Young speakers in the bottleneck

knowledge and use of morphology in Chamorro

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Sentence Processing in Multilingual and Other Less Commonly Studied Populations
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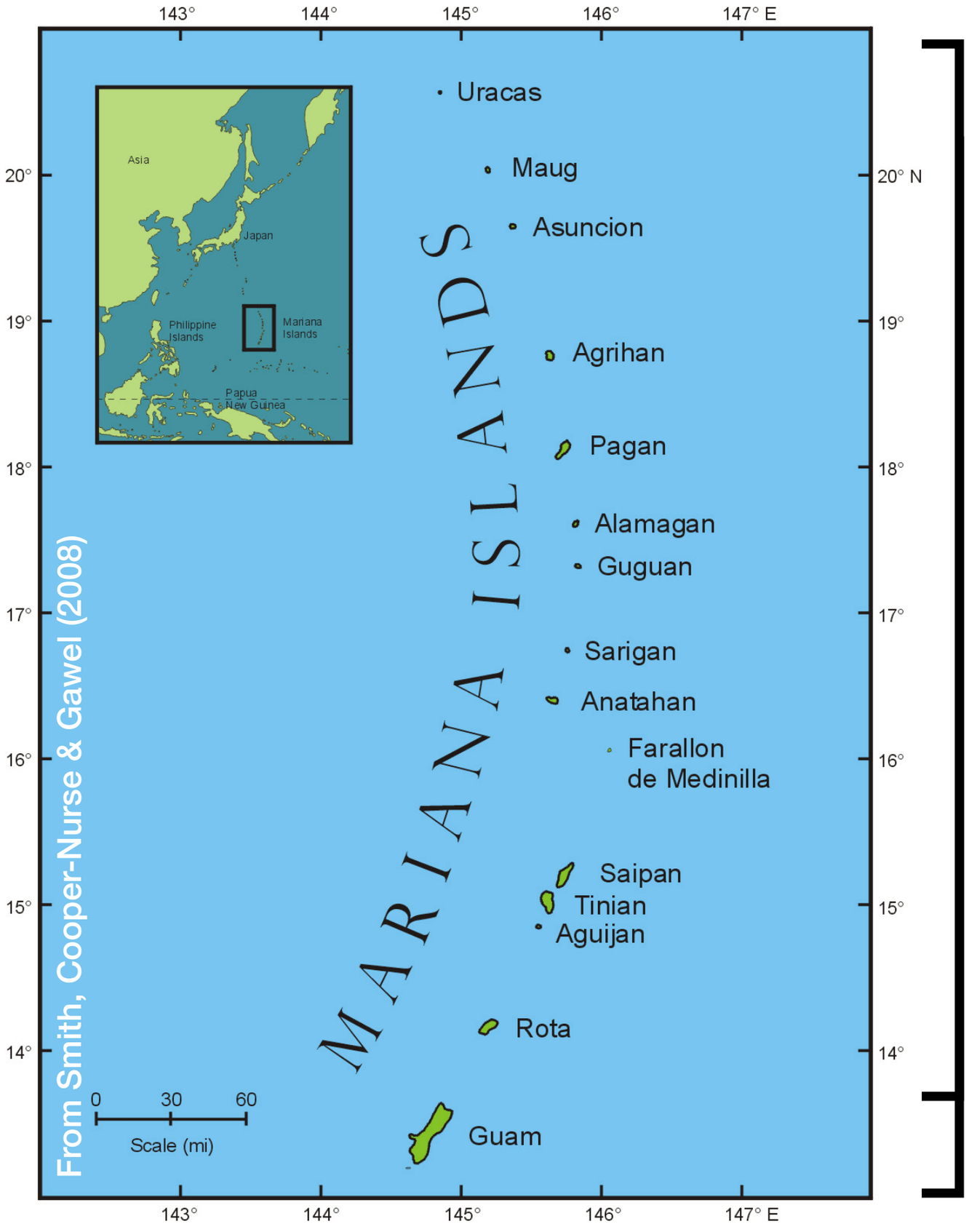
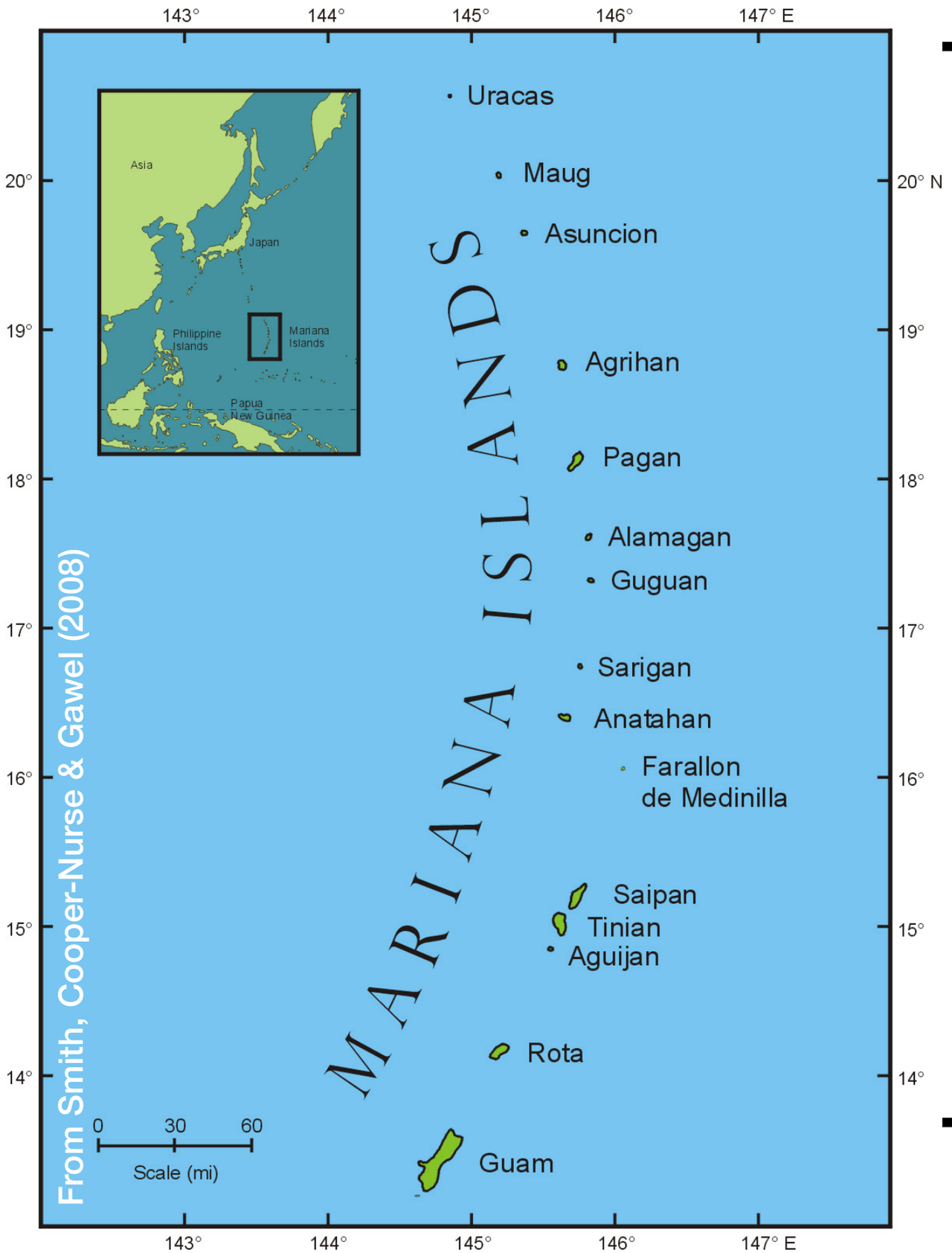


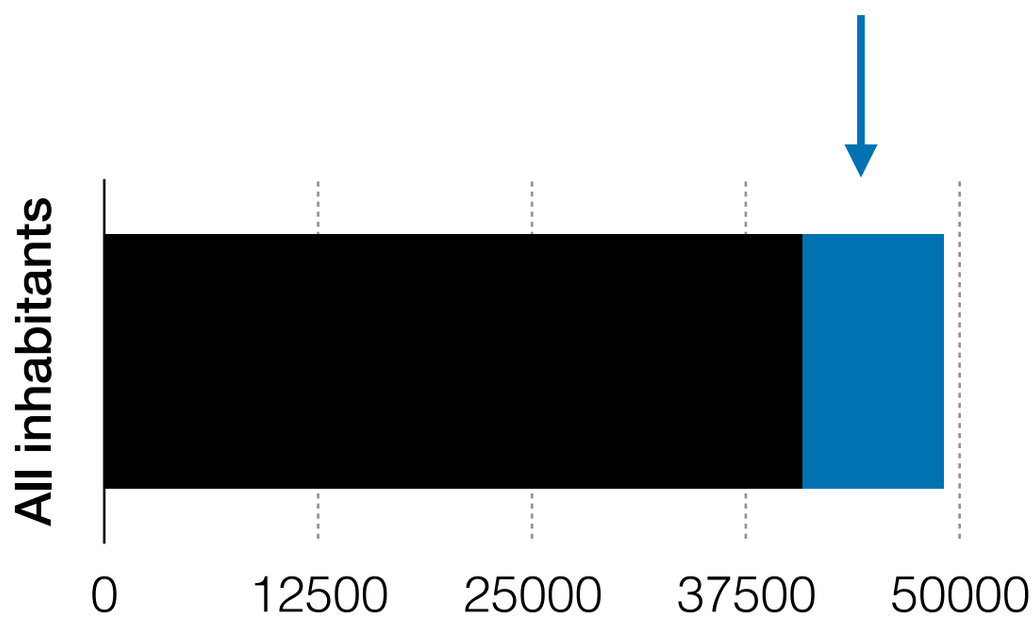
Commonwealth of the Northern Mariana Islands

Guam



Source: 2010 US Census

Commonwealth of the Northern Mariana Islands



Philippine languages (33%)

