

# A Constraint-Based Analysis of Association with Focus in Japanese

Yusuke Kubota  
University of Tokyo  
kubota@phiz.c.u-tokyo.ac.jp

PACLIC 17  
October 1, 2003

## 1 Association with Focus (Rooth 1985)

- (1) a. I only introduced Bill<sub>F</sub> to Sue.  
b. I only introduced Bill to Sue<sub>F</sub>.
- (2) a.  $\forall x[[x \in D \wedge \text{introduce}(i, x, s)] \rightarrow x = b]$   
b.  $\forall x[[x \in D \wedge \text{introduce}(i, b, x)] \rightarrow x = s]$
- Different interpretations (truth conditions) arise when what is focused is different.
  - The focus particle ‘associates with’ the focused phrase. (Rooth 1985)
  - The focused phrase is generally marked by a pitch accent.

## 2 Behaviors of focus particles in Japanese

- (3) [Taroo ni Hanako o syookai si ta] **dake** da.  
Taro DAT Hanako ACC introduce do PAST only COP
- (4) a.  $\forall x[[x \in D \wedge \text{introduce}(i, h, x)] \rightarrow x = t]$   
b.  $\forall x[[x \in D \wedge \text{introduce}(i, x, t)] \rightarrow x = h]$
- ...
- Typically read without any particular pitch accent.
  - Potentially ambiguous.

The term “focus” is defined here purely in terms of semantic interpretation.  
E.g.: *Taro* is focused and associated with *dake* (only) if (3) is interpreted as in (4a).

## 2.1 Narrow Focus Association (NFA)

- (5) a. Gohan o tabe zu, [karai okazu]<sub>F</sub> o tabe te **bakari** iru.  
rice ACC eat NEG salty food ACC eat COP exclusively PRES  
“He only eats salty food without eating any rice.” (Numata 2000:168)
- b. Tanaka sensei wa suugaku no hoka ni rika<sub>F</sub> o osie **mo** si  
Tanaka teacher TOP math in addition to science ACC teach also do  
te iru.  
PRES  
“In addition to math, Mr. Tanaka teaches also science.”

- The focus particle associates with a phrase that is contained inside the phrase it is attached to.

## 2.2 Wide Focus Association (WFA)

- (6) a. [Daikin **dake** morat]<sub>F</sub> te, sigoto o si nai.  
money only receive and work ACC do NEG  
“(He) only receives money and does not do the job.” (Numata 2000:167)
- b. (Tikagoro no konbini no onigiri wa) oisii si [nedan  
recent GEN convenience store GEN rice ball TOP tasty CONJ price  
**mo** tegoro da]<sub>F</sub>.  
also reasonable COP  
“(Rice balls sold at convenience stores these days are) not only tasty but also reasonable in price.”

- The focus particle associates with a phrase that is larger than the phrase it is attached to.

## 3 Analysis

### 3.1 Backgrounds

- HPSG syntax
- Alternative semantics of Rooth (1985)
  - Normal semantic value is specified in CONT|NORM.
  - Alternative semantic value is specified in CONT|P-SET.

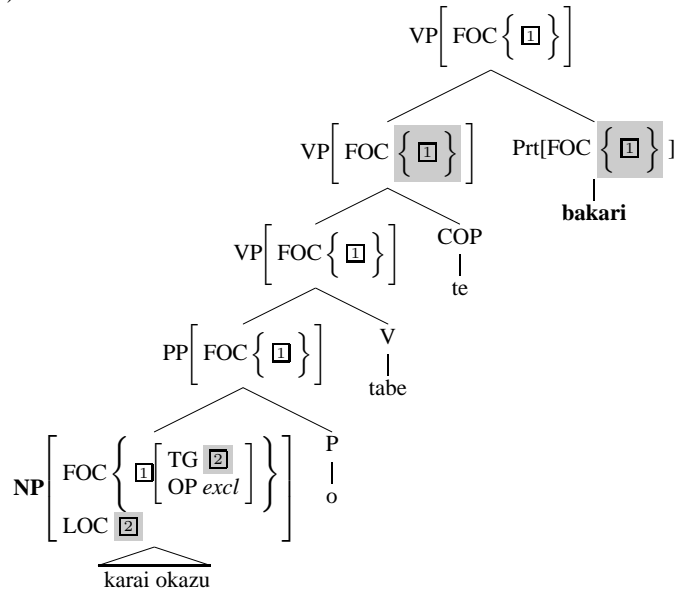
$$\left[ \begin{array}{c} \text{LOC} \\ \text{NL} \end{array} \left[ \begin{array}{c} \text{CAT} \\ \text{CONT} \end{array} \left[ \begin{array}{c} \dots \\ \left[ \begin{array}{c} \text{NORM} \\ \text{P-SET} \end{array} \right] \dots \end{array} \right] \right] \right]$$

