

CCG of Japanese Sentence-final Particles

Sumiyo Nishiguchi

Center for International Cooperation in Engineering Education
 Graduate School of Advanced Technology and Science
 The University of Tokushima
 2-1 Minami-josanjima, Tokushima-city, Tokushima 770-8506, Japan
 nishiguchi@cicee.tokushima-u.ac.jp

Abstract. The aim of this paper is to provide formalization of Japanese sentence-final particles in the framework of Combinatory Categorical Grammar (CCG) (Steedman 1996, 2000, Szabolcsi 1987). While certain amount of literature has discussed the descriptive meaning of Japanese sentence-final particles (Takubo and Kinsui 1997, Chino 2001), little formal account has been provided except for McCready (2007)'s analysis from the viewpoint of dynamic semantics and relevance theory. I analyze particles such as *yo* and *ne* as verum focus operators (Höhle 1992, Romero and Han 2004).

Keywords: verum focus, questions, focus semantic value

1 Research Questions

The questions to be addressed in this paper are:

- What are the lexical categories and meaning of Japanese sentence-final particles?
- Is subcategorization, e.g., S_{FOC} , S_Q , the right way to go?
- Should semantics of questions and focus be reflected in types and categories (Hamblin 1973, Rooth 1996)? What about direct compositionality (Barker and Jacobson 2007)?

Section 3 answers the first question and provides lexical entries in CCG for Japanese sentence-final particles, which has not been discussed much so far (Steedman 1996, 2000). Regarding the second question, the subcategorization adopted in the literature as in Steedman (2000) is introduced in the following section 2. Even though the categories given in section 3 use subcategorization, the semantics avoids any subcategories and reflect the theories on questions and focus in Hamblin (1973) and Rooth (1985, 1992), which leads to the third question discussed in section 4.

2 Steedman (2000): Prosodically Annotated Categories

In CCG, a transitive verb *eat* would have a following lexical category, which is a function from a noun phrase (NP) to another function from NP to a sentence (S).

(1) $\text{ate} := (\text{NP} \backslash \text{S}) / \text{NP} : \text{ate}'$

Steedman (2000,112) further uses prosodically annotated categories and defines the category INFORMATION for theme and rheme values of focused elements.

(2) a. theme:
 $\text{ate} := (\text{NP}_\theta \backslash \text{S}_\theta) / \text{NP}_\theta : * \text{ate}'$
 L+H*

b. rheme:

ate := (NP_ρ \ S_ρ) / NP_ρ: *ate'
H*

In this framework, categories without these features as in (1) are unspecified as to the value of the feature INFORMATION so that they can combine with any of the specified categories and return the same unspecified value.

Following such pattern, the categories for Japanese sentence-final particles given in the following section also uses subcategorized categories such as S_Q and S_{FOC}. The semantics, however, attempts to account for the meaning of questions and focus.

3 Categories of Sentence-final Particles in Japanese

3.1 Syntactic Behavior

Given that Japanese is a SOV language, sentence-final particles may attach either to a verb as in (3), a modal in (4) or a tense marker in (5) which fall in the end of sentences. These particles are generally ungrammatical elsewhere, except for *ne* and *na* which may attach to case markers as well as shown in (4d).

These particles often convey subtle nuances although many appear to be question or exclamative markers which turn the sentences into questions or exclamatives.

- (3) a. So-da-**yo**.
so-be-PAR
“That’s right, isn’t it?”
- b. *So-**yo**-da.
so-PAR-be
“That’s right, isn’t it?”
- c. ***Yo**-so-da.
PAR-so-be
“That’s right, isn’t it?”
- (4) a. Ken-ga hanashi-ta-rashii-**ne**.
Ken-NOM speak-PAST-EVI-PAR
“It seems Ken has spoken, hasn’t he?”
- b. *Ken-ga hanashi-ta-**ne**-rashii.
Ken-NOM speak-PAST-PAR-EVI
“It seems Ken has spoken, hasn’t he?”
- c. *Ken-ga hanashi-**ne**-ta-rashii.
Ken-NOM speak-PAR-PAST-EVI
“It seems Ken has spoken, hasn’t he?”
- d. Ken-ga-**ne** hanashi-ta-rashii.
Ken-NOM-PAR speak-PAST-EVI
“It seems Ken has spoken, hasn’t he?”
- (5) a. O-namae-wa nan-deshi-tak-**ke**.
HON-name-TOP what-HON-PAST-PAR
“What was your name?”
- b. *O-namae-wa nan-deshi-**ke**-ta.
HON-name-TOP what-HON-PAR-PAST
“What was your name?”

