Prediction of thematic roles in Tzeltal: Eye tracking evidence from sentence comprehension in a verb-initial language

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Studies using eye-movements to investigate predictive processing (i.e. anticipation of upcoming words) during sentence comprehension have mostly focused on subject-initial languages [1,2] and found that thematic role knowledge is used to restrict the set of possible interpretations quickly [3-5]. In subject-initial languages, thematic role assignment might be difficult to assess because one argument is always available from the outset (often the Agent) but usually needs the verb to be interpreted semantically. Therefore, it is not clear what type of information comprehenders actually use to anticipate upcoming event participants in these languages. Verb-initial languages provide the opportunity to investigate the early interpretation of events and the type of information that drives anticipatory processing.

In a visual world eye tracking experiment on Tzeltal (Mayan), we investigated how information provided by verbs is used to predict thematic role assignments. Basic word order in Tzeltal is Verb-Patient-Agent (actives) or Verb(-ot)-Agent-Patient (passives). Thus, the verb is always encountered first, making argument structure and syntactic information available at the outset (in contrast to subject-initial languages). By hypothesis, this should facilitate anticipation of the post-verbal content of an utterance. Thus, Tzeltal allows us to test whether anticipatory eye movements to agents and patients are driven by 1) verbal semantics, 2) voice marking and word order (active: VPA or passive: VAP), or 3) if listeners follow a (potentially universal) Agent preference [6-7].

Ninety-two Tzeltal speakers listened to verb-initial sentences as in (1) while seeing a visual display showing two potential referents (e.g., doctor, patient) and two distractors (e.g., swimmer, violinist). We manipulated verb type (predictive: verb has typical agents/patients, e.g. "cure"; non-predictive: verb does not select typical agents/patients, e.g. "address") and voice marking (active vs. passive).

(1)

a. La yusubtes / La sk'opon   woje   chamel   te jpoxtawaneje.
   Cured / addressed   yesterday   patient (P)   the doctor (A)
   'The doctor cured (predictive) / addressed (non-predictive) the patient yesterday.'

b. Utsubtes-ot / K'opon-ot   woje   yu'un poxtawane   te jchamele.
   Was cured / Was addressed   yesterday   by   doctor (A) the patient (P)
   'The patient was cured (predictive) / was addressed (non-predictive) by the doctor yesterday.'

We found differences in anticipatory processing in actives and passives. After having heard a sentence-initial passive-voice verb, listeners quickly integrated semantic and syntactic information to fixate on the agent and turned their gaze towards the patient before it was mentioned. After hearing active verbs, participants' looks to the sentence-final agent were modulated by information from both verb and patient. However, there was no difference in fixations to agents or patients with predictive and non-predictive verbs.

In sum, we suggest that 1) verbal semantics alone is not sufficient to guide visual attention towards referents in Tzeltal (predictive verbs did facilitate anticipatory looks), 2) voice marking drives anticipatory processing towards agent and patient referents, and 3) there is no evidence for a preference towards early agent fixations, challenging the universal salience of agents in sentence comprehension [7].

References

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