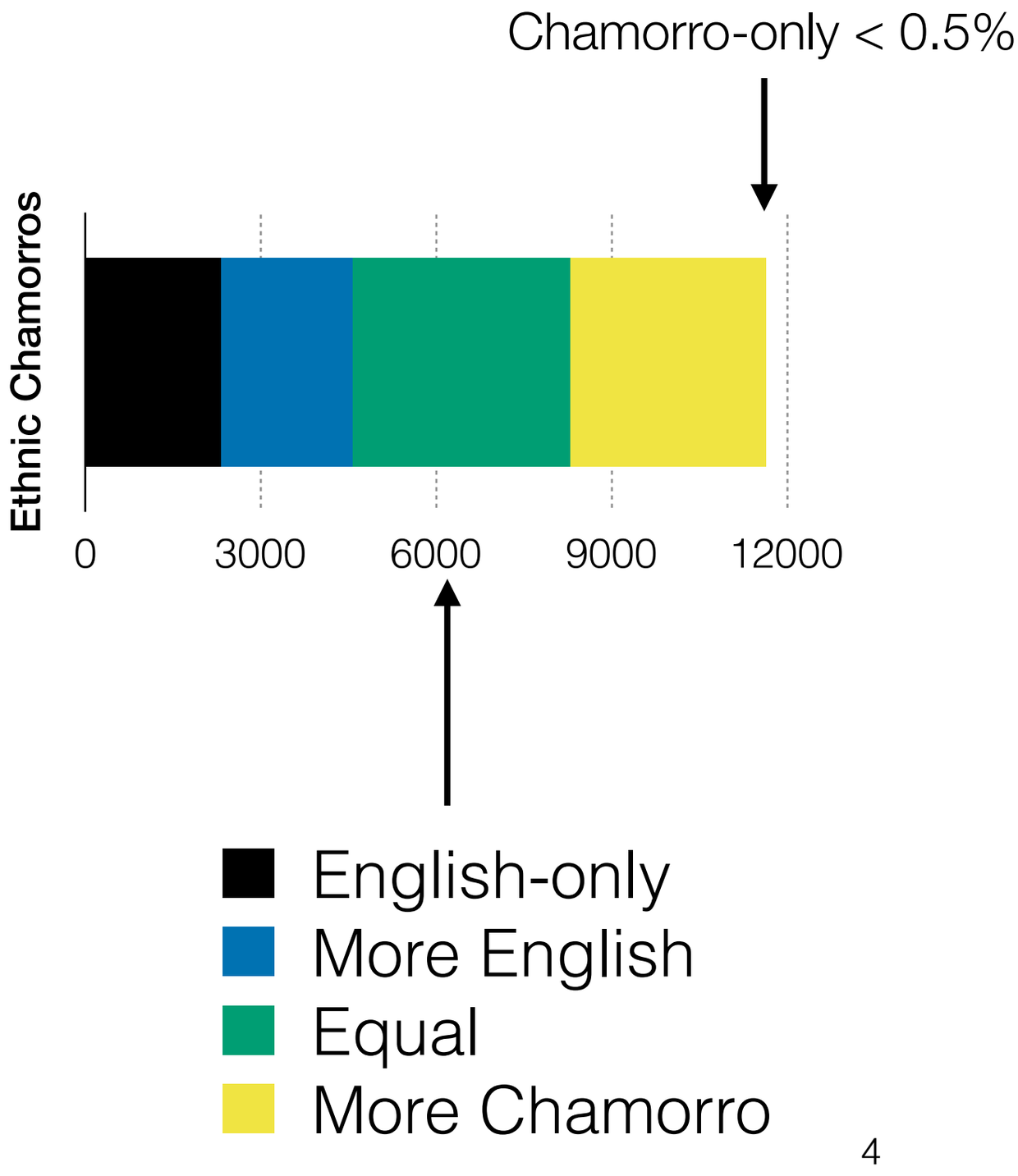
Chamorro (24%)

Other Pacific languages (10%)

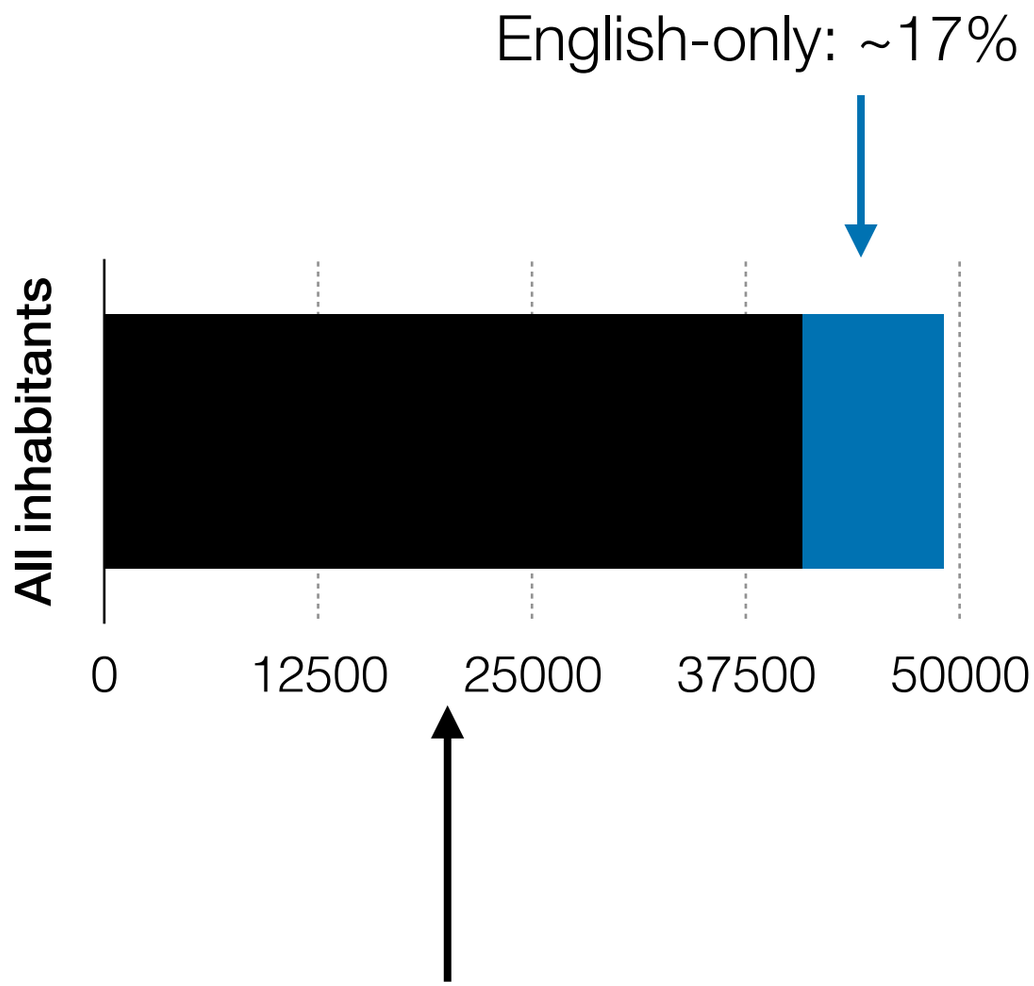
Chinese (7%)

Korean (6%)

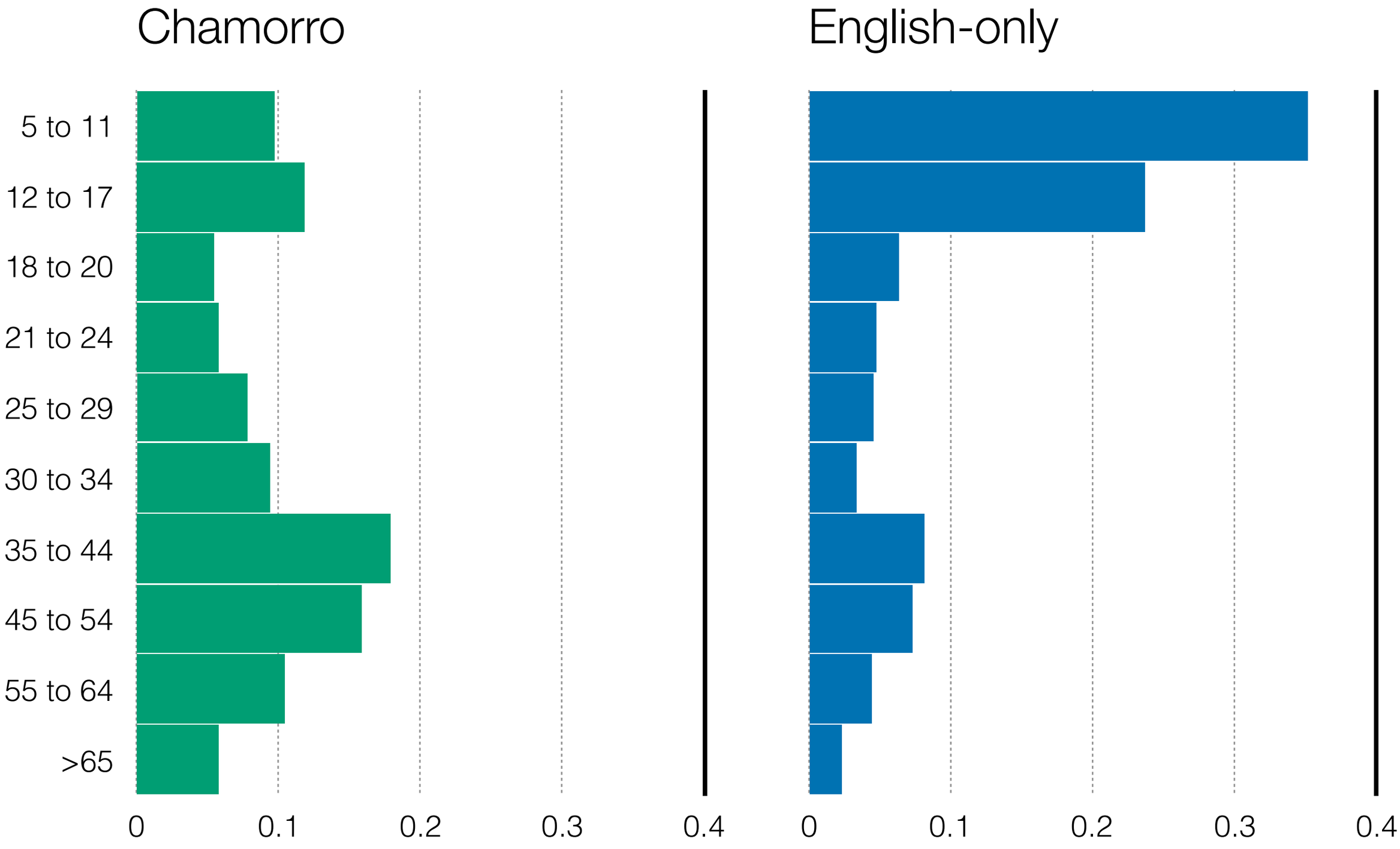
Language Preference Among Ethnic Chamorros



