Testing Mixed Influences on Reference Resolution in Persian

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• Persian bi-morphemic anaphor xod-eš ‘self-3sg’ can be locally or long-distance bound
• The 3sg pronoun un is equally acceptable and ambiguous in the same long-distance context as xod-eš (but is locally subject to Principle B):

\[ \text{Sara be David goft [ke man xod-eš, un ro] rust dar-am]} \]

S. to D. said that I self-3sg/3sg ROM like have-1sg

‘Sara said to David that I like self, ťhemyə.’

• Unexpected in the context of Reinhart and Reuldand’s (1993) typology: xod-eš has the form of a SELF anaphor, but the usage of a SE anaphor

**Overarching Question**

Does Persian xod-eš show other properties of known SE anaphors?

**Comparison case: Korean caki**

• Reference resolution for forms with many potential antecedents within a sentence can be governed by an interaction of multiple influences (Kaiser et al., 2009).
• Korean caki is described as subject oriented (a typical SE anaphor trait)
• Han et al. (2015) tests whether this is moderated by a matrix predicate in long distance cases:

\[ \text{jinisiya-kə Yehnguy-hanthenyongwatu yep-eye [caki,ka]} \]

\[ \text{3nom Y. to hoop beside-at self-nom sysy-ul te manhi sengkong-siki-lke-lako] malha-yess-ta shoot-ACC more much success-CAUT-FUT-COMP} \]

say-PST-DECL

• Anaphor type (caki vs. null) tested against three predicates:

malha ‘say,’ tut ‘hear,’ myeonglyengha ‘order’
• In offline forced choice testing, the anaphor caki is significantly more subject-oriented than the null pronoun, and the soy trials were shown to be significantly more subject oriented, regardless of the anaphor
• In eye-tracking data, caki shows an overall subject bias compared to the null pronoun, not emerging until over one second after the anaphor (a significant interaction between anaphor and time emerges in the 1200-1800ms after utterance timespan)
• So subject orientation is confirmed for caki, before encountering the verb, but moderated by downstream sentence content

**Persian has two additional key differences:**

2. No predicate-neutral preposition

**Refined Research Questions for Persian:**

1. Does xod-eš show subject orientation during sentence processing?
2. Does the choice of predicate in non-canonical embedded clause order have the same impact as in (canonical) Korean word order?

**Methodology**

• 31 adult native speakers of Persian participated in Calgary, Alberta
• Participants see static images of two people on either side of an inanimate object in the middle of the screen
• Two short sentences introduce the named characters and the setting
• Eye-movements are tracked (500 Hz) during the audio playback of ambiguous target sentences
• Followed by a forced-choice reference resolution task

<table>
<thead>
<tr>
<th>Predicate</th>
<th>Anaphor</th>
<th>Reflexive (xod-eš)</th>
<th>Pronoun (un)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Say</td>
<td>Condition 1</td>
<td>Condition 2</td>
<td>Condition 3</td>
</tr>
<tr>
<td>Hear</td>
<td>Condition 3</td>
<td>Condition 4</td>
<td>Condition 3</td>
</tr>
</tbody>
</table>

**Eye Tracking Results**

• Subject Advantage (SA) = Subject Fixations / Subject-Obj Fixations
• SA from anaphor onset to 1800ms (30ms time slices):

**Discussion**

• Xod-eš clearly shows a greater degree of subject orientation than un, in line with predictions for long-distance SE anaphors
• During processing, the prepositions appear to be signalling a contrast between predicates, but no main effect, only interactions
• There is no translation of this online predicate effect into the offline forced choice task (opposite of Korean)
• Persian speakers may be less disposed to adjust final reference resolution based on downstream information (normally the verb would precede the embedded clause)

**References and Acknowledgements**


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