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

A-bar dependencies challenge parsers to associate a displaced phrase (the FILLER) with an empty category (the GAP), whose position is not unambiguously indicated by the evidence in the input. Parsers attempt to establish this link even before there is any direct evidence, and they predictively posit a gap at each available position that would allow this syntactic dependency to be resolved. Most of these experiments, however, have been conducted in languages like English, Dutch, or Japanese—verb-medial and verb-final languages that are well-characterized in the psycholinguistics literature.

Recent evidence from Chamorro, a verb-initial Austronesian language, has demonstrated that verbal morphology modulates parsing, such that predictive identification of the gap only occurs with disambiguating WH-agreement [1]. Here we ask how speakers of Tagalog, another verb-initial Austronesian language, process A-bar dependencies. Like Chamorro, Tagalog verbs exhibit rich morphology that reflects how the verb’s arguments are mapped to syntactic positions; unlike Chamorro, this morphology is not only implicated in A-bar dependencies.

To isolate the contribution of voice morphology in processing A-bar dependencies, we compared the time-course of dependency resolution in WH-questions when verbs exhibit voice (see Fact #1) and when they do not (see Fact #2). We found that in sentences involving agent-extraction, participants were better at discriminating plausible sentences from implausible ones at the verb-region when the verb bore the -um- than when it did not. However, in sentences involving theme-extraction, we found no advantage for -in-marked verbs at the verb-region.

Fact #1: Tagalog’s verbal morphology encodes the thematic role of the subject, the ang-marked DP. When the agent is the subject, the verb bears the affix -um-. When the theme is the subject, the verb bears the affix -in-. Voice morphology interacts with A-bar movement in that only the ang-marked DP can be extracted. When the verb bears -um-, only agent-extraction is licit, as in (1a). When the verb bears -in-, only theme-extraction is licit, as in (1b).

(1) (a.) Aling babae ang=k<um>ain ng=saging which woman eat<AGR:AGENT> banana
‘Which woman ate a banana?’Agent-extraction with -um-
(b.) Aling saging ang=k<in>ain ng=babae which banana kick<AGR:THEME> woman
‘Which banana did the woman eat?’Theme-extraction with -in-

Fact #2: Verbs in the iterative and recent perfective aspects do not exhibit agreement [2-3]. Nevertheless, verbs in these aspects impose comparable restrictions on A-bar dependencies: -um-marked verbs and iteratives are restricted to agent-extraction, and -in-marked verbs and (a particular flavor of) recent perfectives are restricted to theme-extraction. These facts are schematized below in Table 1 and they allow us isolate the contribution of Tagalog voice morphology in WH-processing.

To compare how quickly readers discriminate plausible sentences from implausible ones, we used the STOPS-MAKING-SENSE TASK [4]. Sentences were presented phrase-by-phrase in a self-paced moving-window paradigm. Participants were trained to terminate the presentation after any phrase if the sentence no longer made sense. We crossed the factors VOICE (+, −) and FILLER
Table 1: Schematization of different extraction types with and without voice

<table>
<thead>
<tr>
<th>+VOICE</th>
<th>-um-verbs</th>
<th>-in-verbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VOICE</td>
<td>kumain</td>
<td>kinain</td>
</tr>
<tr>
<td>-VOICE</td>
<td>iteratives</td>
<td>recent perfectives</td>
</tr>
<tr>
<td>-VOICE</td>
<td>kain nang kain</td>
<td>kakakain</td>
</tr>
</tbody>
</table>

Iterative: base form of verb + nang + base form of verb

Recent perfective: kaka + base form of verb

PLAUSIBILITY (+, –) to create two 12-item sets (one for the agent-extraction contrast, and one for theme-extraction). 80 participants were recruited at the University of Philippines–Diliman. An example item set is given in (2) and (3) for agent- and theme-extraction, respectively. Note that “|” represents regions of presentation and “#” represents implausible fillers.

(2) (a.) Aling | {dalaga/tubig} | ang | um | inom parati | ng {tubig/dalaga} ...?
‘Which young girl/#water always drinks water/a young girl ...? [Agent, +VOICE] (b.) Aling | {dalaga/tubig} | ang | inom nang | inom | ng {tubig/dalaga}...
‘Which young girl/#water keeps drinking water/a young girl ...? [Agent, -VOICE]

(3) (a.) Aling | {alak/babae} | ang | ininom | niya ...?
‘Which wine/#woman did he/she (just) drink to relax...? [Theme, +VOICE] (b.) Aling | {alak/babae} | ang | kakainom | lang | niya ...?
‘Which wine/#woman did he/she just drink to relax...? [Theme, -VOICE]

We analyzed the cumulative rejection rates in each region to determine when participants could discriminate plausible sentences from implausible ones. This would indicate the time-course of when the filler-gap dependency was formed. For agent-extraction, participants were more reliable at discriminating implausible sentences from plausible ones at the verb-region when it bore -um-. Only when the co-argument was processed were participants equally as reliable. For theme-extraction, we found no advantage at the verb-region when it bore -in-.

Based on these results, we maintain that -um- facilitates the processing of A-bar dependencies because it strengthens the parser’s commitment to a hypothesis by providing indefeasible evidence that the gap it is associated with is the external argument. We hypothesize that -in- did not exhibit the same effect due to (at least) two factors: (1) the availability of an alternative parse at the verb-region, and (2) the potential dampening effect that results from how wh-questions in Tagalog (involving arguments) are derived—a (pseudo-)cleft where the wh-phrase serves as the predicate and the remaining material is a headless relative [5]. Future studies should investigate how other A-bar dependencies in the language are processed.