}$ Place √SHELF]]]]

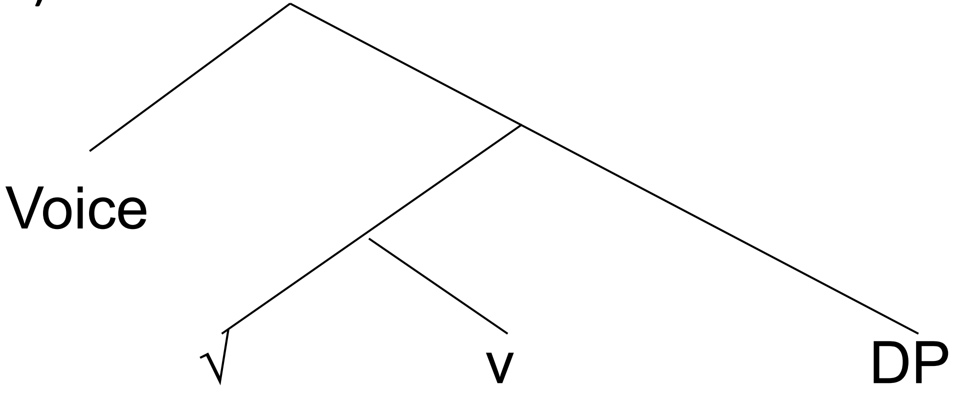
MARANTZ

- Roots cannot be merged as complements, but are always merged as events modifiers.
  - Unergatives as plain intransitives.
  - Transitive structures are plain transitive, i.e no small clause configuration for (a)telic transitives.

MARANTZ

- Unergatives as plain intransitives.
- Transitive structures are plain transitive, i.e no small clause configuration for (a)telic transitives.

(7)



MARANTZ: Empirical Evidence

- Restitutive *re*- prefixation distinguishes between unergative and transitive:

(8) a. John danced.

b. *John re-danced.

c. John re-danced a dance first performed by his distant ancestors.

- Restitutive *re*- prefixation distinguishes between transitives and SC:

(9) a. John re-shelved the books.

b. *John re-put the books on the shelf.

MARANTZ: Empirical Evidence

- Denominal verb formation systematically resists argument interpretation of roots (Rimell, 2011)

(10) John caked last night. (hard to get ‘bake, make, eat’)

- Denominal verbs do not behave as if the root occupies the argument position. Their semantics is that of modifying the event introduced by *v* or the end state of a change of state syntactically projected as a direct object.

MARANTZ: Empirical Evidence

- Verb compounds (outside synthetic noun compounds), where possible, resist argument interpretation of "incorporated" root.

(11) *Truck drive (i.e. 'drive trucks'); cf. truck driver

ACEDO-MATELLÁN (2014)

- Against Marantz (2011):
  - (First) Merge as an operation that takes two objects and creates a first phrasal projection, by definition a structure involving a head and its complement.

ACEDO-MATELLÁN (2014)

- Against Marantz (2011):
  - Cross-linguistic data may support the distinction between roots as adjunct modifiers or complements.

(12) a. Pauline smiled her thanks. (ADJUNCT)

b. *La Paulina somrigué les gràcies. (Catalan)

(13) a. The cow calved yesterday. (COMPLEMENT)

b. La vaca vedellà ahir. (Catalan)

THE DEBATE

- H&K, AM&M: “Generative semantics” view.
  - Semantically unambiguous structures reflecting argument/event structure.
- Marantz: “Interpretive semantics” view of syntax.
  - Syntax does not start with a structure transparently representing argument/event structure.

SENTENCE TYPES

VERB TYPE
UNERGATIVE VERB
The dog barked in quiet parks at night.
COGNATE OBJECT
The man dozed a restful doze on the train.
CREATION VERBS
He baked a delicious cake with spelt flour.
LOCATION/LOCATUM
They saddled a wild horse in the farm.
STRONG TRANSITIVES
He ignored a slight niggle in his knee.
WITH-SMALL CLAUSE
They sprayed a cookie sheet with vegetable oil.

Table 1: Sentence types

- Selection based on frame frequency rates (VALEX), and lexical frequency (COCA).
- Unergatives: frame frequency lower than 0.15.
- Creation, Loc/Loc, *With*-SC: selected from among those with the highest frame frequency rate.
- Strong transitives: frame frequency higher than 0.83.

TWO COMPETING GROUPINGS

<table>
<tr><th>VERB TYPE</th><th>A-M/M</th><th>MARANTZ</th></tr>
<tr><td>UNERGATIVE VERB</td><td rowspan="6">v + √/DP</td><td rowspan="2">v</td></tr>
<tr><td>The dog barked in quiet parks at night.</td></tr>
<tr><td>COGNATE OBJECT</td><td rowspan="8">v + √/DP</td></tr>
<tr><td>The man dozed a restful doze on the train.</td></tr>
<tr><td>CREATION VERBS</td></tr>
<tr><td>He baked a delicious cake with spelt flour.</td></tr>
<tr><td>LOCATION/LOCATUM</td><td rowspan="6">v + SC</td></tr>
<tr><td>They saddled a wild horse in the farm.</td></tr>
<tr><td>STRONG TRANSITIVES</td></tr>
<tr><td>He ignored a slight niggle in his knee.</td></tr>
<tr><td>WITH-SMALL CLAUSE</td><td rowspan="2">v + SC</td></tr>
<tr><td>They sprayed a cookie sheet with vegetable oil.</td></tr>
</table>

Table 2: Sentence types and grouping by theory

SYNTACTIC PRIMING

- The tendency to repeat or better process a sentence because of its structural similarity to a previously experienced, i.e. ‘prime’ sentence (Bock 1986).
- Bock & Loebell 1990; Bock et al. 1992; Pickering & Branigan 1998; Pickering et al. 2002; Pickering & Traxler 2004; Pickering & Ferreira 2009; Thothathiri & Snedecker 2008, 2010; Wittenberg et al. 2015; among others.