Commonwealth of the Northern Mariana Islands

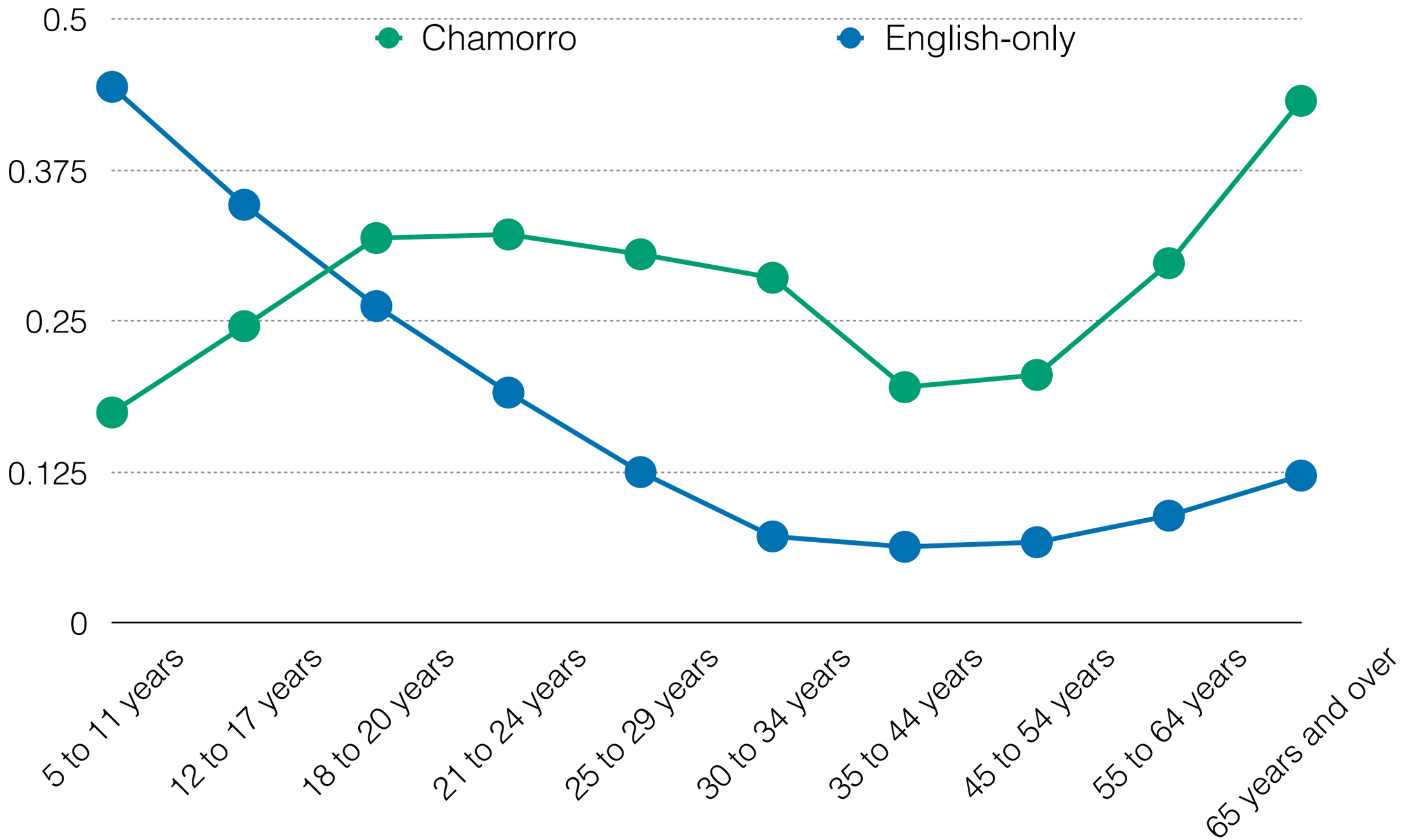


Speaker age
By language each speaker uses at home



Source: 2010 US Census

Percentage of speakers in age group
By language each speaker uses at home



Source: 2010 US Census

Attitudes about change

Chamorro observers evaluating language health often draw evidence from the local music industry.

The Chamorro music industry, which has helped to sustain the fluency and the positive language attitudes of older Chamorros has begun to decline slightly in recent years.... **when young Chamorros branch out into new musical genres, the lack of their fluency in Chamorro leads the result of their creativity energies to be largely in English**.
(Miguel Lujan Bevacqua, 2006)


J.D. Crutch


Flora Baza

http://minagahet.blogspot.com/2006/09/state-of-chamorro-language.html

Our research

Since 2011, we have conducted 6 studies on Chamorro sentence processing, each asking how morphology constrains incremental interpretation.

Approximately **420** unique participants have been involved in our research, amounting to nearly **5% of (eligible) Chamorro speakers** in the CNMI.

Could we leverage our data to ask questions about how younger speakers' knowledge and use of Chamorro might be different from older speakers'?

Today

- Grammar of relative clauses

- Factors affecting RC disambiguation

- Younger speakers' use of complex morphology as a cue to disambiguation

Synopsis

- In the domain investigated, younger speakers show little evidence of having morphological or syntactic knowledge that is divergent from their older counterparts

- But they do show a heightened sensitivity to processing bottlenecks

Language features

1. *Verb-initial canonical word order*
2. Flexible modifier order
3. Rich verbal morphology

1) Verb-initial word order

Verb-initial word order
Flexible modifier order
Rich verbal morphology

(1) **Mañaibuk** i palåo'an lemmai
cook woman breadfruit
"The woman **cooked** breadfruit in coconut milk"

- word order is otherwise flexible

2) Flexible modifier order

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- Modifiers can occur before or after the head noun

(2) **Atan i agaga' na kareta**
look.at red L car
"Look at the **red** car."

(3) **Atan i karetan agaga'**
look.at car.L red
"Look at the **red** car."

2) Flexible modifier order

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- …. Including relative clause modifiers

(4) Ågang i palåo'an **[ni mañaibuk lemmai]**
call woman REL cook breadfruit
"Call the woman **who cooked breadfruit**"

(5) Ågang i **[mañaibuk lemmai]** na palåo'an
call cook breadfruit L woman
"Call the woman **who cooked breadfruit**"

2) Flexible modifier order

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- Additionally: relative clauses may be headless

(6) Ågang i **[mañaibuk lemmai]** ∅
call cook breadfruit

“Call the one **who cooked breadfruit**”

3) Rich morphology

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- Transitive RCs are systematically ambiguous

(7) Atan atyu i **[ha kadididak i biha]** na påtgun.
look.at DEM tickle.PROG old L child

SUBJECT GAP “Look at the child who __ is tickling the old lady”
OBJECT GAP “Look at the child who the old lady is tickling __”

3) Rich morphology

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- “Wh-Agreement” morphology disambiguates

(8) Atan atyu i **[kumadididak i biha]** na påtgun.
look.at DEM tickle.PROG old L child

<um>: Subject Wh-Agreement

3) Rich morphology

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- "Wh-Agreement" morphology disambiguates

(9) Atan atyu i **[kinadidadak-ña i biha]** na påtgun.
look.at DEM tickle.PROG old L child

<in> + -PossAgr: Object Wh-Agreement

3) Rich morphology

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- Many ways to inflect the same root to directly encode filler-gap grammatical role via wh-agreement or voice

hu kadidak, un kadidak … …
makadidak
kinadidak
mangadidak
kumadidak
kinadidak-ku, kinadidak-mu … … … …

tickle, tickle**s**
tickl**ing**
tickl**ed**
HAVE tickl**ed**
BE tickl**ed**

Comparison to English

	Chamorro	English
Word order	**V**-S-O flexible	S-**V**-O less flexible
Modifiers	D-**N**-<u>RC</u> D-<u>RC</u>-**N** D-<u>RC</u>-∅	D-**N**-<u>RC</u>
Morphology	directly identifies gap in RCs	word order provides partial cue to gap

Two experiments (2013, 2014)

1. How does head-modifier order affect interpretation of **ambiguous** RCs?

2. How effective are **unambiguous** morphological cues to RC interpretation?

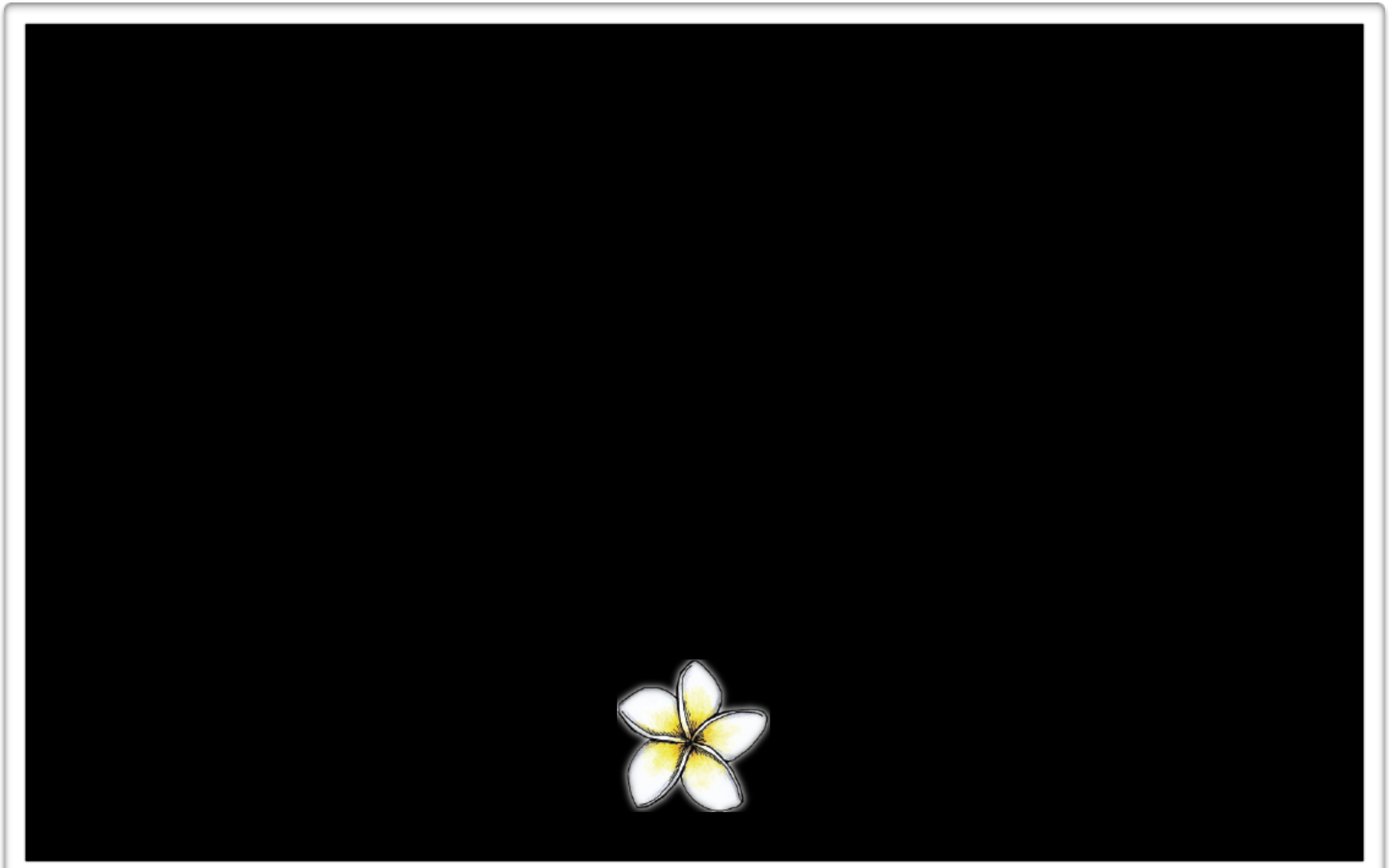
Method

- Picture matching to audio + touch-tracking
  (cf., mouse-tracking, Freeman & Ambady, 2010)

- Developed in OpenSesame http://osdoc.cogsci.nl/
  (Mathôt et al., 2012)