### 3.2 Outline of the analysis

- The nonlocal FOC feature stores and inherits the information of the focused phrase and the focus particle.
- An item in the FOC value is composed the following two features:
  - T(AR)G(ET): LOC value of the focused phrase
  - OP(ERATOR): atomic value designating the focus particle involved

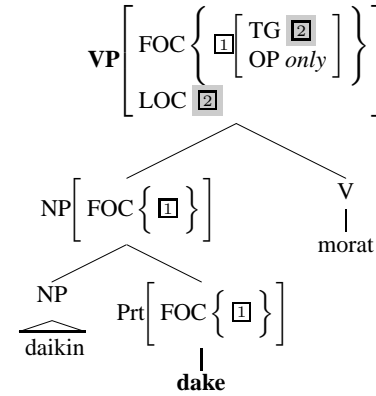
$$\left[ \text{NL} \mid \dots \mid \text{FOC} \left\{ \left[ \begin{array}{l} \text{TG} \textit{ loc} \\ \text{OP} \textit{ only} \end{array} \right] \right\} \right]$$

(7) NFA



The FOC value from the focused phrase is percolated up and gets identified with the FOC value from the focus particle.

(8) WFA



The FOC value from the focus particle gets percolated and finds the focused phrase.

### 3.3 Assumptions about semantic interpretation

- Semantic composition is basically carried out by function application.
- Two additional rules for computing the semantics of focus particles:
  - Focusing Rule
  - Focus Resolution Rule

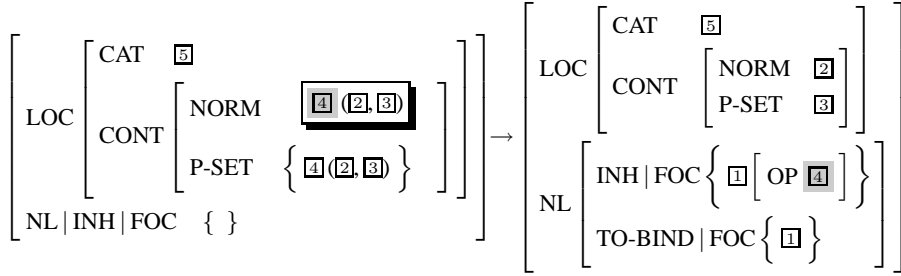
(9) Focusing Rule

$$\left[ \begin{array}{l} \text{LOC} \left[ \begin{array}{l} \text{CAT} \textit{ 5} \\ \text{CONT} \left[ \begin{array}{l} \text{NORM} \textit{ 2} \\ \text{P-SET} \textit{ p-set(2)} \end{array} \right] \end{array} \right] \\ \text{NL} \left[ \text{INH} \mid \text{FOC} \left\{ [ ] \right\} \right] \end{array} \right] \rightarrow \left[ \begin{array}{l} \text{LOC} \textit{ 4} \left[ \begin{array}{l} \text{CAT} \textit{ 5} \\ \text{CONT} \left[ \begin{array}{l} \text{NORM} \textit{ 2} \\ \text{P-SET} \left\{ [ ] \right\} \end{array} \right] \end{array} \right] \\ \text{NL} \left[ \text{INH} \mid \text{FOC} \left\{ [ ] \text{ TG } \textit{ 4} \right\} \right] \end{array} \right]$$

where  $p\text{-set}(P_a) = \{Q \mid Q \text{ is of type } a\}$

- The Focusing Rule applies when the LOC value of the phrase is identified with the TG value of the item in the FOC value (i.e. when the phrase is focused).
- The P-SET value is changed to the alternative semantic value for a focused phrase in the sense of Rooth (1985).

(10) Focus Resolution Rule



- The Focus Resolution Rule
  - incorporates the semantic contribution from the focus particle into the semantics of the phrase and
  - terminates the inheritance of the FOC value.
- The P-SET value of the mother node becomes again a singleton set of the normal semantic value.