PRIMING CONDITIONS

<table>
<thead>
<tr><th></th><th>VERB TYPE</th><th>A-M/M</th><th>MARANTZ</th></tr>
</thead>
<tbody>
<tr><td>C1</td><td>UNERGATIVE VERB</td><td rowspan="6">v + √/DP</td><td rowspan="2">v</td></tr>
<tr><td></td><td>The dog barked in quiet parks at night.</td></tr>
<tr><td>C2</td><td>COGNATE OBJECT</td><td rowspan="8">v + √/DP</td></tr>
<tr><td></td><td>The man dozed a restful doze on the train.</td></tr>
<tr><td>C3</td><td>CREATION</td></tr>
<tr><td></td><td>He baked a delicious cake with spelt flour.</td></tr>
<tr><td>C4</td><td>LOCATION/LOCATUM</td><td rowspan="6">v + SC</td></tr>
<tr><td></td><td>They saddled a wild horse in the farm.</td></tr>
<tr><td>C5</td><td>STRONG TRANSITIVES</td></tr>
<tr><td></td><td>He ignored a slight niggle in his knee.</td></tr>
<tr><td>C6</td><td>WITH-SMALL CLAUSE</td><td rowspan="2">v + SC</td></tr>
<tr><td></td><td>They sprayed a cookie sheet with vegetable oil.</td></tr>
</tbody>
</table>

Table 3: Priming conditions, sentence types and groupings by theory.

STRUCTURAL PRIMING EXPERIMENT

- We test structural priming within and across sentence types.
- Self-paced reading language comprehension study over Mechanical Turk.
- Priming paradigm where each target item also serves as a prime sentence for the next target item (up to attention task or control condition – non-primed sentences).

SYNTACTIC PRIMING: PREDICTIONS 1

- Different structural priming predictions in terms of individual sentence types.

PRIMING RELATIONS – PREDICTIONS

	PRIME	TARGET	AM&M	MARANTZ
C1>C2	UNERGATIVE	COGNATE	✓	✗
C1>C3	UNERGATIVE	CREATION	✓	✗
C2>C1	COGNATE	UNERGATIVE	✓	✗
C2>C4	COGNATE	LOCATION/LOCATUM	✗	✓
C2>C5	COGNATE	STRONG TRANSITIVE	✗	✓
C3>C1	CREATION	UNERGATIVE	✓	✗
C3>C4	CREATION	LOCATION/LOCATUM	✗	✓
C3>C5	CREATION	STRONG TRANSITIVE	✗	✓
C4>C2	LOCATION/LOCATUM	COGNATE	✗	✓
C4>C3	LOCATION/LOCATUM	CREATION	✗	✓
C4>C6	LOCATION/LOCATUM	*WITH*-SMALL CLAUSE	✓	✗
C5 > C2	STRONG TRANSITIVE	COGNATE	✗	✓
C5 > C3	STRONG TRANSITIVE	CREATION	✗	✓
C5 > C6	STRONG TRANSITIVE	*WITH*-SMALL CLAUSE	✓	✗
C6 > C4	*WITH*-SMALL CLAUSE	LOCATION/LOCATUM	✓	✗
C6 > C5	*WITH*-SMALL CLAUSE	STRONG TRANSITIVE	✓	✗

PRIMING RELATIONS – PREDICTIONS

	PRIME	TARGET	AM&M	MARANTZ
C1>C2	UNERGATIVE	COGNATE	✓	✗
C1>C3	UNERGATIVE	CREATION	✓	✗
C2>C1	COGNATE	UNERGATIVE	✓	✗
C2>C4	COGNATE	LOCATION/LOCATUM	✗	✓
C2>C5	COGNATE	STRONG TRANSITIVE	✗	✓
C3>C1	CREATION	UNERGATIVE	✓	✗
C3>C4	CREATION	LOCATION/LOCATUM	✗	✓
C3>C5	CREATION	STRONG TRANSITIVE	✗	✓
C4>C2	LOCATION/LOCATUM	COGNATE	✗	✓
C4>C3	LOCATION/LOCATUM	CREATION	✗	✓
C4>C6	LOCATION/LOCATUM	*WITH*-SMALL CLAUSE	✓	✗
C5 > C2	STRONG TRANSITIVE	COGNATE	✗	✓
C5 > C3	STRONG TRANSITIVE	CREATION	✗	✓
C5 > C6	STRONG TRANSITIVE	*WITH*-SMALL CLAUSE	✓	✗
C6 > C4	*WITH*-SMALL CLAUSE	LOCATION/LOCATUM	✓	✗
C6 > C5	*WITH*-SMALL CLAUSE	STRONG TRANSITIVE	✓	✗

SYNTACTIC PRIMING: PREDICTIONS 2

- Different structural priming predictions in terms of groupings of sentence types by each theoretical approach.

GROUPING RELATIONS – PRIMING PREDICTIONS

	PRIME / TARGET AMONG THEMSELVES	AM&M	MARANTZ
C1-C2-C3	UNERGATIVE – COGNATE – CREATION	✓	✗
C4-C5-C6	LOCATION/LOCATUM – STRONG TRANSITIVES – WITH SMALL CLAUSE	✓	✗
C2-C3-C4-C5	COGNATE – CREATION – LOCATION /LOCATUM – STRONG TRANSITIVES	✗	✓

Table 5: Priming relations - Predictions by sentence groupings

GROUPING RELATIONS – PRIMING PREDICTIONS

	PRIME / TARGET AMONG THEMSELVES	AM&M	MARANTZ
C1-C2-C3	UNERGATIVE – COGNATE – CREATION	✓	✗
C4-C5-C6	LOCATION/LOCATUM – STRONG TRANSITIVES – WITH SMALL CLAUSE	✓	✗
C2-C3-C4-C5	COGNATE – CREATION – LOCATION /LOCATUM – STRONG TRANSITIVES	✗	✓

Table 5: Priming relations - Predictions by sentence groupings

NOTES ON STRUCTURAL PRIMING

- Surface vs. abstract structure priming
  - Bock et al. (1992), Pickering et al. (2002), Pickering & Ferreira (2009), Wittenberg et al. (2015), i.a.: syntactic priming is sensitive / attributable to surface structure.
- In both models, AM&M and MARANTZ, the proposed structures are surface structures.

PRIMING ACROSS MODALITIES

- Production vs. Comprehension (in behavioral studies)
  - Syntactic priming effects in **production** occur without lexical repetition and are enhanced when there is *lexical boost*, e.g. Pickering & Branigan (1998); Segaert et al. (2011, 2013).
  - Pickering & Branigan (1998): priming without lexical repetition only when primed with 2 sentences in **production** (completing sentence fragments).

PRIMING ACROSS MODALITIES

- Production vs. Comprehension (in behavioral studies)
  - Syntactic priming in **comprehension** seems to depend on *lexical boost*, e.g. Pickering & Traxler (2004); Branigan et al. (2005); Arai et al. (2007); Traxler & Tooley (2007); Tooley et al. (2009); Segaert et al. (2011, 2013).
  - Recent studies reporting syntactic priming in **comprehension** independent from *lexical boost*: Thothathiri & Snedeker (2008a,b); Traxler (2008); Pickering, McLean & Branigan (2013).

