Japanese gapless relativization:
The syntax–prosody interface to semantics

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Abstract

Analysis of Japanese **Gapless Relativization** (GR) in LFG

Proposals:

- In Japanese, the REL argument is introduced at the syntax–prosody interface
- GR generates a non-subcategorizable GF (RELATIVE) in syntax
- Weak semantic role (*relative*) in semantics

Introduction: Gapless Relativization

Gapless Relativization (GR): Relativization in which the gap for the head noun is not found in the modifying relative clause (RC).

(1) *neko=ga   nezumi=wo   toraeta*
     cat=NOM   mouse=ACC caught
     'The cat caught the mouse'

(2) [____$_i$ *nezumi=wo toraeta*] *neko$_i$*
          mouse=ACC caught   cat
     'The cat that caught the mouse' (Subject relativized)

(3) [*neko=ga* ____$_i$ *toraeta*] *nezumi$_i$*
     cat=NOM   caught   mouse
     'The mouse that the cat caught' (Object relativized)

(4) [*neko=ga nezumi=wo toraeta*] *oto*
     cat=NOM mouse=ACC caught   sound
     'The sound (that is caused by the event where) the cat caught the mouse' (Gapless relativization)

Previous analyses and their issues

In semantics, typical gapped RCs are computed by assuming the Predicate Modification (PM) rule (Heim and Kratzer, 1998), but this does not work for GR.

- $[\![\textbf{sound}]\!] = \lambda x.\mathsf{sound}(x)$
- $[\![\textbf{the cat caught the mouse in the house}]\!]$
  $= \exists e.\mathsf{catch}(e) \wedge [\mathsf{agent}(e) = c] \wedge [\mathsf{theme}(e) = m] \wedge [\mathsf{loc}(e) = h]$
- $\rightarrow$ Type mismatch

Cha's (1999) explanation:

- A special predicate $P(e, x)$, taking an event e and an entity x, is conjoined
- P only specifies that the event and the entity share some relationship reasonably inferred from the context and syntax
- P becomes "semantically vacuous" in gapped RCs

Problems:

- Where does this P come from?
- How does P become semantically vacuous?

1. Prosody to syntax: Introducing REL(ative)

No relativizer in Japanese — how does it mark relativization?

- Pitch assimilation
- Pitch assimilation in Tokyo Japanese: the preceding modifier's pitch spreads to the modified noun, as in Table 1 and Figure 1 (Uyeno et al., 1980; Jun and Koike, 2003)
- Pitch accent of Tokyo Japanese: each mora has a high or low tone
- Pitch without assimilation sounds unnatural (Table 1)
- Following Jun (2003), these prosodic words (PW) form a unit as an accentual phrase (AP).

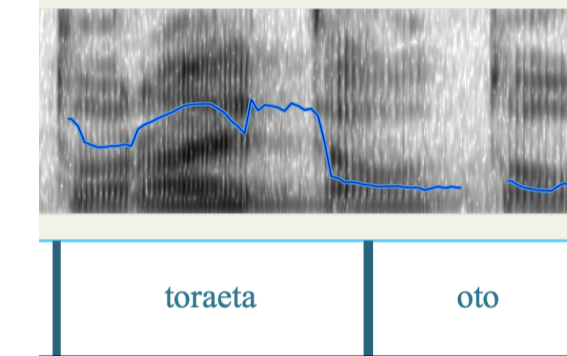| Form	Unit	Pitch	Translation
toraeta	PW	/tò.rá.è.tà/	"caught"
oto	PW	/ò.tó/	"sound"
toraeta oto	AP	/tò.rá.è.tà.**ò.tò**/ ??/tò.rá.è.tà.ò.tó/	"catching sound"

Table 1. Pitch assimilation.

Figure 1. Pitch (blue line), pronounced by the author.

Japanese relativization is marked by prosody forming AP:

- Introduces an abstract argument REL
- Provides an f-description $(\uparrow \text{ADJ REL}) = (\uparrow \text{PRED})$ (shared value) in the lexical entry of the head noun

