VOS preference in Seediq: A sentence comprehension study

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Word order and sentence processing

- Word order is one major factor influencing the speed and accuracy of sentence comprehension (van Gompel, 2013 for a review).
- The SO advantage in SVO and SOV languages.
  - ex.) People take more time to read OSV sentences in German (Bader & Meng, 1999). ex.) OSV sentences in Japanese incur more activation in Broca’s area (Kim, et al., 2009).
- Research Question:
  - Can we observe the SO advantage even in languages that allow VOS word order?
  - What did we find? A sentence comprehension study in Seediq (Truku dialect)
  - What we found: Sentences in VOS order were processed faster than those in SVO order.

- One take-home message: the SO advantage is not universal.

Seediq language

- Seediq is an Austronesian language spoken in Taiwan.
- About 25,000 speakers, major communities in Hualien (Tsukida, 2005).
- It has a very rich Voice system (Tsukida, 2009, Tang, 2011, Aldridge, 2014).
- Various word orders available including SOV and SVO.
- An example sentence with different voice and word order
  - “The nurse cleaned the house.”
  - (a) AV_VOS
    - knnaraw sapah niyi ka kangahu
      - cleaned, AV the.house NOM the.nurse
  - (b) AV_SVO
    - kangahu o knnaraw sapah niyi
      - cleaned, AV the.nurse NOM the.house
  - (c) GV_VOS
    - knerag an kangahu o sapah niyi
      - cleaned, GV the.nurse NOM the.house
  - (d) GV_SVO
    - sapah niyi o knerag kangahu
      - cleaned, GV the.nurse NOM the.house

Dependency Locality Theory ( Gibson, 1998, 2000)

- Linear distance between words matters for processing the linguistic dependencies.
- Longer distance in the dependency increases the reading time (= locality effect) that reflects the cost in working memory.
- Locality effects are observed between a predicate and an argument, a filler and a gap, etc. (Grodzinsky & Gibson, 2005)

(1) The reporter who [ ] attached the senator.] admitted the error.
(2) The reporter who [ the senator attached] ] admitted the error.
(3) The patient [who the nurse [who was from the clinic] supervised] scolded . . .
(4) The patient [who the nurse supervised] scolded . . .

Analysis and Results

- Data from the trials where participants made incorrect responses were removed.
- 3 SD cut-off.
- The remaining reaction time data were analyzed using linear mixed effects models, using Word Order (VOS vs. SVO) and Voice (AV vs. GV) as fixed effects.

Order: $f = -2.90$, p < 0.01
Voice: $f = 2.45$, p < 0.05
Order*Voice: $f = 0.24$, p = 0.81

Order	VOS	SVO

Agent Voice	3609	3810	3405	3719
Goal Voice

Structural properties and predictions

- DLT provides predictions about the processing cost for each sentence type.
- Predictions
  - AV sentences are more costly than GV sentences.
  - SVO sentences are more costly than VOS sentences.

Experiment: A sentence comprehension study

Auditory sentence comprehension study (Caplan, et al., 2008, Koizumi, et al. 2014)

- Participants: 6 native speakers of Truku (planned to add more)
  - Mean age = 74.7
- Materials: 48 sets of target sentences (4 sentence types); 48 filler sentences.
  - Length of the target sentences was about 3.2 second, no difference across conditions.
- Design: Voice (AV vs. GV) x Order (SVO vs. VOS) = 4 conditions (within subjects)
- Task: plausibility judgment task
  - Target sentences are all plausible (yes-responses).
  - Filler sentences are all implausible (no-responses).
  - Participants were instructed to listen to the sentences and make responses as soon as possible.
- Sample filler sentences (no response)
  - (a) AV_PA (V-A x)
    - ??The knife wet the towel.
  - (b) P-GV_A (V-A x)
    - ??Soy sauce turned on the radio.

Discussion and Conclusion

What is the source of the effects?

- The reaction time patterns from the experiment largely conformed to the predictions based on the linear distance.
- Under this account, AV sentences are more costly than GV sentences due to the intervening object in AV sentences.
- Also, SVO sentences are more costly than VOS sentences because the dependency in SVO sentences (movement from [Spec,TopP] to the sentence initial [Spec,CP]) crosses the verb and the object.
- The complexity of the syntactic structure plays a major role for determining the processing cost of the sentences.
- Discourse-related factors (focus, topic, etc.) should be investigated further.

References


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