PRIMING IN COMPREHENSION

- Pickering & Traxler (2004): no priming in comprehension without lexical boost (eye tracking recording in reading task).

(14) The man watched by the woman was tall.

a. =/=The child cleaned by the girl was covered in chocolate.

b. ==>The mouse watched by the cat was hiding under the table.

PRIMING IN COMPREHENSION

- Segaert et al. (2013): no syntactic priming in active sentences in the absence of lexical boost of head word (fMRI neuronal study of active and passive sentence comprehension and production).

PRIMING IN COMPREHENSION

- Thothathiri & Snedeker (2008): priming effects without lexical repetition in comprehension with 2 primed sentences (eye tracking identification plus acting out).
- Problems (reported in Tooley & Traxler 2010):
  - two prime sentences may reflect a task-specific effect,
  - kids had to act out target sentence with toys, invoking some covert production.

PRIMING IN COMPREHENSION

- Traxler (2008): first evidence of between-sentence structural priming in online sentence comprehension without lexical overlap, involving adjunct relations (eye-tracking).

(15) a. The chemist poured the fluid in the beaker into the flask earlier. (Same-structure PRIME)

b. The chemist poured the fluid into the flask earlier. (Different-structure PRIME)

c. The vendor tossed the peanuts in the box into the crowd during the game (TARGET).

PRIMING IN COMPREHENSION

- Pickering, McLean & Branigan (2013): structural priming in both lexically independent and lexically dependent comprehension (sentence-picture matching task of high and low-attachment ambiguous adjuncts).

(16) a. The policeman is thumping the soldier with the gun. (PRIME)

b. The waitress is prodding the clown with the umbrella. (TARGET)

STIMULI IN STRUCTURAL PRIMING

- Garden-path sentences

  (17) The man accepted the price was not going to him. (Trueswell & Kim 1998)

- Ambiguous low and high-attachment adjuncts

  (18) The waitress is prodding the clown with the umbrella. (Pickering, McLean, Branigan 2013)

STIMULI IN STRUCTURAL PRIMING

- Double Object versus Dative constructions

(19) a. Give the bird the dog bone.

b. Give the bird house to the sheep. (Thothathiri & Snedeker 2008)

STIMULI IN STRUCTURAL PRIMING

- Datives versus Locatives versus Passives

  (20) a. The wealthy widow drove her Mercedes to the church. (PRIME)

  b. A rock climber sold some cocaine to an undercover agent. (TARGET) (Bock & Loebell 1990)

  (21) a. The foreigner was loitering by the broken traffic light. (PRIME)

  b. The referee was punched by one of the fans. (TARGET) (Bock & Loebell 1990)

- Actives versus Passives (e.g. Bock 1986; Segaert 2011, 2013)

PERSISTENCE OF PRIMING

- Hartsuiker et al. (2008): enhanced priming effect due to lexical boost does not persist across any number of intervening structures in production (picture description task).
- Carminati & van Gompel (2009): lexically dependent syntactic priming effects persist across 2 intervening sentences in comprehension (eye tracking identification task).

EXPERIMENTAL DESIGN

- 24 sentences of each condition (24 x 6 = 144), separated into 4 segments:
  - Subject
  - Verb
  - First Complement
  - Second Complement
- 1/6 of trials preceded by a two-choice comprehension question
- 3 blocks of trials, with 6 block orderings
  - Trials randomized within blocks

SEGMENTS OF 4 PHRASES

		NP	V (+N/NP)	PP	PP
C1	Unergative	The dog	barked	in the park	at night

		NP	V	NP	PP
C2	Cognate	The dog	barked	a ferocious bark	in the garden.
C3	Creation	The man	built	a detached house	in the countryside.
C4	Locative/Locatum	The man	caged	a young tiger	in the zoo.
C5	Strong Transitive	The man	ignored	a slight niggle	in his knee.
C6	*With*-Small Clause	The man	crammed	a cigarette butt	into the ashtray.

STUDY IMPLEMENTATION

- Created in Ibex
  - Each segment presented sequentially in center of the screen
  - 400 ms between each sentence
  - Participants were shown instructions and completed a practice round before beginning

-- --

The army

flooded

a small river

in Austin.

Did they block it up or cross it?

1. cross it
2. block it up

STUDY IMPLEMENTATION

- Distributed via Amazon Mechanical Turk (500 HITs completed)
  - Restricted to participants in the U.S.
  - 95% or greater HIT acceptance rate

DATA PROCESSING

- Exclusion criteria:
  - Non-native English speakers
  - Multilinguals
  - < 70% overall accuracy
  - Duplicate participants
- n = 355 included participants

DATA PROCESSING

- Average reading time was calculated for each participant, for each segment:
  - Trials with RT > 2 standard deviations from participant's respective mean were excluded.
- First trial of each block was excluded.

CONTROLLED ANALYSES

- Based on preliminary ANOVA results (6x6 within subjects; Factors: cond + prev_cond) and visual inspection of the plots, we decided to focus on the reading times of Segment 3, the first constituent after the verb (complement /adverbial).
- The analyses that follow will have Segment 3 reading time as the outcome/response variable.

ANCOVA
(Analysis of Covariance)

- We designed a mixed effects ANCOVA with random intercepts by subject and by item.
- ‘Nuisance’ variables included as covariates:
  - trial order,
  - verb frequency,
  - RT of previous segment,
  - RT of same segment in previous trial.

ANCOVA (1.0)
(Analysis of Covariance)

- We coded two variables:
  - Conditions recoded/grouped based on Marantz theory: Unergatives, DP/Root, Small Clause ($V\alpha$)
  - Conditions recoded/grouped based on AM&M theory: DP/Root, Small Clause ($V\beta$)
- These two variables were included as predictors in an ANCOVA model, with log-transformed frequency, trial order, previous trial RT, and previous segment RT as controls/covariates.