2. REL in syntax

Mapping from the prosody to the c-/f-structures

- Pitch assimilation gives the f-description defining the REL argument (see Figure 2a)
- The f-structure shows the shared value (see Figure 2b)
- In gapped RCs, the REL further shares its value with the gap (SUBJ, OBJ, etc.)
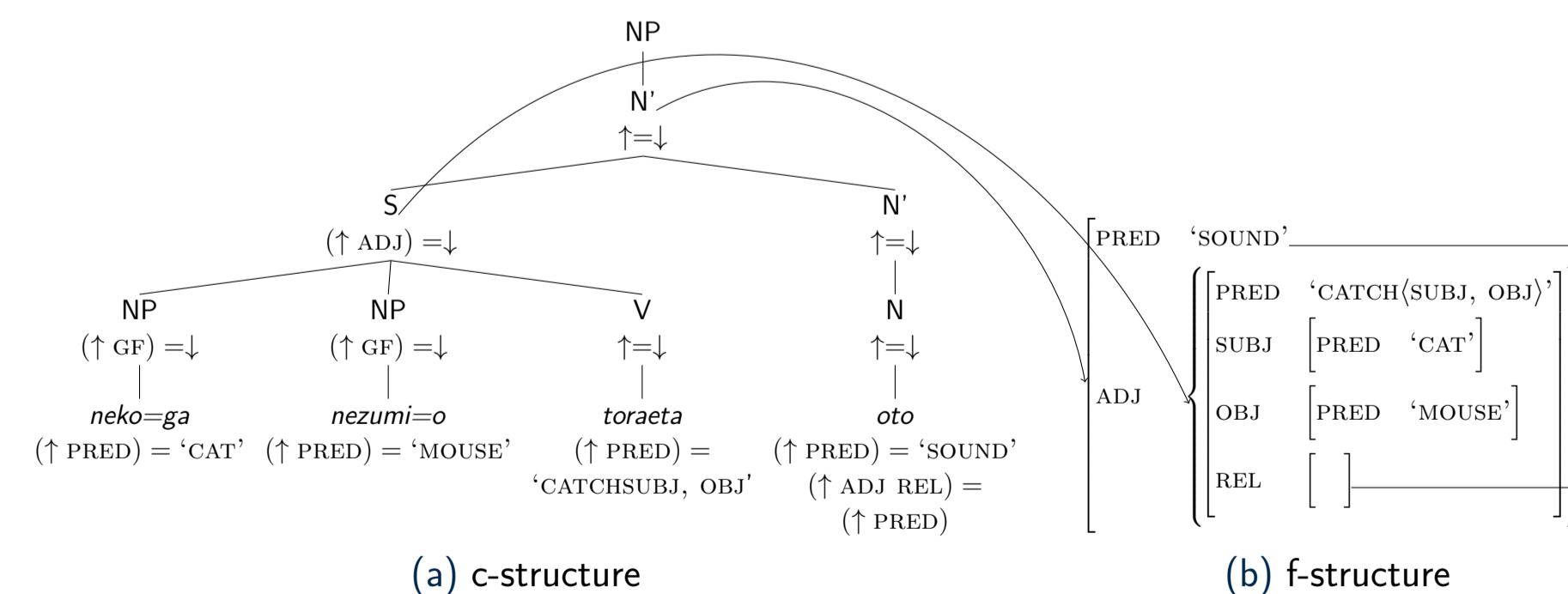

(a) c-structure   (b) f-structure

Figure 2. c- and f-structures for (4). Other grammatical information such as tense is omitted for simplicity.

3. *rel*(ative) as a semantic role

Rather than using an underdefined predicate P, assume a weak thematic relation representing the relatedness to the event

- Same semantic derivation as other semantic roles (shown below)
- Weak semantic roles have already been proposed: *content* for noun complement clauses (Moulton, 2015) and *participant* for tough constructions (Gluckman, 2021)
- The REL arguments give $\lambda x \lambda e.\mathsf{rel}(e) = x$ to be conjoined with the event predicate

Lexicon	Meaning constructor
neko	$c : \uparrow_\sigma$
nezumi	$m : \uparrow_\sigma$
toraeta	$\lambda y \lambda x \lambda e.\mathsf{catch}(e) \wedge \mathsf{ag}(e) = x \wedge \mathsf{th}(e) = y : (\uparrow \text{OBJ})_\sigma \multimap (\uparrow \text{SUBJ})_\sigma \multimap (\uparrow \text{EV})_\sigma \multimap \uparrow_\sigma$
oto	$\iota x.\mathsf{sound}(x) : \uparrow_\sigma$
θ_{REL}	$\lambda x \lambda e.\mathsf{rel}(e) = x : (\uparrow \text{ARG})_\sigma \multimap (\uparrow \text{EV})_\sigma \multimap \uparrow_\sigma$

Table 2. Lexicon.

Figure 3. Glue proof. CPA: Conditional Proof Assumption, PM: Predicate Modification rule.

Conclusion

This study…

- Provided an alternative analysis for Japanese GR with LFG
- Identified the source of Japanese relativizer: syntax–prosody interface
- Demonstrated the mapping from syntax to semantics

Discussions:

- Do we really need the abstract REL? Can't we just stick with ADJ?
- How about languages with GR but without pitch accent (e.g., Seoul Korean)?

References

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