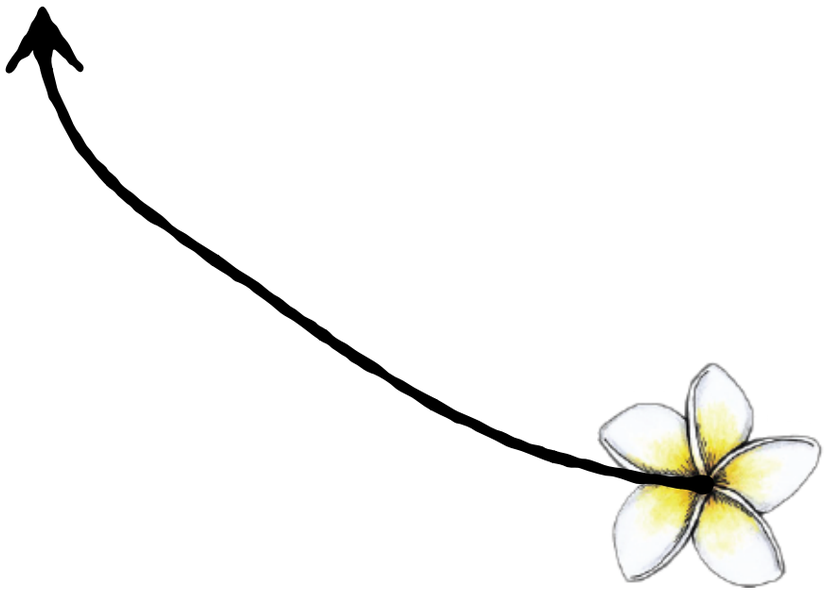
- and deployed on
  Google Nexus 10 tablets

paini ‘comb’



Chonnik i floris guatu gi atyu …

Push the flower over to that …



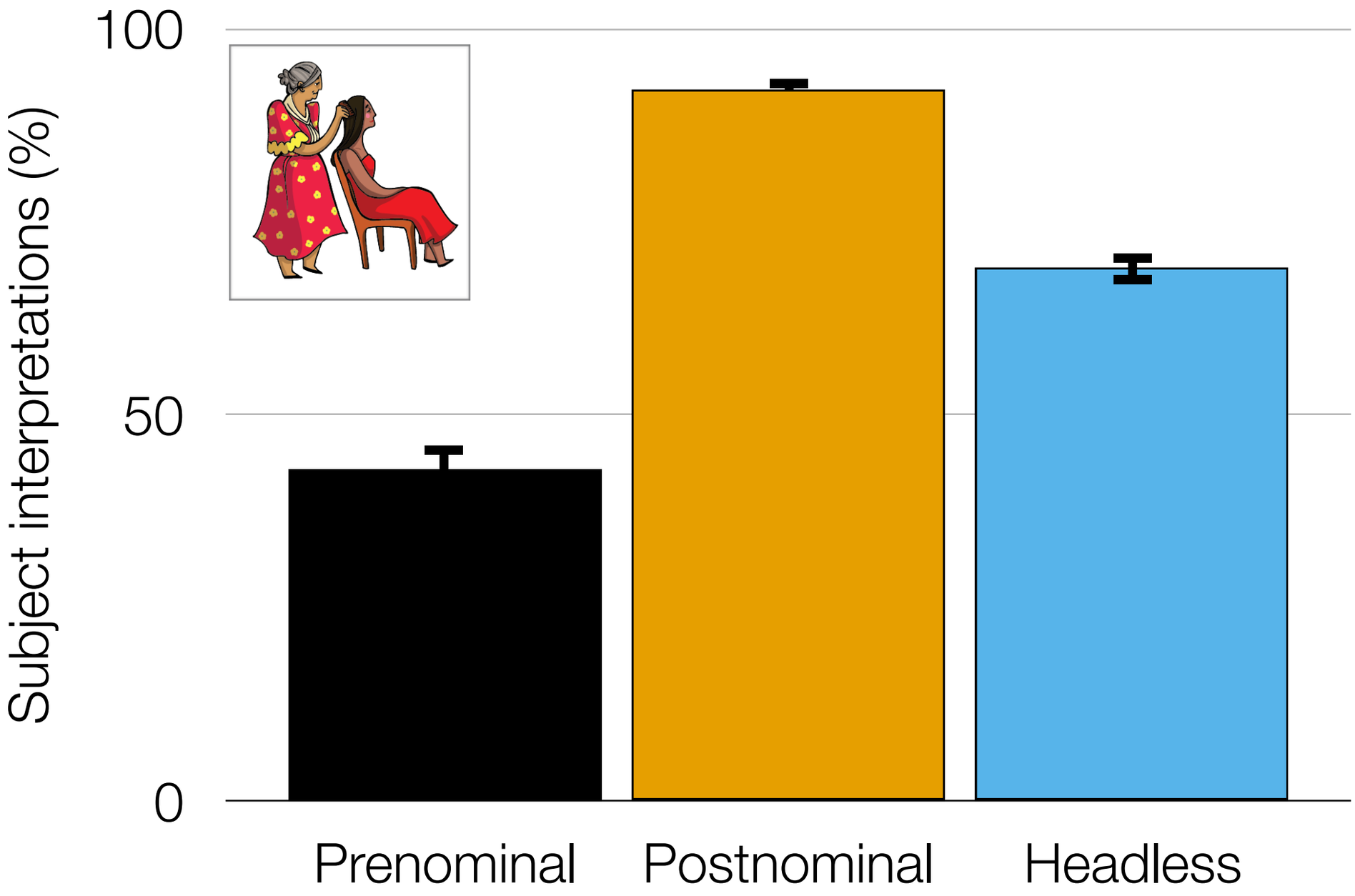
Subject Gap Interpretation

Postnominal relative clause

… na biha **i ha papaini i palåo'an**

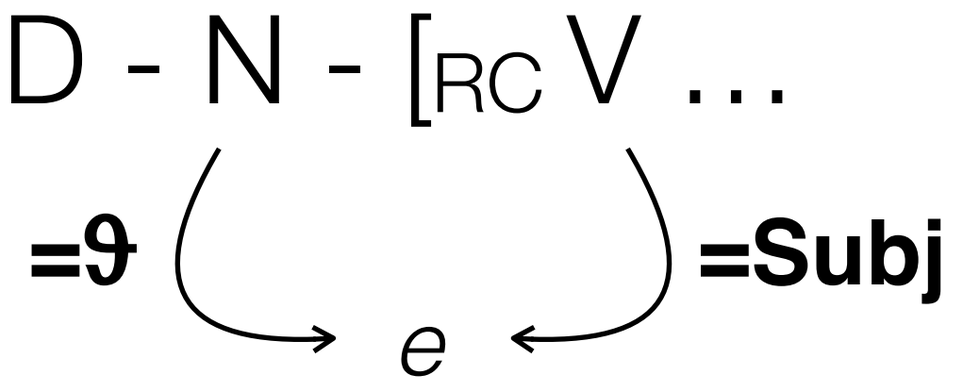
… old lady who __ is combing the woman

Ambiguous RCs



Why does {RC, N} order matter?

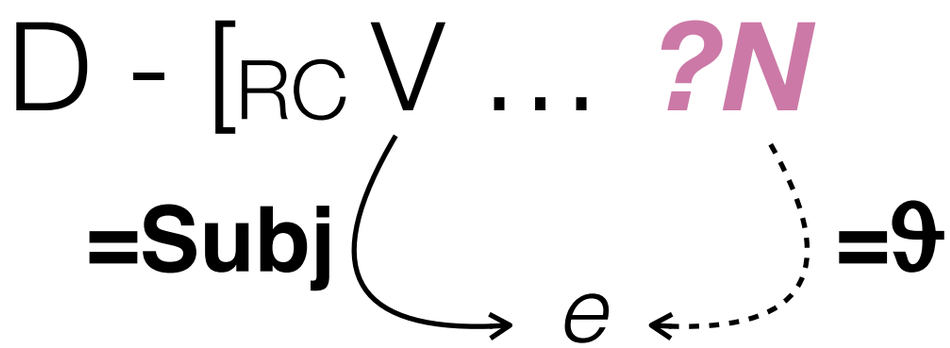
postnominal



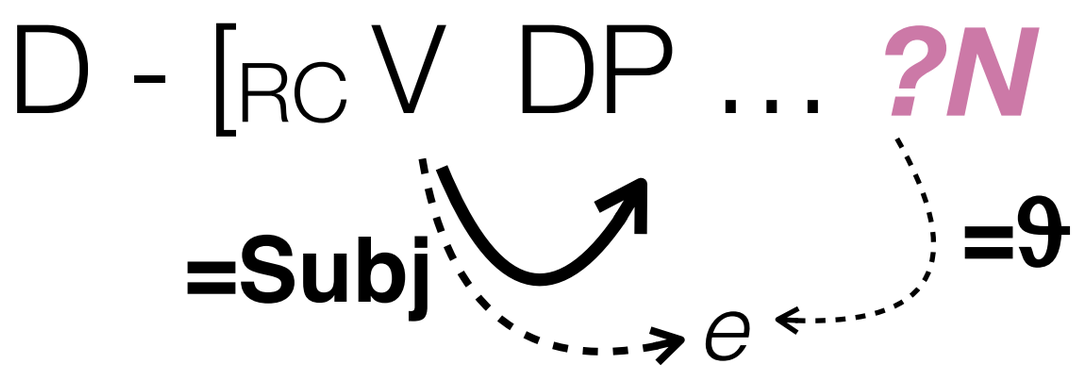
An early analysis links the visible RC-external argument to the subject position, simultaneously satisfying its need for a thematic role and the verb's need for a subject.

Why does {RC, N} order matter?