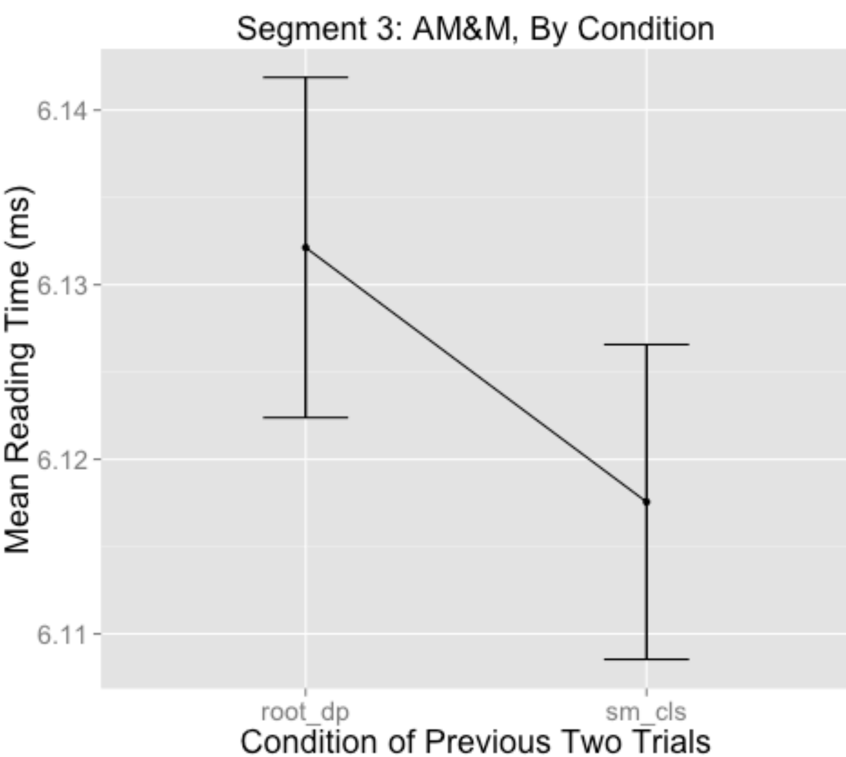
ANCOVA (1.0) – FINDINGS

- The full model was tested against models excluding each respective variable of interest.

- We found:
  - Significant contribution of Marantz model ($p = .012$)
  - Neither significant nor trending contribution of AM&M model ($p = .1379$)

AM&M vs. MARANTZ – By Condition

- No significant separation between conditions for the AM&M model – error bars overlap quite a bit.
- Significant separation in the Marantz model.



ANCOVA (2.0) – PREVIOUS TWO SAME CATEGORY

- We created two new binary variables:
  - Trials preceded by TWO trials of the same condition (same as each other, not as the current trial)
    - According to the Marantz theory (Vγ)
    - According to the AM&M theory (Vδ)
- Included the same control variables as in the previous ANCOVA models.
- We ALSO included the interaction of the two above variables (Vγ, Vδ) with the variables associated with their respective models (Vα, Vβ).

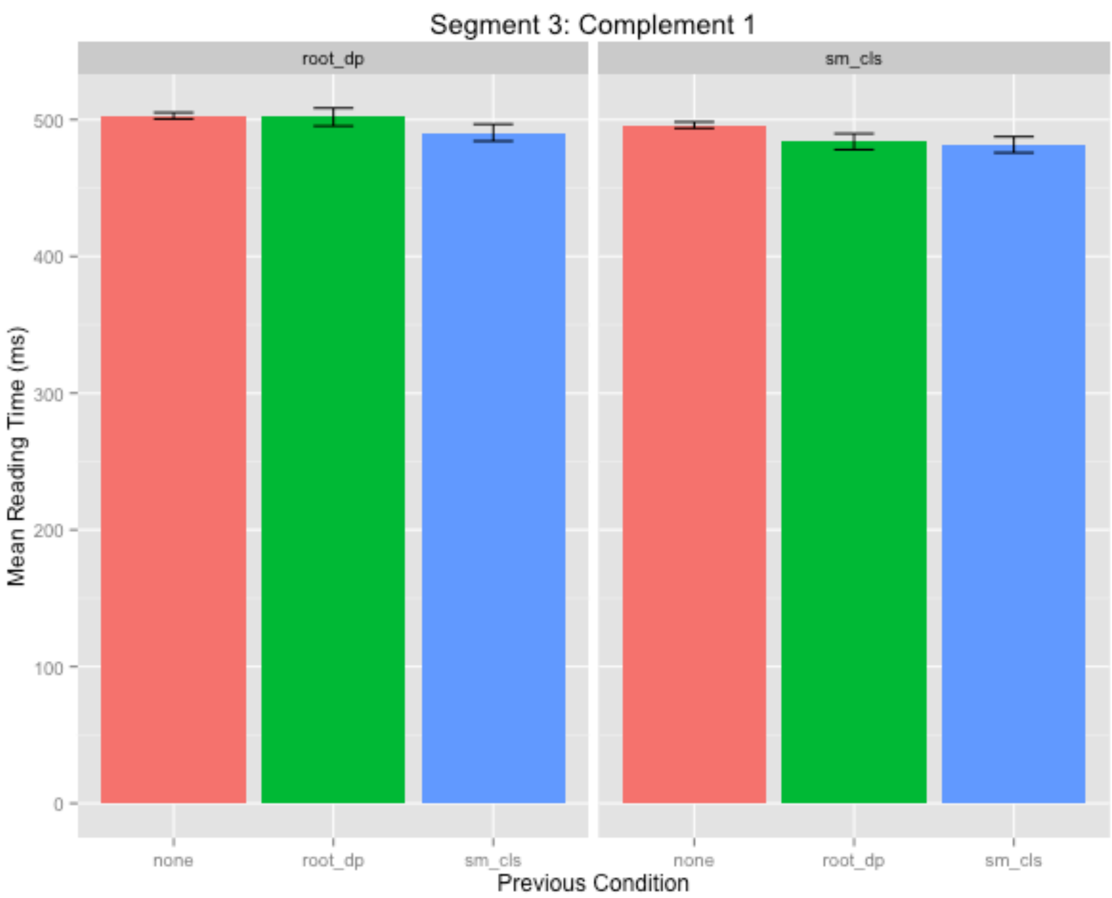
ANCOVA (2.0) – FINDINGS

- The full model was tested against models excluding each respective interaction term.
- This gave a null result:
  - The contribution of the Marantz interaction was not significant ($p = .649$)
  - The contribution of the AM&M interaction was not significant ($p = .863$)

