Processing arguments in Korean nominal predicates

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INTRODUCTION

This study investigates animacy effects in the online processing of Korean nominal event predicates.

BACKGROUND

Agent first advantage: Comprehenders are better & faster at processing when **agents** appear as the first argument in a string [1-2].

Animacy bias: When the first argument in a string is **animate**, participants are:

1. more likely to commit to an **agent** interpretation early on, and
2. more likely to be inhibited if reanalysis is necessary [3-6].

Subject first bias: Ordering **subjects** before objects is typologically more common than word orderings that place objects before subjects [7].

- Even in languages that have possible object before subject orderings, there are preferences for **production of subject before object** [8].

Prominence alignment theories interpret these findings as pressures that, when aligned, facilitate faster comprehension [9-13]. Contrastively, *misaligned* configurations are more difficult to comprehend [14].

DESIGN & PREDICTIONS

Animacy by Predicate Type (2 x 2)

Predicate types: "NP" predicate, "CP" predicate

- **"NP"**: subcategorizes for only an NP complement
- **"CP"**: subcategorizes for only a CP/PP complement

Animacy: animate argument, inanimate argument

- **Animate**: [+human], capable of being an agent
- **Inanimate**: [–alive], incapable of being an agent

Predictions

This experiment design manipulates the necessary linking of arguments needed for a successful parse of the predicate. Given that animacy biases agentivity:

- CP-animate conditions: no re-analysis possible
- CP-inanimate conditions: re-analysis **required**
- NP-(in)animate conditions: re-analysis optional

EXPERIMENT 1

A plausibility rating study on a 7-point Likert scale, (7 = most natural, 1 = most awkward).

- Participants (n=28)

Example itemset:

(1) "Because the investigation was ongoing, ...the {old man/evidence}'s quiet {compliance/concealment} .... made everyone suspicious."

CP x Anim ...***acessi***-*uy coyonghan* ***hyepco***-*nun*...
[**old.man**-GEN quiet **compliance**-TOP]

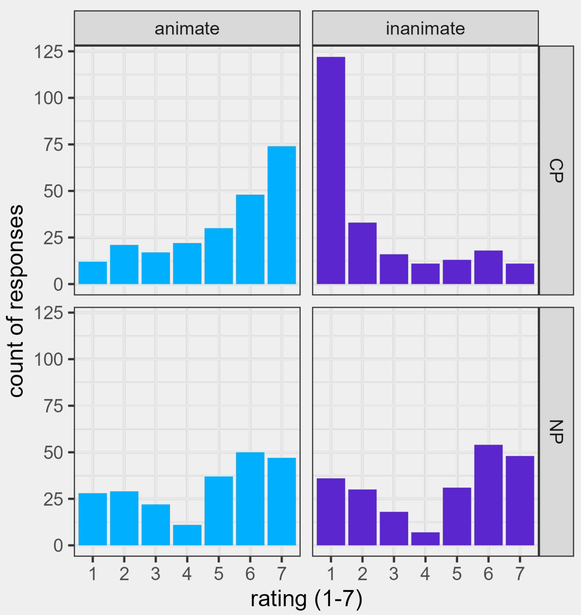
CP x Inanim ...***cungke***-*uy coyonghan* ***hyepco***-*nun*...
(implausible!) [**evidence**-GEN quiet **compliance**-TOP]

NP x Anim ...***acessi***-*uy coyonghan* ***unphyey***-*nun*...
[**old.man**-GEN quiet **concealment**-TOP]

NP x Inanim ...***cungke***-*uy coyonghan* ***unphyey***-*nun*...
[**evidence**-GEN quiet **concealment**-TOP]

Results:

- The CP-ANIM condition was rated significantly higher than all other conditions, at an average of **5.13**.
- Within the NP predicate types, ratings for both animate and inanimate conditions collapse to approximately the same mean, with NP-ANIM at an average of **4.51**, and NP-INANIM at **4.43**.



Interaction between Predicate Type and Animacy (PREDICATE TYPE*ANIMACY, $\beta = 1.70$, $SE = 0.15$, $z = 11.26$, $p < 0.001$)

EXPERIMENT 2

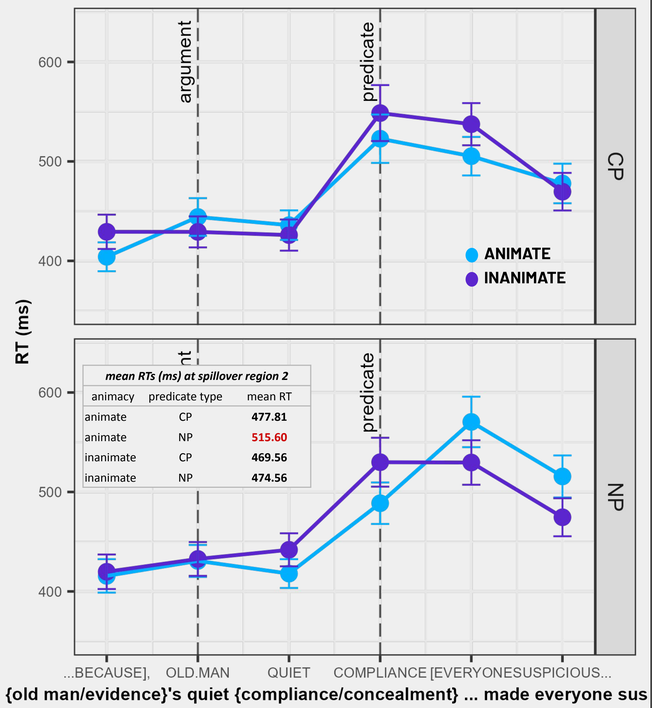
A self-paced reading study paired with a decision task to reject the sentence for semantic implausibility.