prenominal

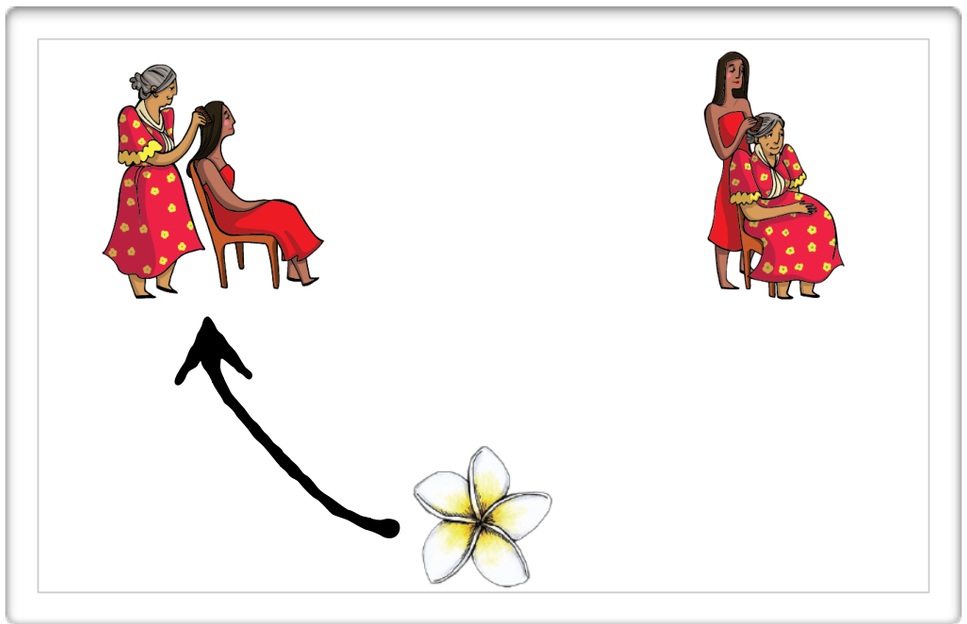


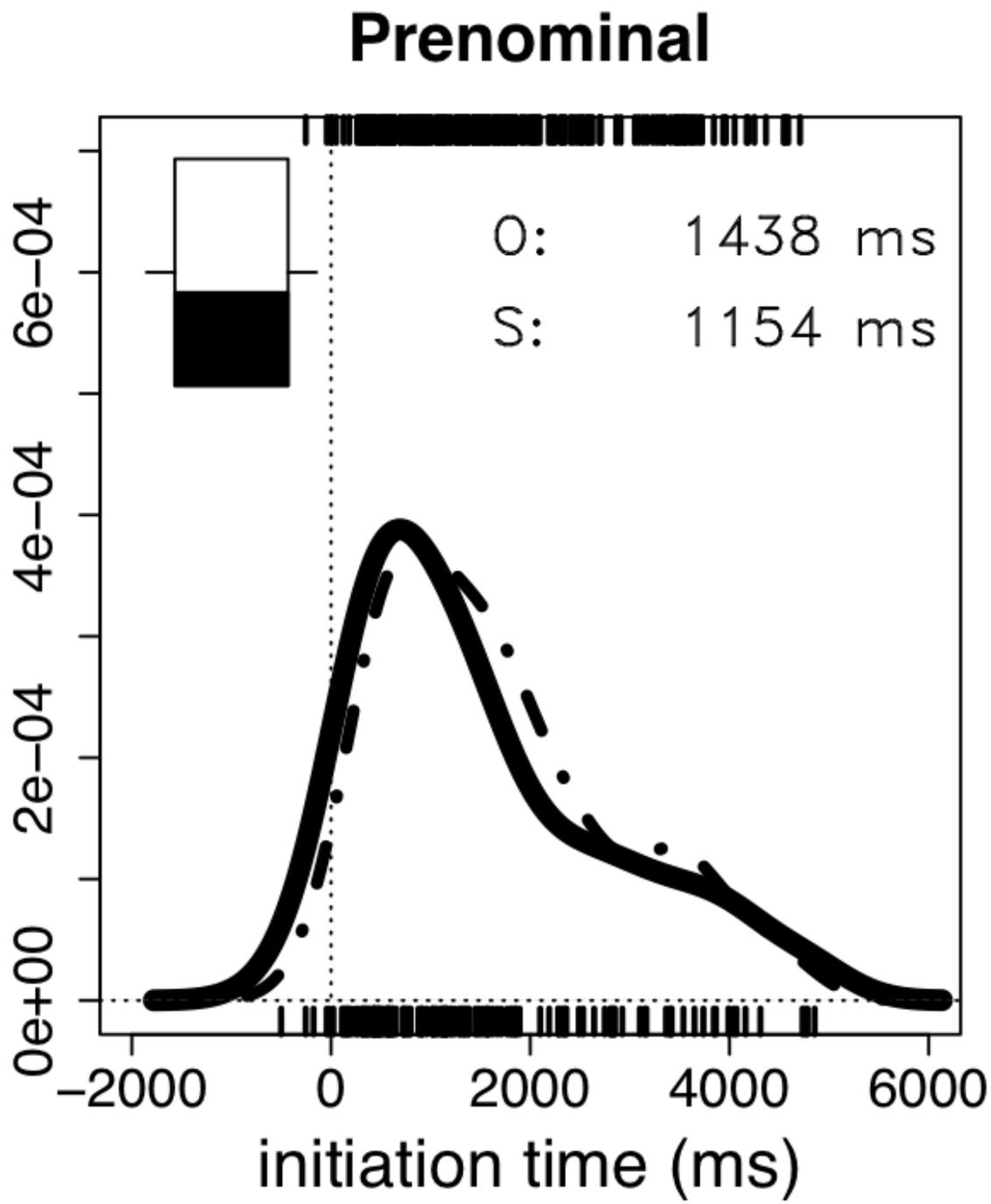
An early, hypothetical analysis links the unseen RC-external argument to the subject position.



It gives way under competition to a stronger analysis, which links the **visible** internal argument to that position.

Earlier subject analyses in prenominal RCs





Two experiments (2013, 2014)

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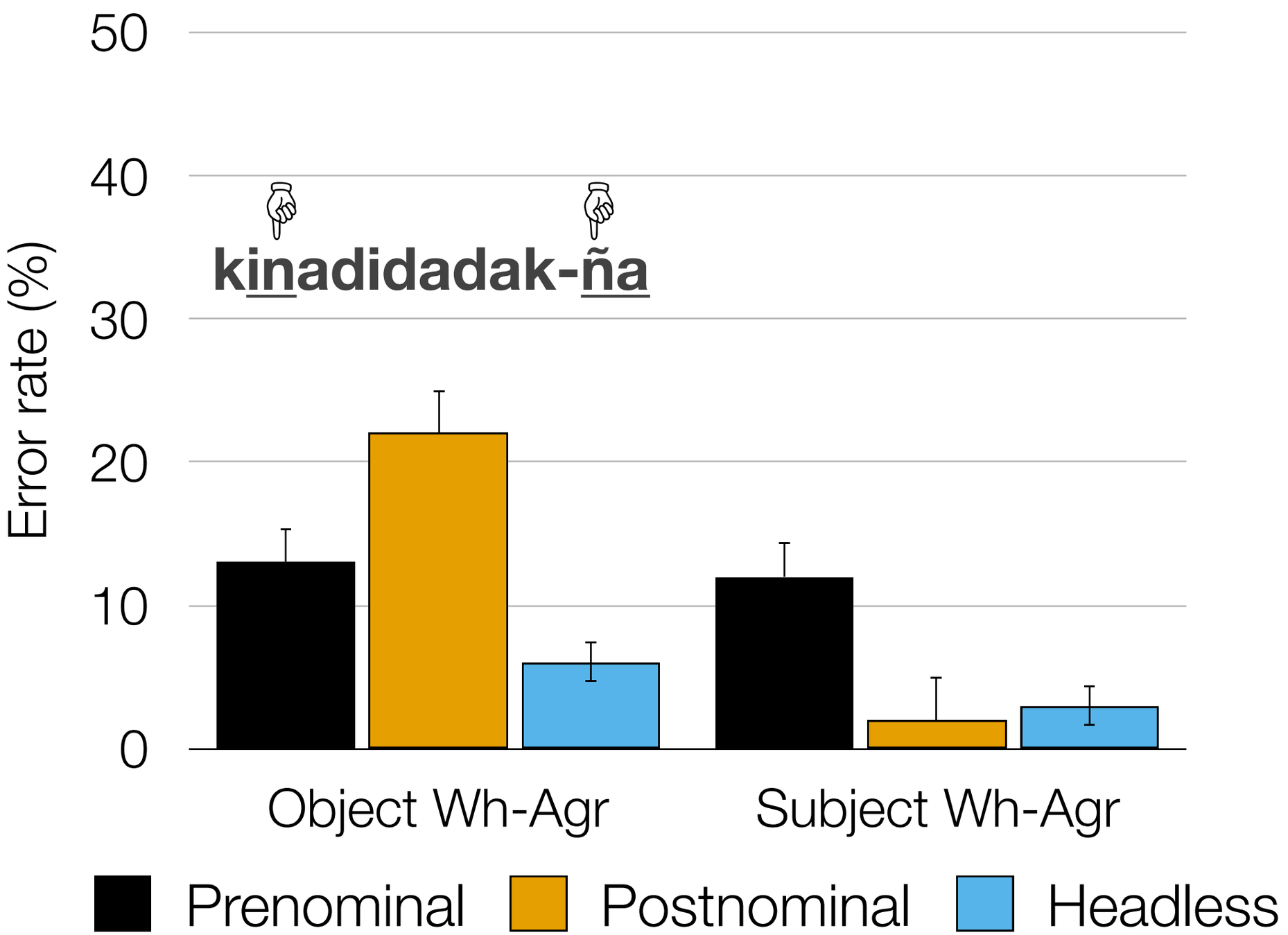
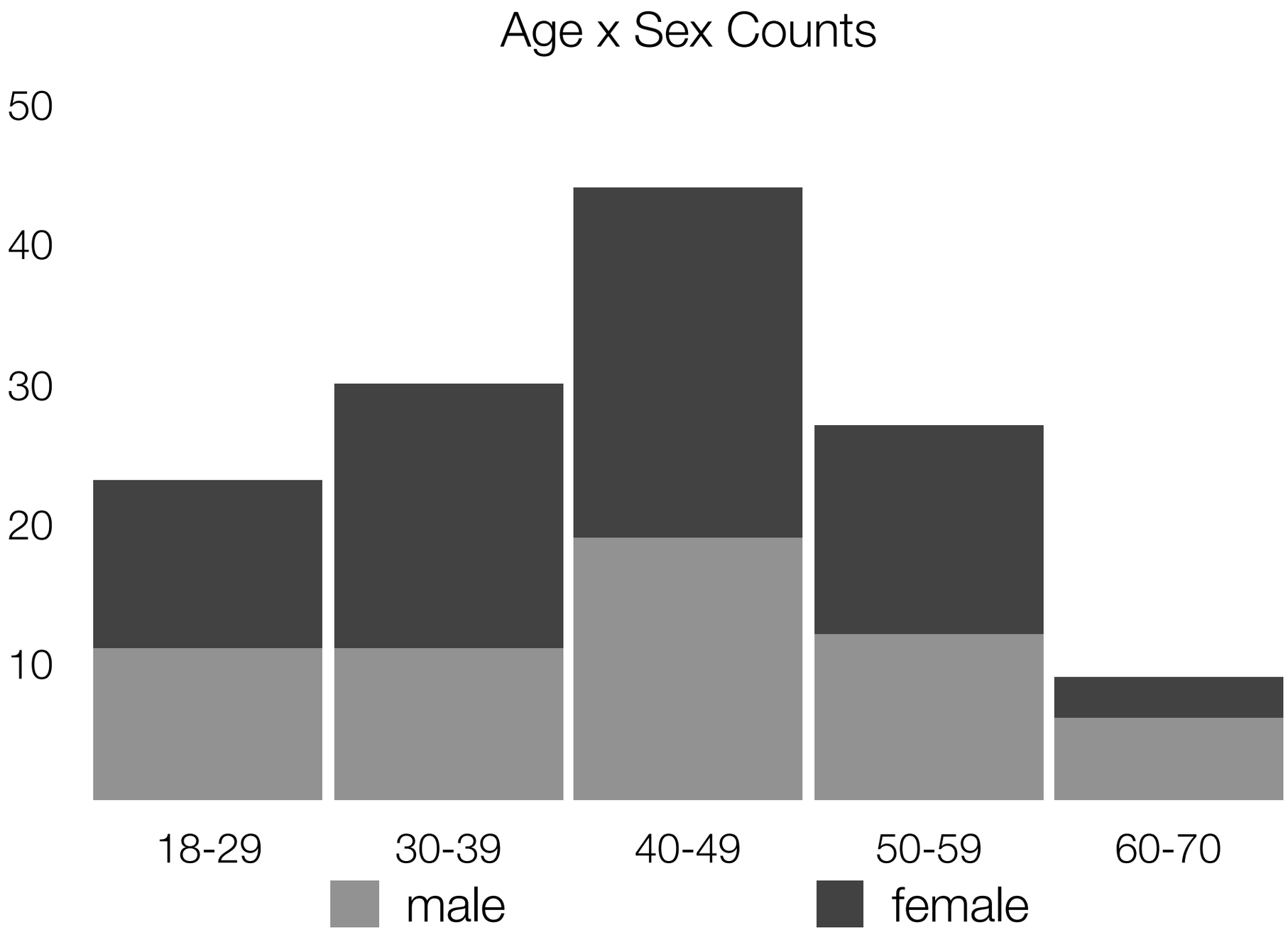
2. How effective are **unambiguous** morphological cues to RC interpretation?