ANCOVA (2.0) – FINDINGS

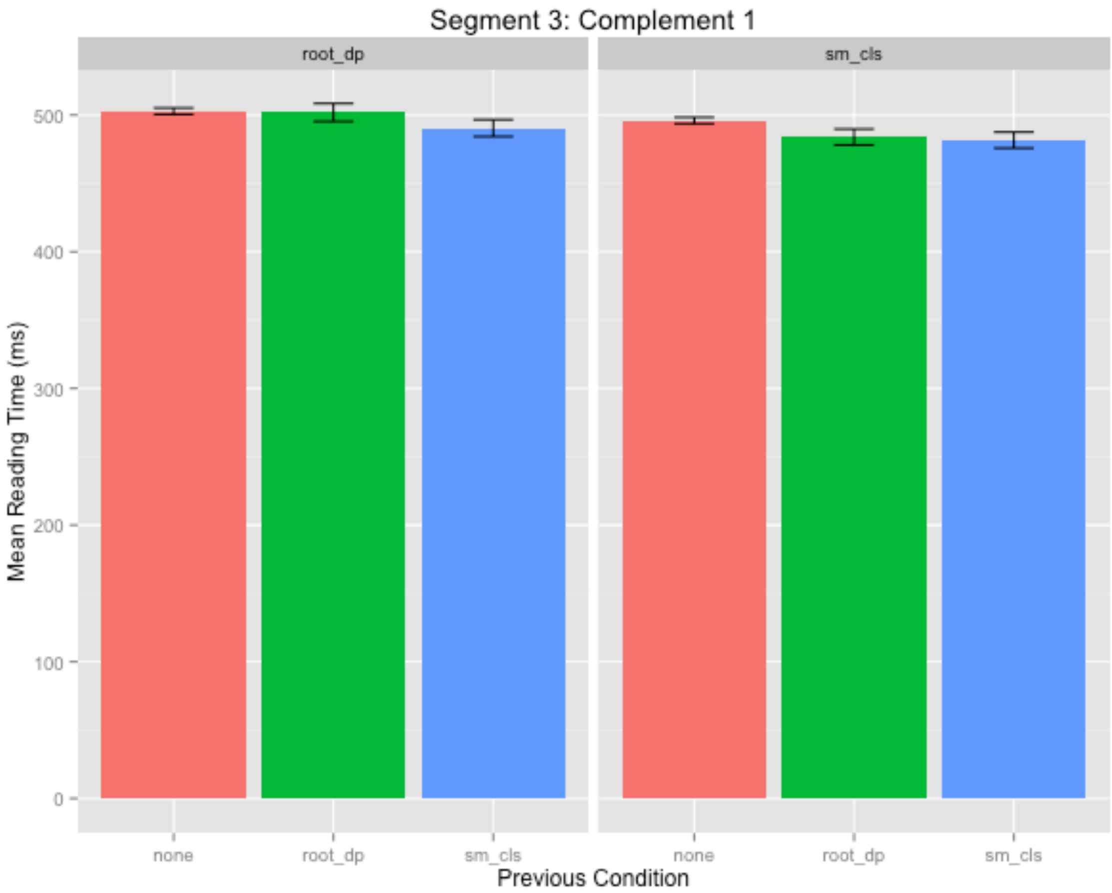
- However, when we remove the random effects structure, keeping order as a covariate, we obtain significant effects
  - The contribution of the Marantz interaction was significant ($p = .0037$)
  - The contribution of the AM&M interaction was not significant ($p = .756$)
- Caution: Simplified model!

AM&M Model Prev2



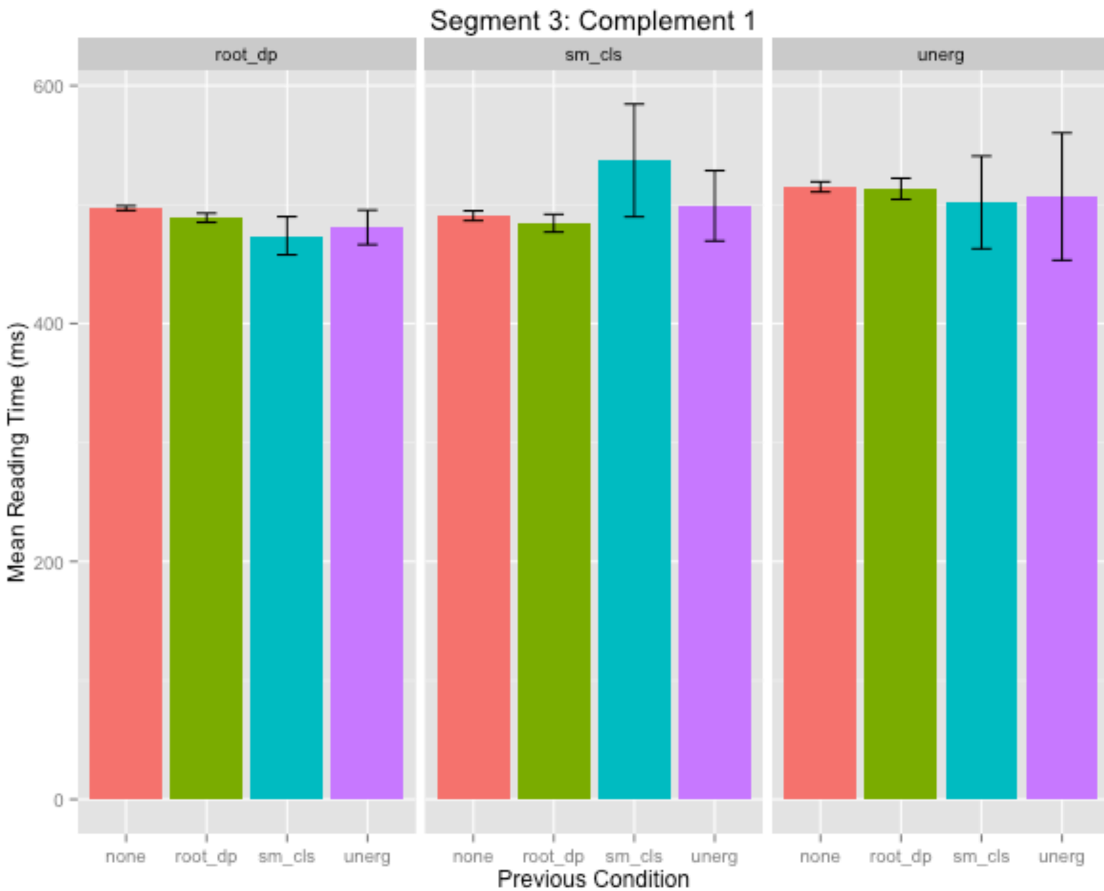
- Differences in mean RT for Segment 3, by condition and previous condition for trials preceded by TWO trials of the same condition.
- None= Trials not preceded by 2 of the same condition.

