The role of voice morphology in processing Tagalog A-bar dependencies

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Preliminaries

Comprehenders attempt to associate a moved DP to a gap even before any direct evidence in the input*

*Crain & Fodor (1985); Frazier (1987); Frazier & D’Arcais (1989); Stowe (1986)
Comprehenders attempt to associate a moved DP to a gap even before any direct evidence in the input*

*Crain & Fodor (1985); Frazier (1987); Frazier & D’Arcais (1989); Stowe (1986)
THE BIG QUESTION

What types of linguistic cues do comprehenders employ to guide their prediction and facilitate their interpretation of A-bar dependencies?
Voice morphology encodes information about the thematic and structural position of the “subject”*

(1) Bumili ng=isda ang=lalaki
buy fish man
‘The man bought fish.’

Voice morphology encodes information about the thematic and structural position of the “subject”*

(2) **Binili** * ng=lalaki  ang=isda
buy  man  fish

‘The man bought the fish.’

TAGALOG VOICE MORPHOLOGY

Spellouts of $v$: Aldridge (2012); Case-agreement: Rackowski & Richards (2005)
A NARROWER QUESTION

Can voice morphology guide the comprehender’s prediction by allowing them to infer the position of the gap in A-bar dependencies, and in particular, *wh*-questions?
ROADMAP

1. Tagalog morphosyntax
2. Experiments
3. Results
4. Discussion
Voice morphology interacts with A-bar movement: only the “subject” can be extracted*

<table>
<thead>
<tr>
<th>VOICE</th>
<th>EXTRACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>um</td>
<td>EA GOOD</td>
</tr>
<tr>
<td>in</td>
<td>BAD</td>
</tr>
</tbody>
</table>

*Aldridge (2002); Rackowski (2002); Sabbagh (2005)*
Offline acceptability judgment ratings reveal that the patterns in extraction restriction are not as clear cut as previously described.
EXTRACTION RESTRICTION

\[ \mu: 5.6 \]

\[ \mu: 1.6 \]

\[ 3.3 \]

\[ 5.5 \]
Offline acceptability judgment ratings reveal that the patterns in extraction restriction are not as clear cut as previously described.

<table>
<thead>
<tr>
<th>VOICE</th>
<th>EXTRACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>EA</td>
</tr>
<tr>
<td>um</td>
<td>GOOD</td>
</tr>
<tr>
<td>in</td>
<td>VARIABLE</td>
</tr>
<tr>
<td></td>
<td>IA</td>
</tr>
<tr>
<td></td>
<td>BAD</td>
</tr>
<tr>
<td></td>
<td>GOOD</td>
</tr>
</tbody>
</table>
To isolate the contribution of voice morphology...
WITHOUT VOICE

There are aspects in Tagalog where the verb does not (obligatorily) exhibit voice morphology: iterative and recent perfective*

Crucially, they impose comparable restrictions on A-bar movement.

*Kroeger (1995); Schachter & Otanes (1983)
WITHOUT VOICE

-um-marked verbs and iteratives are restricted to EA-extraction

-in-marked verbs and recent perfectives (RPs) are restricted to IA-extraction

Offline paraphrase acceptability ratings reveal that these pairwise comparisons hold
Now for the experiments...
Voice morphology allows comprehenders to sharpen their predictions

- Morphologically encodes the thematic and structural information of the subject
- Allows comprehenders to project the structure of vP
HYPOTHESIS

Aling dalaga ang um inom...

Aling alak ang in inom

Subject

dalaga

vP

v VP

V DP?

Subject

alak

vP

v [EPP]

VP

V t
METHODS

PARTICIPANTS
80 Tagalog speakers (40 F, 40 M; 18–35 y.o.)

TASK
Stops-making-sense task*

* Boland, Tanenhaus, Garnsey, & Carlson, 1995
METHODS

SELF PACED READING*

This is a sample presentation in SPR!

* Just, Carpenter, & Wooley (1982)
METHODS

DESIGN

Plausibility (±) x Voice (±)

Two 12-item sets: one for EA-extraction, and one for IA-extraction

48 fillers
MATERIALS: EA-EXTRACTION

Aling dalaga ang *umiinom* parati ng tubig... ?

which woman drink always water

Aling tubig ang *umiinom* parati ng dalaga... ?

+VOICE +PLAUS

Aling dalaga ang *inom nang inom* parati ng tubig... ?

-VOICE +PLAUS

Aling tubig ang *inom nang inom* parati ng dalaga... ?

-VOICE -PLAUS
MATERIALS: IA-EXTRACTION

Aling alak ang ininom niya kani-kanina lang...?
which wine drink 3SG recently just

Aling babae ang ininom niya kani-kanina lang...?