Unambiguous RCs

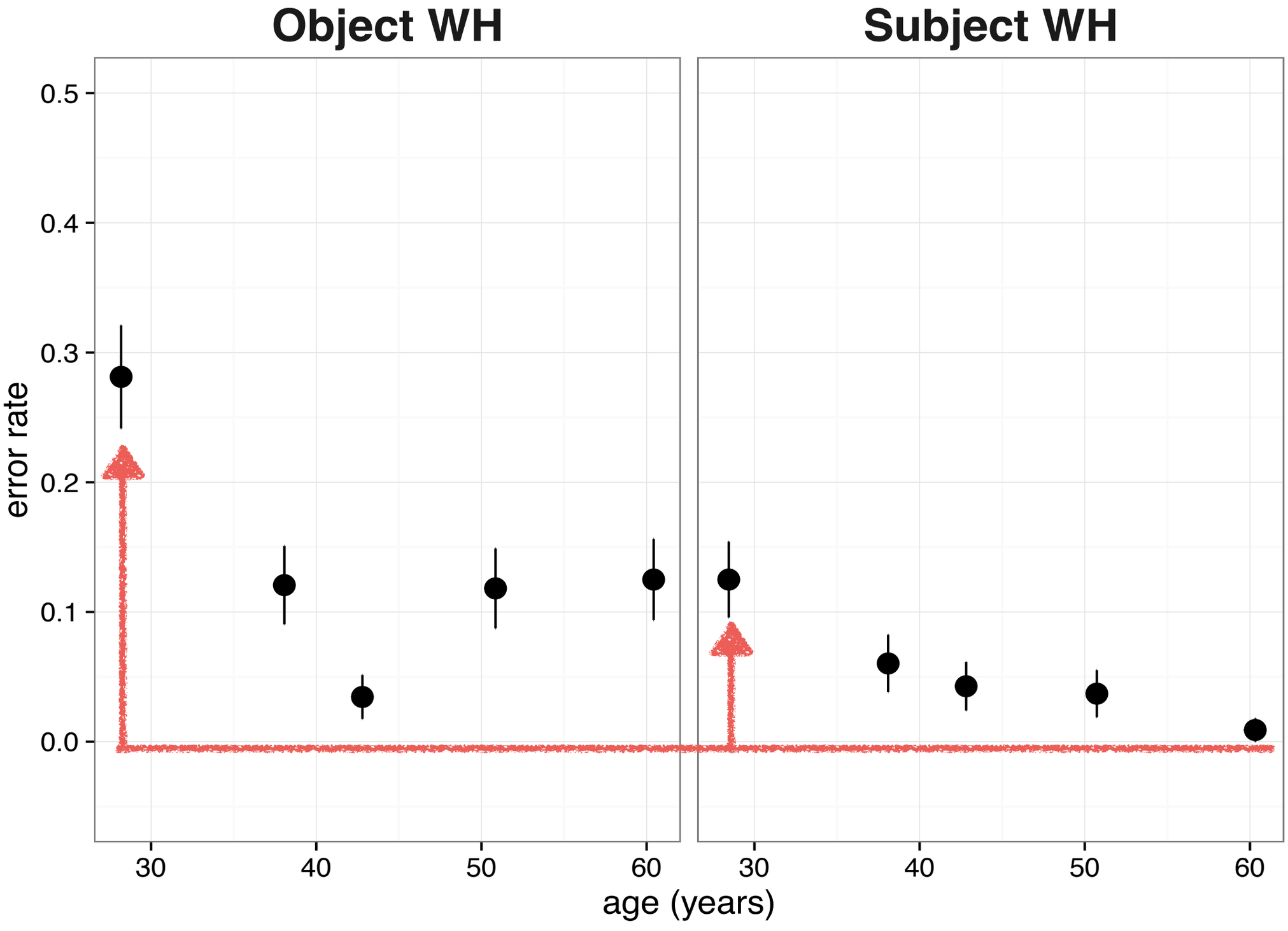


Wagers, Borja & Chung, in prep

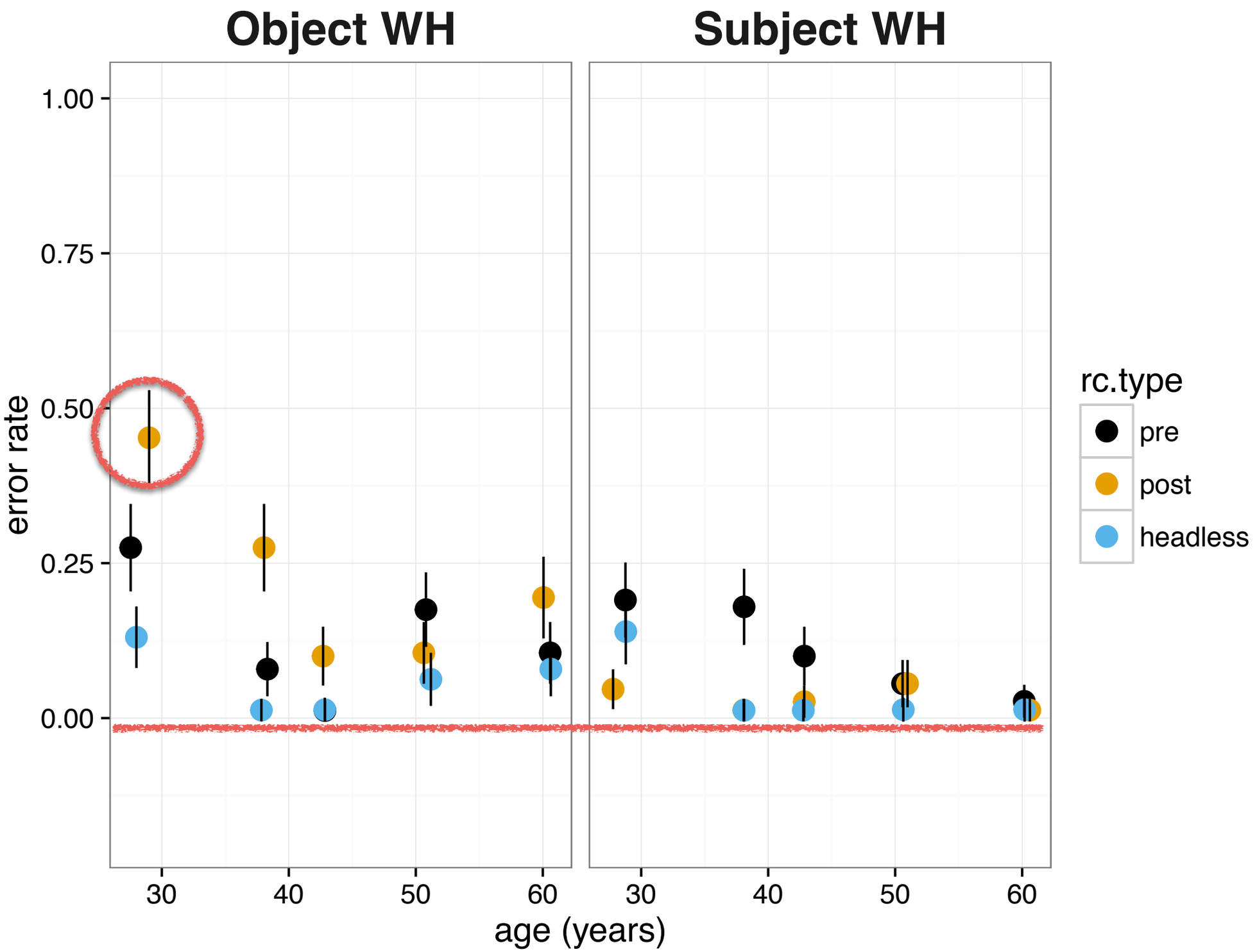
Speaker characteristics



The youngest speakers make the most errors.



But not across the board! Only in certain RC orders.



Error summary

- The youngest speakers can use morphology to correctly disambiguate, **but not in all orders.**

- Across the board, speakers make the fewest errors on ***headless relative clauses.***

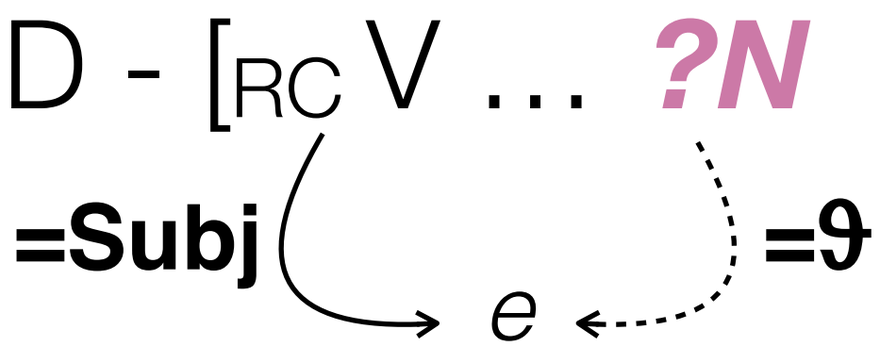
Conjecture, I

- Younger speakers' grammars of movement and Wh-Agreement are not divergent from older speakers'.

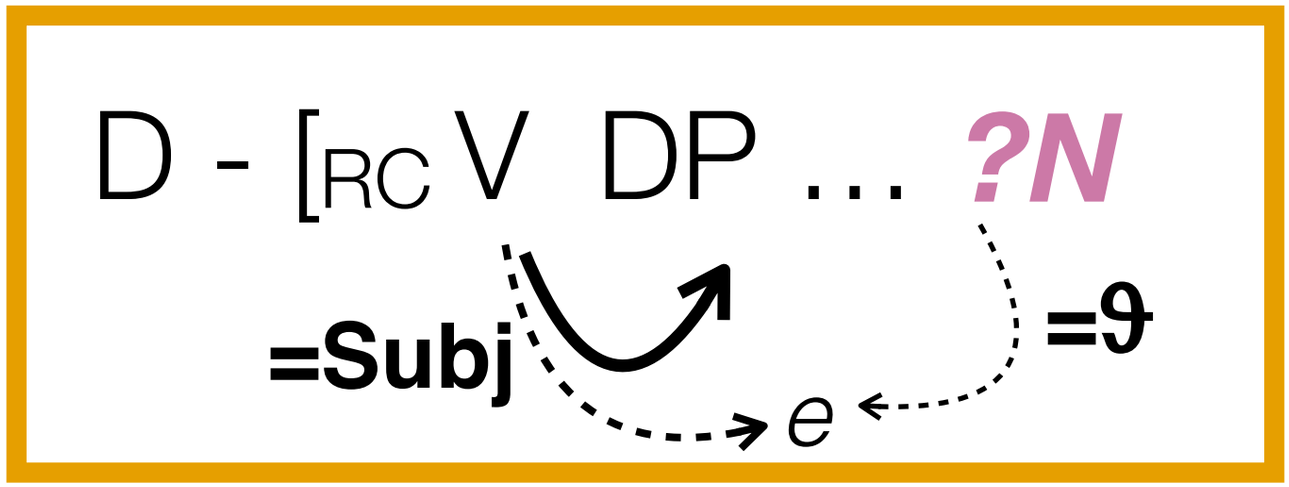
- But, younger speakers are more sensitive to the processing bottlenecks caused by competition or reanalysis