3.4 Example Analyses

- (11) a. Pan<sub>F</sub> o tabe ta **dake** da.  
bread ACC eat PAST only COP  
“(I) ate only bread.”
- b. [Pan **dake** o tabe ta.]<sub>F</sub>  
bread only ACC eat PAST  
“(I) only ate bread.”

In Figure 1 (Tree for (11a)),

- The NP *pan* is focused. (The TG value  $\boxed{3}$  of the item in the FOC value and the LOC value of the phrase is structure-shared at the NP node immediately dominating *pan*.)
- The Focusing Rule is applied to produce the right alternative value for the focused phrase (i.e. the set of objects of type *e*).
- The FOC value gets percolated up to the S node.
- When the focus particle *dake* attaches, the FOC value of the focus particle and the FOC value of the head daughter (inherited from the focused phrase) are identified.<sup>1</sup>
- The Focus Resolution Rule is applied at the node immediately above the one where *dake* attaches. By this rule,

- the semantic contribution of the focus particle (inherited via the OP feature of the FOC value) gets incorporated into the semantics of the phrase,
- the inheritance of the FOC value is terminated, and
- the P-SET becomes again the singleton set of the NORM value.

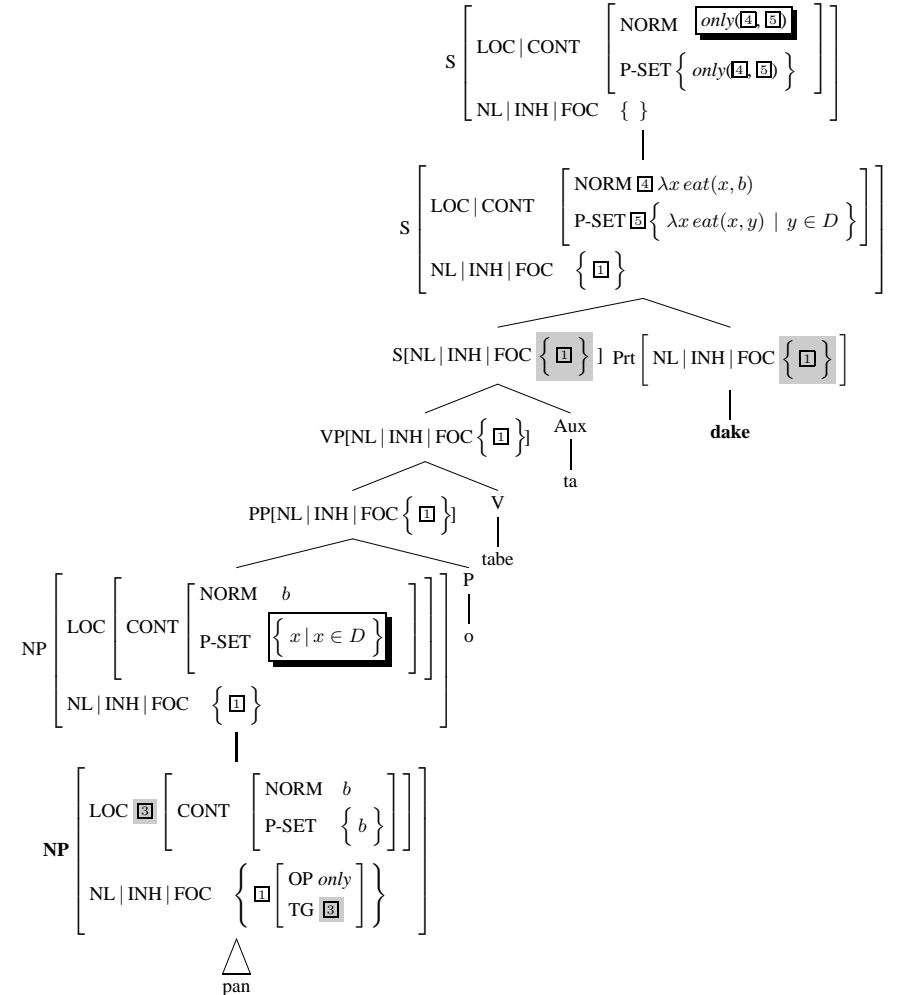


Figure 1: Tree for (11a)

- (12)  $only(P_{\langle e,t \rangle}, Q) = \lambda x \forall R [[R \in Q \wedge R(x)] \rightarrow R = P]$
- (13) the CONT|NORM value of the top S node:  
 $only(\boxed{4}, \boxed{5}) = \lambda x \forall R [[R \in \{ \lambda x eat(x, y) | y \in D \} \wedge R(x)] \rightarrow R = \lambda x eat(x, b)]$

<sup>1</sup>The exposition here is slightly simplified. For a complete formalization, see the full paper.