AM&M Model Prev2



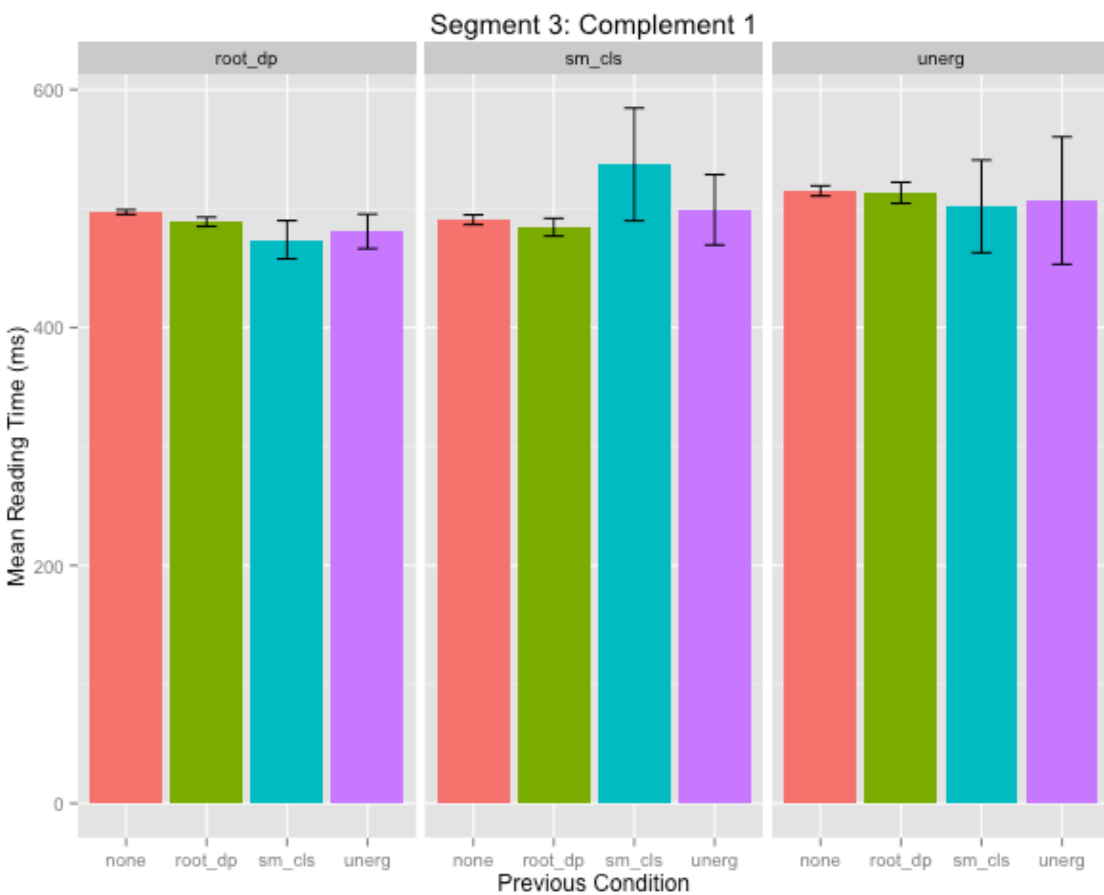
- No evidence that some set of V NP PP structures behave like SC or that unergatives look like transitives.

Marantz Model Prev2



- Differences in mean RT for Segment 3, by condition and previous condition for trials preceded by TWO trials of the same condition.
- None= Trials not preceded by 2 of the same condition.

Marantz Model Prev2



- We see effects for the SC condition. 2 SC sentences before a SC sentence causes a significant slow down in Segment 3 RTs, while 2 standard V NP PP sentences before SC causes a significant speed up in S3 reading.

ANCOVA – Limitations

- Limitations:
  - The AM&M variable, and thus the interaction including this variable, had fewer levels than the Marantz model, perhaps inherently restricting its ability to capture variance associated with this interaction.
  - However, adding more levels to the categorical predictor does not improve the analysis. The test of the ungrouped condition variable is still not significant ($p = .11$).

LINEAR MIXED EFFECTS REGRESSION MODEL

- To test priming on the basis of the grouping of conditions in each model.
- Same control variables as in previous ANCOVA analyses.
- We coded two additional binary variables based on the predictions of each model :
  - Primed
  - Unprimed

PRIMING RELATIONS – PREDICTIONS

	PRIME	TARGET	AM&M	MARANTZ
C1>C2	UNERGATIVE	COGNATE	✓	✗
C1>C3	UNERGATIVE	CREATION	✓	✗
C2>C1	COGNATE	UNERGATIVE	✓	✗
C2>C4	COGNATE	LOCATION/LOCATUM	✗	✓
C2>C5	COGNATE	STRONG TRANSITIVE	✗	✓
C3>C1	CREATION	UNERGATIVE	✓	✗
C3>C4	CREATION	LOCATION/LOCATUM	✗	✓
C3>C5	CREATION	STRONG TRANSITIVE	✗	✓
C4>C2	LOCATION/LOCATUM	COGNATE	✗	✓
C4>C3	LOCATION/LOCATUM	CREATION	✗	✓
C4>C6	LOCATION/LOCATUM	*WITH*-SMALL CLAUSE	✓	✗
C5 > C2	STRONG TRANSITIVE	COGNATE	✗	✓
C5 > C3	STRONG TRANSITIVE	CREATION	✗	✓
C5 > C6	STRONG TRANSITIVE	*WITH*-SMALL CLAUSE	✓	✗
C6 > C4	*WITH*-SMALL CLAUSE	LOCATION/LOCATUM	✓	✗
C6 > C5	*WITH*-SMALL CLAUSE	STRONG TRANSITIVE	✓	✗

LINEAR MIXED EFFECTS REGRESSION MODEL

- To test priming on the basis of the grouping of conditions in each model.
- Same control variables as in previous ANCOVA analyses.
- We coded two additional binary variables based on the predictions of each model :
  - Primed
  - Unprimed
- ✓ coded as 1
- ✗ coded as 0