Why does {RC, N} order matter?

prenominal

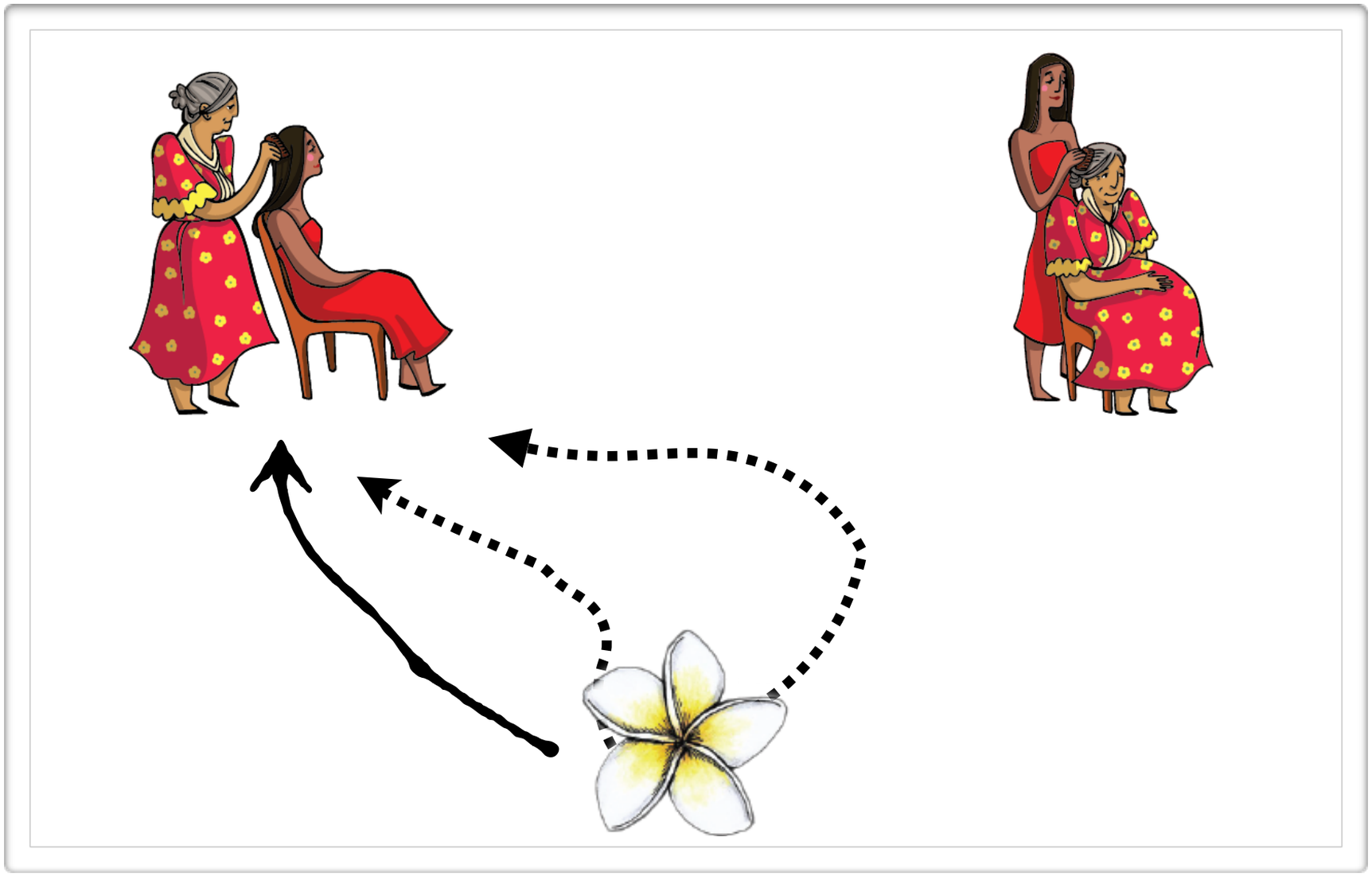


An early, hypothetical analysis links the unseen RC-external argument to the subject position.



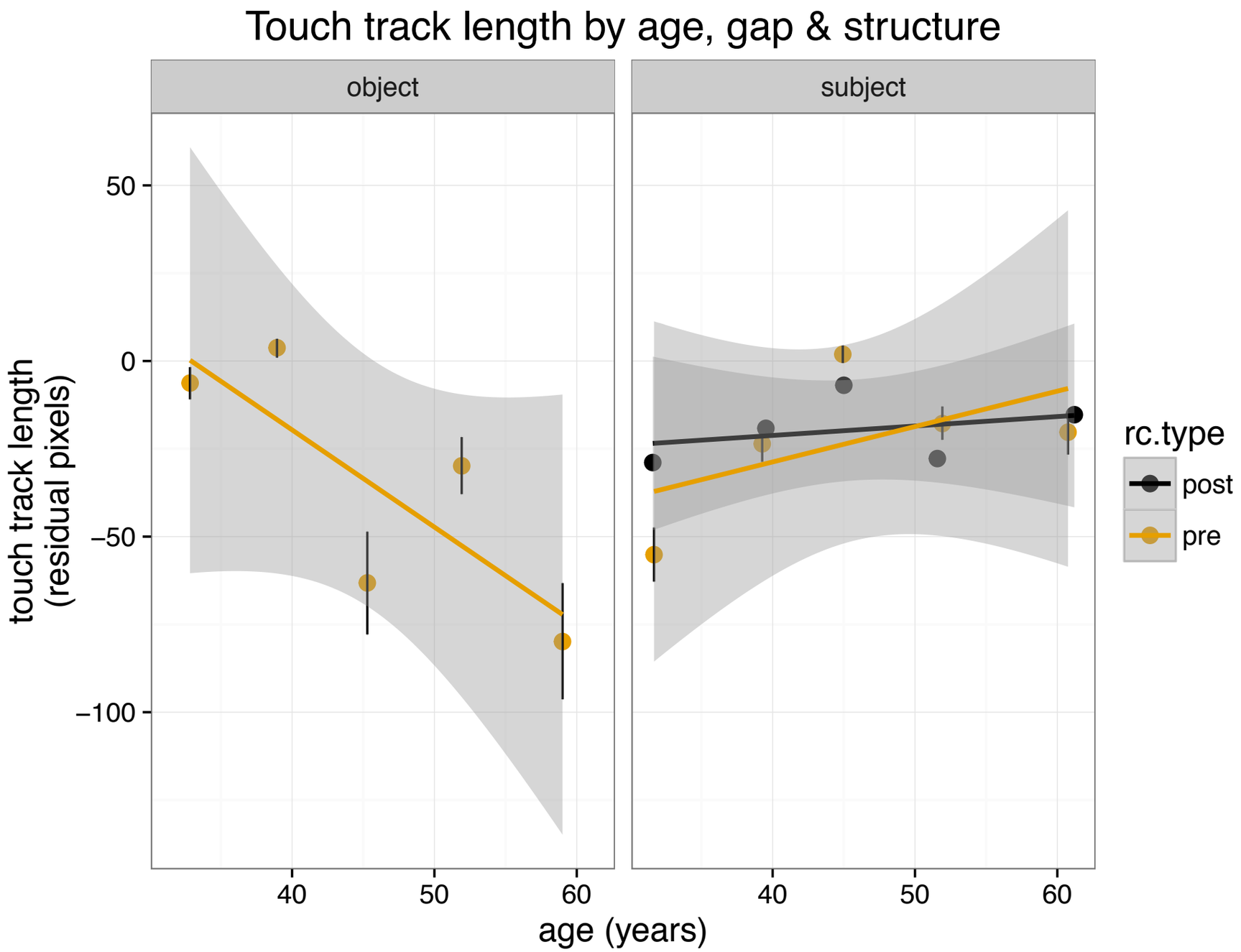
It gives way under competition to a stronger analysis, which links the **visible** internal argument to that position.

Younger speakers experience greater competition in ambiguous, prenominal RCs.



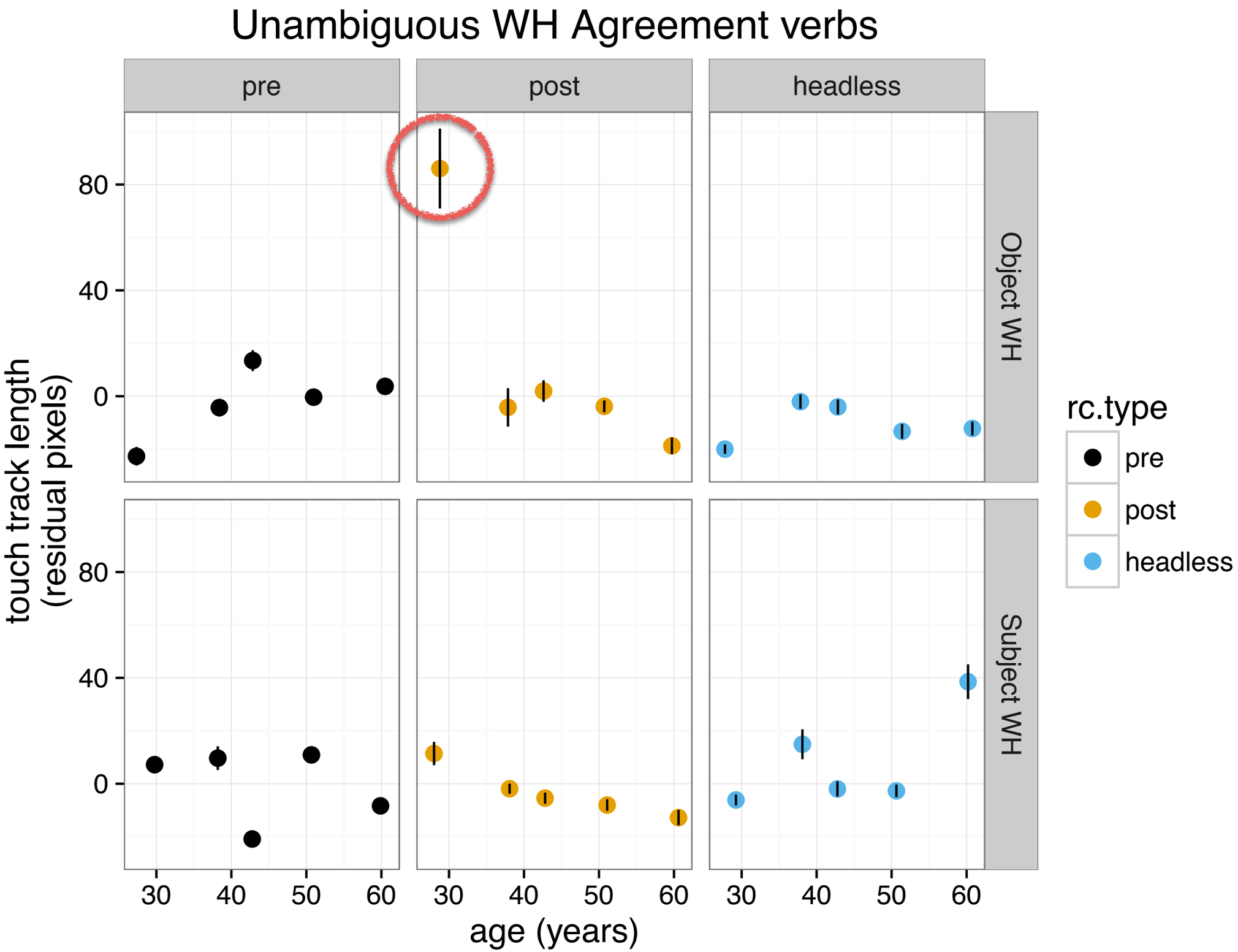
(cf. mouse-tracking, Freeman & Ambady, 2010)

Younger speakers experience greater competition in ambiguous, prenominal RCs.