Paraphrase: of all the propositions of the form “(I) ate  $y$ ,” only the following holds: “(I) ate bread.”

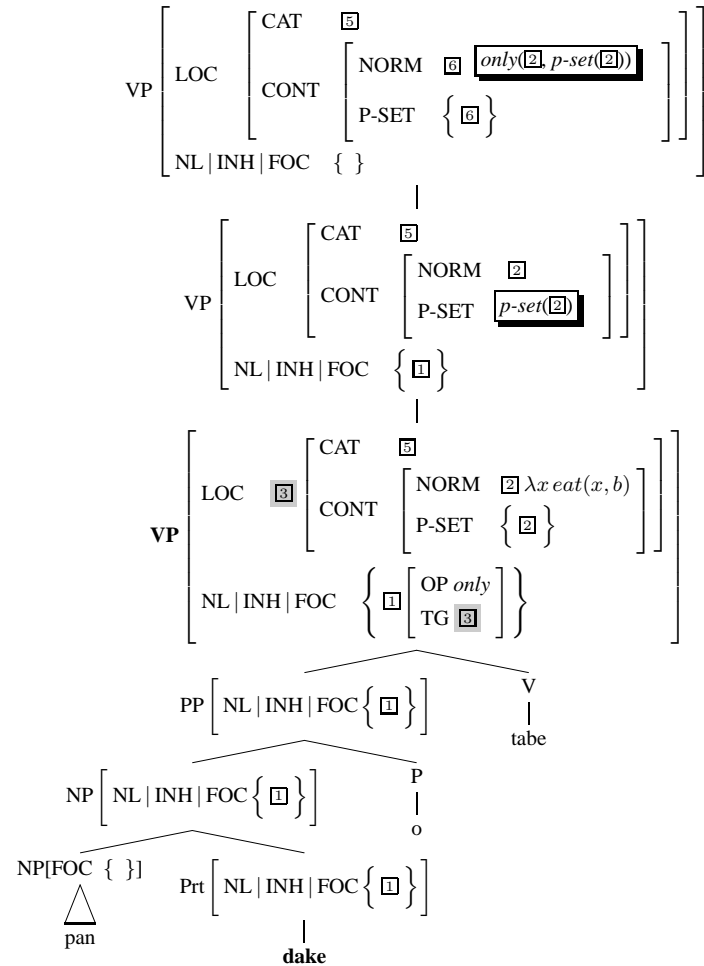


Figure 2: Tree for (11b)

In Figure 2 (Tree for (11b)),

- The FOC value from the focus particle *dake* gets percolated.
- At the lowest VP node, the LOC value of the phrase and the TG value of the singleton item in the FOC value gets identified. (This VP is focused in this sentence.)

- The Focusing Rule and the Focus Resolution Rule is applied successively.

$$(14) \text{ only}(\underline{2}, p\text{-set}(\underline{2})) = \text{only}(\lambda x \text{ eat}(x, b), D_{\langle e, t \rangle}) \\ = \lambda x \forall R[[R \in D_{\langle e, t \rangle} \wedge R(x)] \rightarrow R = \lambda x \text{ eat}(x, b)]$$

Paraphrase: of all the propositions of the form “(I)  $x$ -ed,” only the following holds: “(I) ate bread.”

## 4 Conclusion

- Focus particles in Japanese
  - Wide focus association
  - Narrow focus association
- Formal analysis of association with focus by
  - Alternative semantics
  - HPSG syntax

## References

- Numata, Yoshiko. 2000. Toritate (Focusing). In Satoshi Kinsui, Mayumi Kudo and Yoshiko Numata. *Toki, Hitei to Toritate (Tense, Negation and Focusing)*. Tokyo: Iwanami Shoten.
- Pollard, Carl J. and Ivan A. Sag. 1994. *Head-Driven Phrase Structure Grammar*. Chicago: University of Chicago Press.
- Rooth, Mats Edward. 1985. *Association with Focus*. Ph. D. Dissertation. University of Massachusetts, Amherst.