Aling alak ang kakainom lang niya...?

Aling babae ang kakainom lang niya...?
And now for the results…
RESULTS: EA-EXTRACTION

Plausibility effect

Cumulative % Rejection

+VOICE  -VOICE
Plaus  Implaus

Which  young woman  ang  drink  water  young woman

0  20  40  60

0  20  40  60
RESULTS: EA-EXTRACTION

Facilitatory effect

Discriminability score

Which young woman water ang drink water young woman

+VOICE —VOICE
RESULTS: EA-EXTRACTION

At the verb

- **Plausibility effect**: implausible sentences were rejected more than plausible ones.

- **Facilitatory effect**: implausible sentences with voice morphology on the verb led to greater rejection than those without.
RESULTS: IA-EXTRACTION

Plausibility effect

Cumulative % Rejection

Which wine young woman ang drink him

+VOICE

–VOICE

Plaus

Implaus
RESULTS: IA-EXTRACTION

Discriminability score vs. words

- +VOICE
- -VOICE

No effect

Which, wine, woman, ang, drink, him
RESULTS: IA-EXTRACTION

At the verb

- **Plausibility effect**: implausible sentences were rejected more than plausible ones
- **Facilitatory effect**: no evidence that voice mediated rejection rates
SUMMARY OF RESULTS

We found evidence that -um- facilitated the comprehension of wh-questions; we do not have evidence that -in- did.
These results leave us with two questions:

• Why is there an asymmetry in the effect of -um- and -in-?

• Why is the effect of voice attenuated?
This is unexpected because by hypothesis, voice morphology provides a rich source of information.
DISCUSSION: ATTENUATION

Pseudo-clefting strategy*

Relation between the wh-phrase and the gap is mediated via predication (not via direct movement).

* Aldridge (2012)
**DISCUSSION: ATTENUATION**

Compare the rejection rates in Chamorro*

<table>
<thead>
<tr>
<th>TAGALOG</th>
<th>CHAMORRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>-um-</td>
<td>-in-</td>
</tr>
<tr>
<td>+Plaus</td>
<td>7%</td>
</tr>
<tr>
<td>−Plaus</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>2%</td>
</tr>
</tbody>
</table>

*Adapted from Section 5.1 of Wagers, Borja, & Chung (2015)
DISCUSSION: um-in ASYMMETRY

Results not unique to this study

We also see this asymmetry in acquisition studies*

* Pizarro-Guevara, 2014; Tanaka et al., 2016a; Tanaka et al., 2016b
DISCUSSION: EA-IA ASYMMETRY

Both -um- and -in- facilitate the processing of A-bar dependencies

BUT their effects are mediated by a slew of other things
DISCUSSION: EA-IA ASYMMETRY

Results can be decomposed into the interaction of the following:

- Facilitatory effect of voice morphology
- Temporal lag incurred by the syntax of *wh*-questions
- Ambiguity found in IA-extractions
DISCUSSION: EA-IA ASYMMETRY

There is considerable inter-speaker variation when the verb has -in- and the EA is extracted.
Maraming salamat po!
Thank you!

Slides and handouts will be made available at
http://people.ucsc.edu/~jpguevar
REFERENCES


REFERENCES


REFERENCES


Acceptability judgment task

GOAL
Determine whether the extraction restrictions proposed in the literature hold

DESIGN
Voice (um, in) x Extraction (EA, IA)
Acceptability judgment task

MATERIALS

Inatake sa puso ang tatay na kumain ng lechon

Masarap ang ulam na kumakain ang dalaga

Nakakalasing ang alak na ininom ng guro

Nahulog ang sanggol na ininom ang gatas
Verb has -um-; EA-extraction
Mean rating: 5.58
EXTRACTION RESTRICTION

Verb has -in-; IA-Extraction
Mean rating: 5.47
EXTRACTION RESTRICTION

Verb has -um-; IA-Extraction
Mean rating: 1.63
EXTRACTION RESTRICTION

Verb has -in-; EA-extraction
Mean rating: 3.33
## Acceptability judgment task

### RESULTS

<table>
<thead>
<tr>
<th></th>
<th>$b$</th>
<th>SE</th>
<th>df</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>4.00</td>
<td>0.06</td>
<td>79</td>
<td>71.61</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Voice</td>
<td>0.79</td>
<td>0.10</td>
<td>237</td>
<td>8.05</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Extraction</td>
<td>0.91</td>
<td>0.10</td>
<td>237</td>
<td>9.25</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Interaction</td>
<td>-6.09</td>
<td>0.20</td>
<td>237</td>
<td>-30.90</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

**[um,EA] = [in,IA] > [in,EA] > [um, IA]**
Paraphrase judgment task

GOAL
Determine whether the pairwise comparisons of verbs with voice and those without hold

DESIGN
Construction of sentence A (Iterative, Recent perfective) x Voice of sentence B (um, in)
Paraphrase judgment task

MATERIALS

Sentence A:
Aling anak ang sapok nang sapok ng mga kapatid?

