The predictive value of voice morphology in processing filler-gap dependencies
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When comprehenders process FILLER-GAP DEPENDENCIES (FGDs), they attempt to link a filler to a gap before encountering any direct evidence in the linguistic signal [1]. They posit gaps at positions where the grammar licenses the FGD to be resolved. Like other kinds of predictive parsing decisions, FGD-formation is potentially resource intensive (and wasteful) because the posited gap sites may not be present. In this study, we ask whether Tagalog comprehenders leverage voice morphology (akin to verbal agreement in more familiar languages) to guide their predictions and ease the uncertainty when interpreting FGDs.

Tagalog is a verb-initial Austronesian language spoken in the Philippines, whose voice system interacts with the range of possible FGDs. Fact #1: voice morphology registers the role of the nominative argument (signaled by ang) in a clause [2]. See examples (1) and (2). When the nominative argument is the agent, the verb exhibits AGENT VOICE (AV); when it is the patient, the verb exhibits PATIENT VOICE (PV). Fact #2: voice imposes a restriction on which arguments are eligible for extraction: if the verb has AV, only the agent can undergo extraction; if it has PV, only the patient can [3]. See the table in (3). Fact #3: the spell-out of voice depends on tense: in the non-future, AV has identifiable phonological content (i.e., voice is overt), while PV does not (i.e., voice is null); in the future, AV is null, while PV is overt [4].

Voice could potentially provide a rich source of information for comprehenders during processing by narrowing down the hypothesis space of potentially upcoming FGDs (Fact #2). If comprehenders do leverage voice in processing, we ask if it depends on (i) the particular flavor of voice (Fact #1); (ii) whether voice morphology is associated with an identifiable phonological content in the signal (Fact #3); (iii) the type of FGD.

We conducted 3 experiments that compared the time-course of detecting local plausibility effects in 3 types of FGDs (wh-questions, relative clauses, and topicalization) when voice morphology was overt and when it was not. We used a phrase-by-phrase non-cumulative moving window Stops-Making-Sense paradigm (SMS) [5]. The implementation of SMS was a modified version of self-paced reading combined with online acceptability judgment task. As each phrase appeared, participants (n = 85, 18-44 years old) decided whether the sentence made sense up to that point. We crossed VOICE (AV, PV), PLAUSIBILITY of the filler (+PLAUS, –PLAUS), and SPELL-OUT of voice (OVERT, NULL) in a 2×2×2 design (24 items, 72 fillers). A schematization of a sample item is provided below.

In order to determine if comprehenders leveraged voice when processing FGDs, we used bootstrapping analyses to calculate cumulative d’ series by scaling correct rejections in implausible conditions against misses in plausible conditions at each region. Results based on 10,000 bootstrapped samples indicated that participants were able to reliably predict the implausibility of a sentence as early as the VERB-region without having to wait for the co-argument. In Figure 1, the d’ were positive at the verb in all the 3 experiments, suggesting that comprehenders did leverage voice when processing FGDs. The flavor of voice did not seem to confer any advantage, except in sentences involving topicalization (ay-inversion). There was a clear AV-advantage at the VERB- and VERB+1-region, as shown by lower d’ for the yellow compared to blue points in those regions. Mean d’ at each region are provided below.
Examples

(1) Agent-voice morphology (AV)  
Kumakain ng=tinapay ang=lalaki
eat.AGENT GEN=bread NOM=man

(2) Patient-voice morphology (PV)
Kakainin ng=lalaki ang=tinapay
will.eat.PAT GEN=man NOM=bread

'The man eats bread'
'The man will eat the bread'

(3) Schematization of how voice morphology restricts extraction possibilities

<table>
<thead>
<tr>
<th>What voice morphology is exhibited by the verb?</th>
<th>Which argument is extracted?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent voice (AV)</td>
<td>Grammatical</td>
</tr>
<tr>
<td>Patient voice (PV)</td>
<td>Ungrammatical</td>
</tr>
</tbody>
</table>

Materials

Schematization of an item. The j-region corresponds to where the filler is introduced: in experiment 1 (wh-questions), j = 4; in experiment 2 (relative clauses), j = 6; and in experiment 3 (topicalization), j = 2. The j+1-region corresponds to the nominative marker ang in experiment 1, the complementizer na in experiment 2, and the topic marker ay in experiment 3. The YP in the j+3-region may either be a locative, temporal or manner adverb.

<table>
<thead>
<tr>
<th>Region</th>
<th>j</th>
<th>j+1</th>
<th>j+2</th>
<th>j+3</th>
<th>j+4</th>
<th>j+5</th>
</tr>
</thead>
<tbody>
<tr>
<td>...</td>
<td>Filler (±Plausible)</td>
<td>X</td>
<td>Verb</td>
<td>YP</td>
<td>Co-argument</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>(ang, na, ay)</td>
<td>(AV, PV) × (Overt, Null)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1

Mean d’ (Cumulative % rejection of implausible sentences - Cumulative % rejection of plausible sentences) and SD of the bootstrap sampling at each region, collapsing across SPELL-OUT

References:  