- c. *O-namae-wa nan-**ke**-deshi-ta.
HON-name-TOP what-PAR-HON-PAST
“What was your name?”
- d. *O-namae-wa-**ke** nan-deshi-ta.
HON-name-TOP-PAR what-HON-PAST
“What was your name?”

3.2 Meaning of Sentence-final Particles

While Takubo and Kinsui (1997) provide descriptive meaning of sentence-final particles, there has not been much formal descriptions of these sentence-final particles so far in my knowledge. The literature from the pedagogical view point, such as Chino (2001), lists Japanese sentence-final particles such as *no*, *ne*, *yo*, *na*, *ke*, *mono*, and others and describe their meanings. Only McCready (2007) presents an analysis from the viewpoint of dynamic semantics and relevance theory.

In harmony with their syntactic position as sentence-final particles, semantically speaking, all Japanese sentence-final particles, in common, take the entire proposition in its scope. The sentence-final particles take a proposition as the argument and returns a set of propositions. Below I define them as functions from a proposition to another proposition.

1. *no*: a question marker or a polarity focus operator (Höhle 1992, Romero and Han 2004).

$$S \setminus S_Q:$$

$$\lambda S_{\langle st \rangle} . \lambda T_{\langle st \rangle} . \wp_{\langle st, t \rangle} (T_{\langle st \rangle})$$

2. *ne*: a tag question marker

$$S \setminus S_Q:$$

$$\lambda S . \lambda T . \wp(T)$$

3. *yo*: a polarity focus marker

$$S \setminus S_{FOC}:$$

$$\lambda S . \lambda T . \wp(T)$$

4. *na*: a question marker or an exclamative marker

$$S \setminus S_Q:$$

$$S \setminus S_{FOC}:$$

$$\lambda S . \lambda T . \wp(T)$$

5. *ke*: a question marker

$$S \setminus S_Q:$$

$$\lambda S . \lambda T . \wp(T)$$

6. *kashira*: a question marker

$$S \setminus S_Q:$$

$$\lambda S . \lambda T . \wp(T)$$

3.2.1 No *No* can be either a question marker or a polarity (verum) focus marker such as *really* or *indeed* in English, with which the speaker assures the affirmative answer (Höhle 1992, Romero and Han 2004).

- (6) a. Nani-o shi-teru-no?
what-ACC do-PROG-Q
“What are you doing?”
- b. Hon-o yon-deru-no.
book-ACC read-PROG-FOC
“I am reading a book.”

$$\frac{\frac{\frac{\phi}{NP_{NOM}} \text{ Lex} \quad \frac{\frac{Nani - o}{NP_{ACC}} \text{ Lex} \quad \frac{\frac{shiteru}{TVP : \lambda x, y. do(x)(y)} \text{ Lex}}{VP}}{S}}{S_Q}}{S} > > \frac{no}{S \setminus S_Q} \text{ Lex} <$$

(7) a.

$$\frac{\frac{\frac{\phi}{NP_{NOM}} \text{ Lex} \quad \frac{\frac{hon - o}{NP_{ACC} : \lambda P. book'(x) \& P(x)} \text{ Lex} \quad \frac{\frac{yonderu}{TVP : \lambda x, y. read(x)(y)} \text{ Lex}}{VP}}{S}}{S_{FOC}} > > \frac{no}{S \setminus S_{FOC}} \text{ Lex} <$$

b.

- (8) a. Chikaku-ni sun-deru-no?
nearby-LOC live-PROG-Q
“Do you live nearby?”

$$\frac{\frac{\frac{\phi}{NP_{NOM}} \text{ Lex} \quad \frac{\frac{chikaku - ni}{VP/VP : \lambda P. \lambda x. nearby'(x) \& P(x)} \text{ Lex} \quad \frac{\frac{sunderu}{VP : \lambda x. live(x)} \text{ Lex}}{VP}}{S}}{S_Q}}{S} > > \frac{no}{S \setminus S_Q} \text{ Lex} <$$

b.

3.2.2 Yo Kinsui (1993) defines two usages of *yo* as the following:

1. *Kyoji* (teaching/notifying):

A, hankachi-ga ochi-mashi-ta-yo.
oh handkerchief-NOM fall-HON-PAST-FOC
“Oh, you have dropped your handkerchief.”

2. *Chui* (alert):

Omae-wa jukensei-da-yo. Terebi-o keshite benkyo-shi-nasai.
you-TOP entrance-exam-taker-be-FOC TV-ACC turn.off study-do-IMP
“You are preparing for an entrance exam. Turn off the TV and study.”

I would like to point out that, in both usages, *yo* strengthens affirmativeness of the proposition so that the addition of *yo* informs the addressee what he has not known.