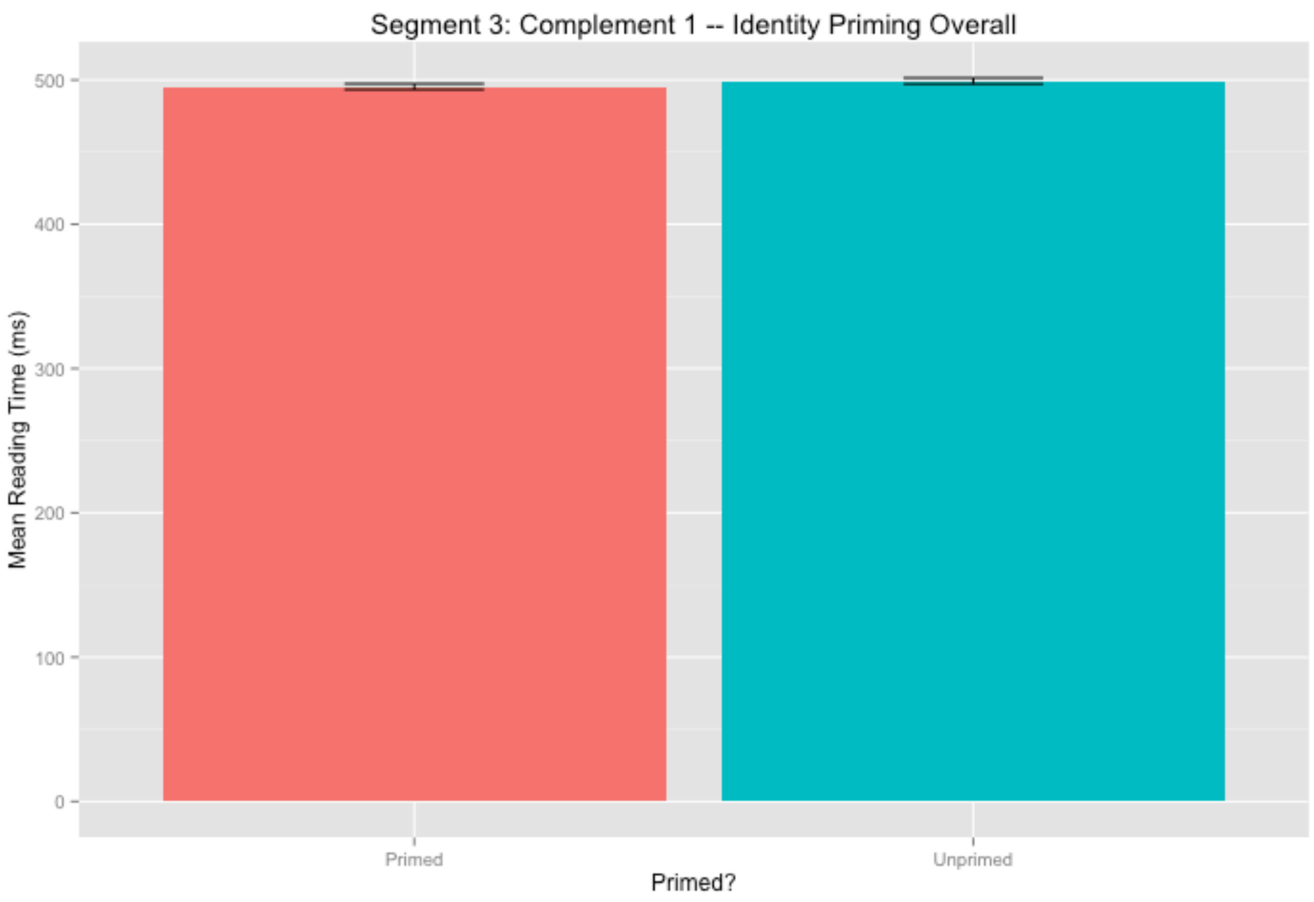
LINEAR MIXED EFFECTS REGRESSION MODEL

- Results are not significant. However, the effect size for the Marantz model is consistently larger than that of AM&M.
- Without considering random effects:
  - Marantz model ($p = .1078$)
  - AM&M model ($p = .2999$)
- With random effects:
  - Marantz model ($p = .1766$)
  - AM&M model ($p = .565$)

LINEAR MIXED EFFECTS REGRESSION MODEL

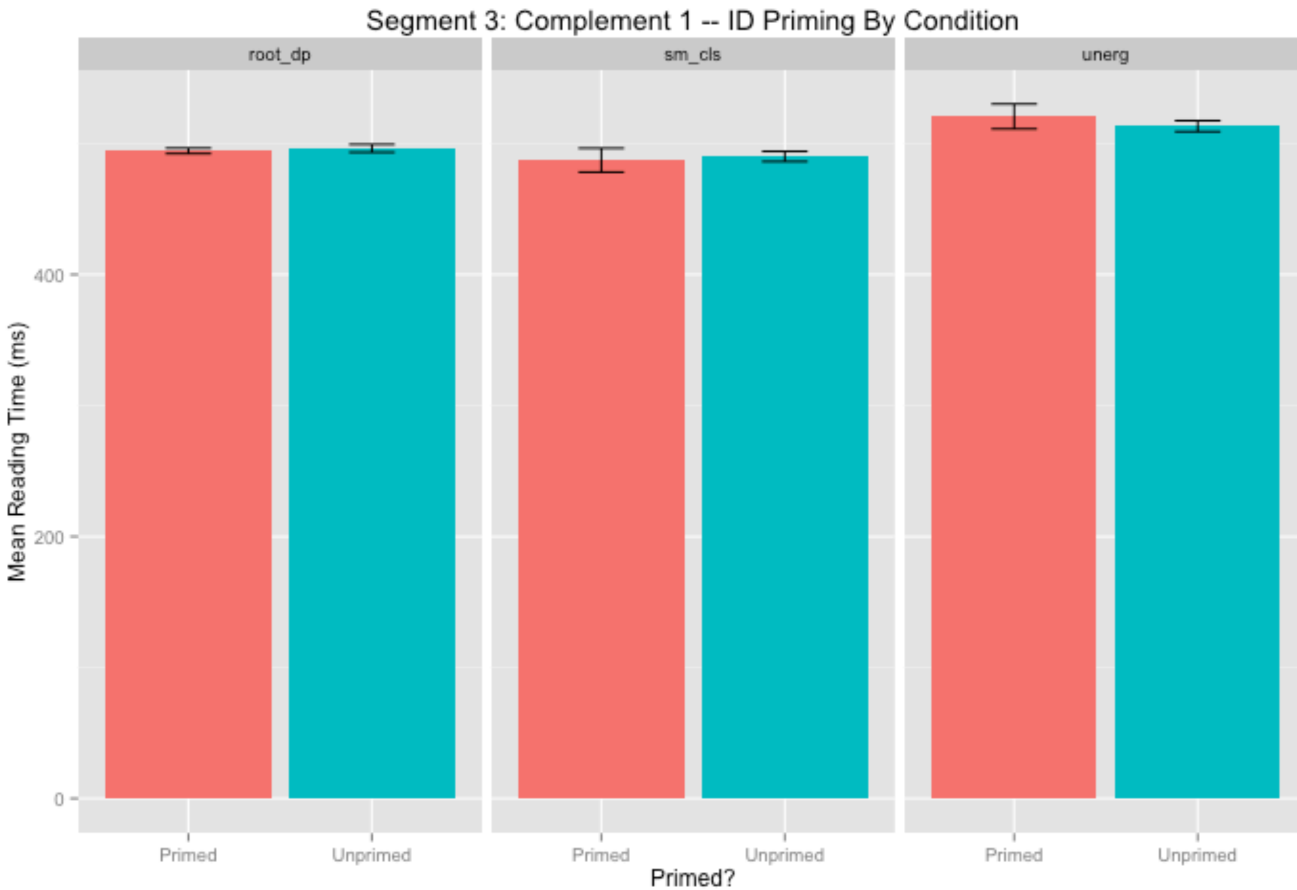
- This is likely our most reliable model, because we have reduced the number of levels for the variables we are testing to just two for both models.