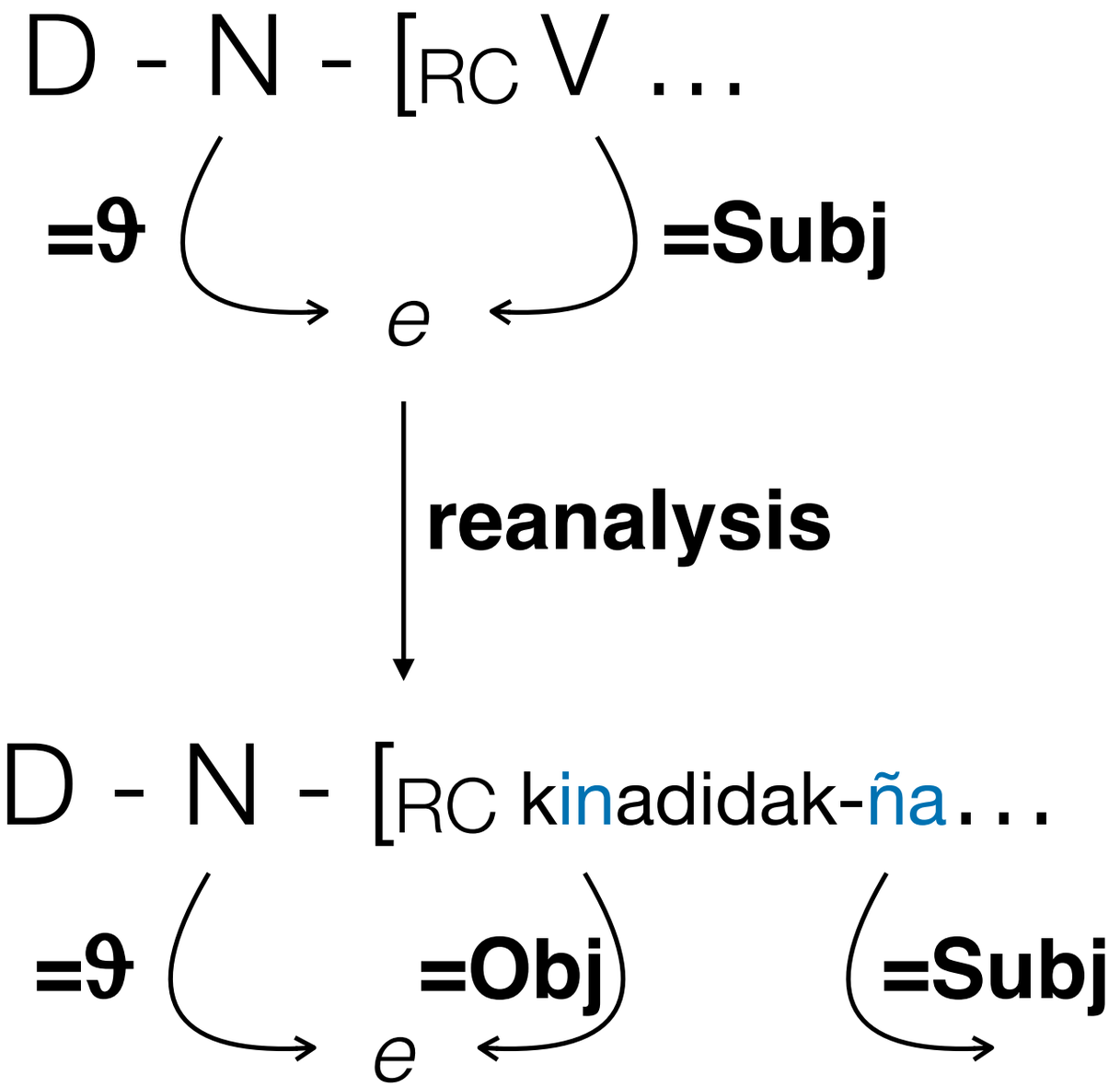
(cf. mouse-tracking, Freeman & Ambady, 2010)

… and in postnominal RCs with Object Wh-Agreement



Reanalysis with Object Wh-Agreement

postnominal



Summary

- The youngest speakers can use morphology to correctly disambiguate, **but not in all orders.**

- Across the board, speakers make the fewest errors on ***headless relative clauses.***

- Touch-tracking measures give evidence of more pronounced competition for younger speakers between 2 interpretations/pictures

Conjecture, II

- Younger speakers' grammars of movement and Wh-Agreement are not divergent from older speakers'

- Younger speakers are most sensitive to competition from their English grammar, leading to worse **performance on more English-like structures**

3) Rich morphology

Verb-initial word order
Flexible modifier order
Rich verbal morphology

- Transitive RCs are systematically ambiguous

(7) Atan atyu i **[ha kadididak i biha]** na påtgun.
look.at DEM tickle.PROG old L child

SUBJECT GAP “Look at the child who __ is tickling the old lady”
OBJECT GAP “Look at the child who the old lady is tickling __”

4) Radical *pro* drop

Verb-initial word order
Flexible modifier order
Rich verbal morphology
Radical *pro* drop

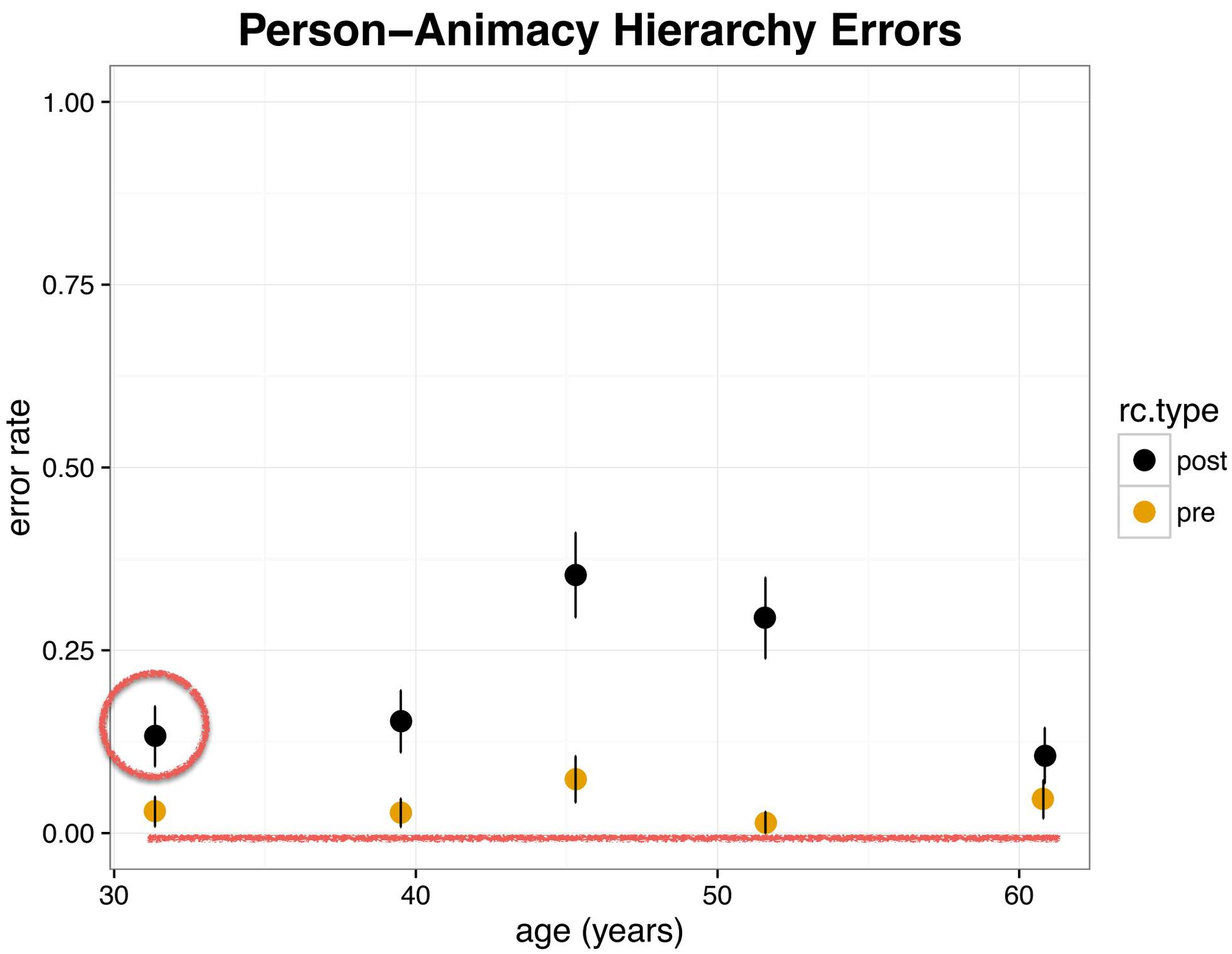
- … but, *pro* cannot be an object if the subject is an animate full DP ← *"Person-Animacy Hierarchy"*

(7) Atan atyu i **[ha** **kadididak** pro **]** na påtgun.
look.at DEM tickle.PROG L child

~~**SUBJECT GAP** "Look at the child who __ is tickling her"~~

OBJECT GAP "Look at the child who she is tickling __"

The youngest speakers make very few errors!



Summary, II

- Younger speakers do comparatively well at enforcing a decidedly un-English-like constraint

- … in the same competitive environments that gave them problems before

Conclusions

- N-RC order affects how ambiguous RCs are interpreted
- It also affects how easily RCs are processed with disambiguating morphology
- Younger speakers can process complex object Wh-Agreement verb forms with very few errors
- But they are more sensitive to RC type than older speakers

Conclusions

- Younger speakers are more sensitive to RC type than older speakers
- … in particular, the number or ordering of DP arguments
- Our data suggest that either:
  - they are more sensitive to competition between analyses;
  - OR they are most errorful when processing uniquely Chamorro morphology in English-like syntactic environments;

Collaborators

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University of California, Santa Cruz

Manuel F. Borja
Inetnun Åmut yan Kutturan Natibu

Dångkulu na Si Yu'us Ma'åsi'!

Luta

* Tita A. Hocog
* Office of Mayor Melchior T. Mendiola
* Bureau of Motor Vehicles
* Department of Commerce
* Dept. of Community and Cultural Affairs
* Municipal Council
* Police Department
* Port Authority
* Sinapalo School

Tinian

* Gineftao i Manmo'na Center
  * Florine M. Hofschneider
  * Lorna Cruz

Chamorro Dictionary Working Groups

* Dr. Elizabeth D. Rechebei

NMI Humanities Council

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http://chamorro.sites.ucsc.edu

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Thank you ~ Si Yu’us Ma’åsi’

Nicole Goux - illustrator