- (9) a. Notifying *yo*:

$\neg \text{Past}(\text{Believe}(p)(s)) \wedge \text{Now}(\text{Believe}(p)(s))$

- b. Alerting *yo*:

$\text{Past}(\text{Believe}(p)(s)) \wedge \text{Now}(\text{Believe}(p)(s))$

- (10) *yo*: $S \setminus S_{FOC}$:

$\lambda S. \lambda T. \phi(T)$

3.2.3 Na Na can be either an exclamative marker or a question marker.

Exclamative:

- (11) Sugoi ie-da-na.
gorgeous house-be-EXC
“What a gorgeous house!”

(BCCWJ 2009,pn 14475)

Question:

- (12) Muri-ka-na.
impossible-Q-Q
“Will it be impossible?”

Chino (2001) observes that some kind of *no* softens the effect of an assertion.

- (13) 8-ji-kara 11-ji-da-na.
 8-o'clock-from 11-o'clock-be-PAR
 "From eight o'clock to 11 o'clock."

(BCCWJ 2009,oc sentence ID 64)

4 Categories of Questions and Focused Sentences

There exists a mismatch between syntactic categories and semantics of Japanese sentence-final particles. Semantically speaking, these particles are functions from a proposition to a set of propositions. For example, *no* as a question marker is a function from a proposition to a set of possible answers in a given context (Hamblin 1973). The meaning of (14a) is a set of propositions as in (14b).

- (14) a. Arisu-o mi-ta-no.
 Alice-ACC watch-PAST-PAR
 "Did you see Alice?"
 b. $[[\textit{Did_you_see_Alice?}]] = \{ \textit{you saw Alice, you did not see Alice} \}$

Since a proposition is a set of possible worlds which is of type $\langle s, t \rangle$, the set of possible answers is a set of sets of possible worlds, namely, type $\langle st, t \rangle$.

However, syntactically speaking, sentence-final particles are functions from a sentence to a question or a focused sentence. Therefore, their categories remain $S \setminus S_Q$ or $S \setminus S_{foc}$ and cannot be $S \setminus (S \setminus S)$ which seems to reflect their semantics better.

The hypothesis of direct compositionality assumes that the syntax and the semantics work together in tandem. Every expression that is computed in syntax has meaning (Jacobson 2002, Barker and Jacobson 2007). Direct compositionality advocates a rule-to-rule view—each syntactic rule is a semantic rule specifying how the meaning of the larger expression is derived from the meanings of the smaller expressions.

Our dilemma is that the semantic type of sentence-final particles $\langle st, \langle st, t \rangle \rangle$ more straightforwardly correspond to type $S \setminus (S \setminus S)$ rather than $S \setminus S_Q$ or $S \setminus S_{foc}$ even though there is no syntactic composition with two sentences.

References

- Barker, C. and Jacobson, P. (eds): 2007, *Direct Compositionality*, Oxford University Press.
- BCCWJ: 2009, *Balanced Corpus of Contemporary Written Japanese, BCCWJ2009 edition*, The National Institute of Japanese Language.
- Chino, N.: 2001, *All About Particles: A Handbook of Japanese Function Words*, Kodansha, Tokyo.
- Hamblin, C.: 1973, Questions in montague english, *Foundations of Language*, Vol. 10, pp. 41–53.
- Höhle, T. N.: 1992, Über verum fokus in deutschen, *Linguistische Berichte* pp. 112–141.
- Jacobson, P.: 2002, *Linguistics ad Philosophy* **25**, 601–626.
- Kinsui, S.: 1993, Shujoshi *Yo*, *Ne-no imironteki bunseki*.
- McCready, E.: 2007, Particles: Dynamics vs. utility, in Y. Takubo (ed.), *Japanese/Korean Linguistics 16*.

- Romero, M. and Han, C.-h.: 2004, On negative yes/no questions, *Linguistics and Philosophy* **27**, 609–658.
- Rooth, M.: 1985, *Association with Focus*, PhD thesis, University of Massachusetts at Amherst.
- Rooth, M.: 1992, A theory of focus interpretation, *Natural Language Semantics* **1**, 75–116.
- Rooth, M.: 1996, Focus, in S. Lappin (ed.), *The Handbook of contemporary semantic Theory*, Blackwell, Oxford, pp. 271–297.
- Steedman, M.: 1996, *Surface Structure and Interpretation*, MIT Press, Cambridge, Mass.
- Steedman, M.: 2000, *The Syntactic Process*, MIT Press, Cambridge, Mass.
- Szabolcsi, A.: 1987, Bound variables in syntax (are there any?), *Proceedings of the 6th Amsterdam Colloquium*, pp. 331–353.
- Takubo, Y. and Kinsui, S.: 1997, Discourse management in terms of mental spaces, *Journal of Pragmatics* **28**, 741–758.