Marantz – Identity Priming Overall



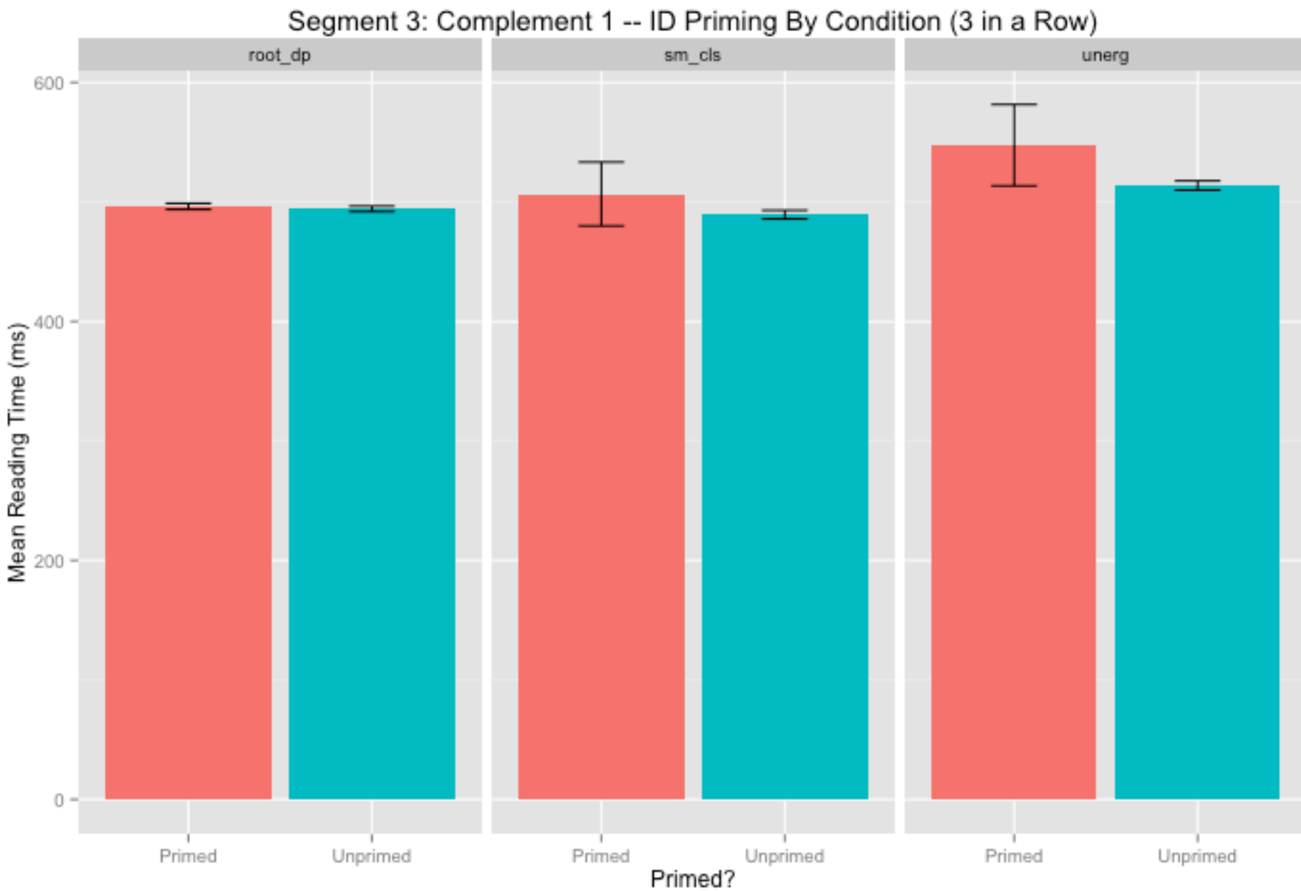
- Conditions preceded by the same condition (just 1 previous trial), given the grouping of conditions in the Marantz model.

Marantz – Identity Priming By Condition



- Conditions preceded by the same condition (just 1 previous trial), given the grouping of conditions in the Marantz model by condition.

Marantz – Identity Priming By Condition 3 in a Row



- Conditions preceded by TWO same conditions (2 previous trials), given the grouping of conditions in the Marantz model by condition.

CONCLUSIONS

- Self-paced reading comprehension study shows syntactic priming effects with canonical (simple) NP V NP PP structures.
- ANCOVA 1.0: By Condition, we get significant effects of the Marantz model.
- ANCOVA 2.0: Interaction of Models with Prev_Two_Same, we get significant effects of the Marantz model with trial order and no random effects.

ONGOING QUESTIONS

- The inhibitory effect in slower RTs in conditions of priming.
- Limitations of the model variables in the number of levels (3 vs. 2) in the ANCOVAs, perhaps inherently conditioning their ability to capture variance.

NEXT STEPS

- More data are needed. Preliminary effects showing that the Marantz model is a better predictor are based on one aspect of the model, and we may not currently have enough statistical power to look at ALL aspects of the model.
- We had few trials preceded by 2 trials of the same condition as the current trial. We need more data to get reliable results in this direction.

DGfS 2016
AG2: The syntax of argument structure

Syntactic priming as a test of argument structure: A self-paced reading experiment

THANKS!

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