- Participants (n=40)

Results:

At predicate region:

- inanimates are read **slower** than animates (not significant).
- Prior to predicate (e.g. before argument structure resolution), **no effects of animacy emerge**.



mean RTs (ms) at spillover region 2

animacy	predicate type	mean RT
animate	CP	477.81
animate	NP	515.60
inanimate	CP	469.56
inanimate	NP	474.56

At spillover region 1&2:

- **NP-animates** are read **slower** than all other conditions

Spillover region 1:
ANIMACY, $\beta = -0.006$, $SE = 0.003$, $t = -2.37$, $p < 0.02$; PREDICATE TYPE, $\beta = -0.108$, $SE = 0.003$, $t = -40.93$, $p < 0.001$; ANIMACY*PREDICATE TYPE, $\beta = 0.149$, $SE = 0.003$, $t = -56.85$, $p < 0.001$.

Spillover region 2:
ANIMACY, $\beta = -0.061$, $SE = 0.031$, $t = -1.91$, $p < 0.06$; PREDICATE TYPE, $\beta = -0.053$, $SE = 0.032$, $t = -1.67$, $p < 0.1$; no significant interactions.

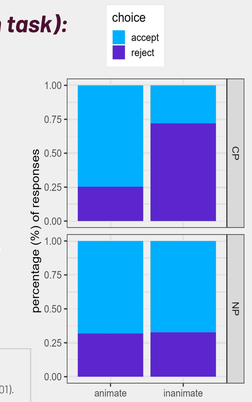
CONCLUSION

DISCUSSION

- Comprehenders were **not** found to be better at processing when agents were the first argument.
  - Suggests a weaker commitment to early agentive role assignment within nominals, in contrast with clauses
- Animacy was found to play only an **indirect role** in **biasing agentivity**.
- In NP-anim. conditions, animacy, agentivity, and grammatical function are aligned, and yet a prominence alignment advantage was not found.

Accuracy data (from decision task):

- Overall rejection rates for plausible conditions at about **~25%**
- NP conditions at slightly higher rates of rejection at about **%30**.
- Implausible condition CP -inanim was only falsely accepted at a **~25%** rate.



ANIMACY ($\beta = 1.27$, $SE = 0.14$, $z = 9.33$, $p < 0.001$)
PREDICATE TYPE ($\beta = 0.83$, $SE = 0.13$, $z = 6.21$, $p < 0.001$)
PREDICATE TYPE*ANIMACY ($\beta = 2.43$, $SE = 0.27$, $z = 8.96$, $p < 0.001$).

FUTURE DIRECTIONS

A possible account - resolving implicit arguments:

Animate items are good agents, but are also often patients/themes, given context. Inanimate items however, are almost never good agents.

- We see RT slowdown at the predicate representing the calculus of **argument integration**, but this is noticeably more costly for NP-animate conditions.
- This may represent the **cost** of identifying and **integrating an implicit theme** argument, which is only a must in the NP-animate conditions.
- In NP-inanimate conditions, the implicit agent is perhaps already assumed **prior to the predicate**, facilitating faster processing.

Replication study is underway.

Selected references. **[1]** Cohn & Paczynski 2013. *Cog. Psy. 67(3).* **[2]** Ferreira 2003. *Cog. Psy. 47(2).* **[3]** Branigan et al. 2008. *Lingua, 118(2).* **[4]** Clifton et al. 2003. *JML 49(3).* **[5]** Kuperberg et al. 2007. *B&L 100(3).* **[6]** Nairne et al. 2013. *Psych. Sci. 24(10).* **[7]** Aissen, J. 1999. *Nat. Lang. & Ling.Theory, 17(4).* **[8]** Koizumi et al. 2020. *LC&N 35(2).* **[9]** Bornkessel-Schlesewsky & Schlesewsky 2009. *Lang. & Ling. Compass 3(1).* **[10]** Do & Kaiser 2022. *LC&N 37(5).* **[11]** Ferreira 1994. *JML 33.* **[12]** Hammerly et al. 2022. *Cognition 225.* **[13]** Wagers et al. 2018. *Cognition 178.* **[14]** Wilson & Dillon 2022.

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