Sentence B:
Aling anak ang sumasapok parati ng mga kapatid?
Paraphrase judgment task

MATERIALS

Sentence A:
Aling babae ang hilot nang hilot ng buntis?

Sentence B:
Aling babae ang hinihilot parati ng buntis?
Paraphrase judgment task

**MATERIALS**

Sentence A:
Aling bata ang *kakayakap* lang niya?

Sentence B:
Aling bata ang *yumakap* sa kaniya kani-kanina lang?
Paraphrase judgment task

MATERIALS

Sentence A:
Aling matanda ang kakasampal lang niya?

Sentence B:
Aling matanda ang sinampal niya kani-kanina lang?
Iterative, Paraphrase has -um-
Mean rating: 5.46
Iterative, Paraphrase has -in- 
Mean rating: 2.21
Recent perf, Paraphrase has *um-*

Mean rating: 2.19
Recent perf, Paraphrase has \textit{-in-}

Mean rating: 5.66
# Acceptability judgment task

<table>
<thead>
<tr>
<th>RESULTS</th>
<th>$b$</th>
<th>$SE$</th>
<th>$df$</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>3.88</td>
<td>0.10</td>
<td>80.55</td>
<td>40.23</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Voice</td>
<td>-0.08</td>
<td>0.15</td>
<td>227.11</td>
<td>-0.58</td>
<td>0.56</td>
</tr>
<tr>
<td>Construx</td>
<td>0.12</td>
<td>0.15</td>
<td>206.80</td>
<td>0.79</td>
<td>0.43</td>
</tr>
<tr>
<td>Interaction</td>
<td>-6.71</td>
<td>0.29</td>
<td>237.00</td>
<td>-23.18</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

[um,Iterative] > [in,Iterative]

[in,Recent perfective] > [um, Recent perfective]
What’s a discriminability score?

Calculate the effect of voice morphology in rejecting implausible sentences relative to plausible sentences

\[\text{EmpLogit} = \log \left( \frac{\text{RejRate} + .5}{3 - \text{RejRate} + .5} \right)\]

\[\text{DS} = \text{EmpLogit}(-\text{Plaus}) - \text{EmpLogit}(+\text{Plaus})\]
What’s a discriminability score?

In a nutshell, discriminability scores (DS) show:

- A DS of 0 indicates that implausible and plausible sentences were rejected equally
What’s a discriminability score?

In a nutshell, discriminability scores (DS) show:

• A positive DS indicates that implausible sentences were rejected more than plausible ones.
What’s a discriminability score?

In a nutshell, discriminability scores (DS) show:

• A negative DS indicates that plausible sentences were rejected more than implausible ones.
RESULTS: EA-EXTRACTION

Unrejected RTs (ms)

Which young woman water

+VOICE

−VOICE

Plaus Implaus

Unrejected RTs (ms)

2000
1500
1000
500

Which young woman water

ang

drink

water young woman

AFLA 2016 | Tokyo University of Foreign Studies - 10 June 2016
RESULTS: EA-EXTRACTION

Unrejected RTs (ms)

Which wine young woman ang drink him
FOLLOW-UP EXPERIMENTS

We are thinking of ways to improve the design of the current experiment.

• Add more “padding” between the verb and the co-argument, using temporal adverbs

• Compare bumili and bibili
FOLLOW-UP EXPERIMENTS

CLAIM: Our results were attenuated due to the syntax of *wh*-questions in Tagalog.

We want to test this claim by running the same experiment with a dependency that is derived via direct movement.
FOLLOW-UP EXPERIMENTS

DEPENDENCY OF INTEREST:
Ay-inversion and or topicalization

PREDICTION:
Rejection rates will pattern more like Chamorro
FOLLOW-UP EXPERIMENTS

Ang **dalaga** | ay | **umiinom** | XP | ng **tubig** ...
Ang **tubig** | ay | **umiinom** | XP | ng **dalaga** ...

Ang **dalaga** | ay | **iinom** | XP | ng **tubig** ...
Ang **tubig** | ay | **iinom** | XP | ng **dalaga** ...
FOLLOW-UP EXPERIMENTS

CONTENTION: Maybe the um/in asymmetry arose because the infix is NOT a voice marker, but instead an aspectual marker.

FOLLOW-UP: Run a similar study that uses the irrealis, where the verb has the suffix -in.
FOLLOW-UP EXPERIMENTS

FORM OF INTEREST:
Instead of ininom, use iinomin