JAPANESE HONORIFICATION IN AN HPSG FRAMEWORK

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Abstract

We present a solution for the representation of Japanese honorificational information in the HPSG framework. Basically, there are three dimensions of honorification. We show that a treatment is necessary that involves both the syntactic and the contextual level of information. The Japanese grammar is part of a machine translation system.

1 Introduction

The Verb*mobil* system is a machine translation system for German, English and Japanese dialogues. The szenario is a special sort of task-oriented dialogues: appointment scheduling[1].

Spoken language encodes references to the social relation of the dialogue partners. The utterances can express social distance between addressee and speaker and third persons, who are mentioned. Honorifics can even express respect concerning entities of the world. Consider the following examples from Japanese, German and French:

(1)	*wann*	*haben*	*Sie*	*Zeit*
	when	*have*	*you*	*time*

(2)	*quand*	*est-ce que*	*vous*	*avez*	*du*	*temps*
	when	*do*	*you*	*have*	*the*	*time*

(3)	*itsu*	*go-tsugoo*	*ga*	*yoroshii*	*deshoo*	*ka*
	when	*HON-conditions*	*NOM*	*good*	*COP*	*QUE*

The semantic content of these utterances is: 'When does it suit you?'. But there is an additional pragmatic content: The speaker expresses social distance concerning the addressee. This is expressed by the honorific pronouns *Sie* and *vous* in German and French. In the Japanese example it is expressed by the following attributes:

[1]See [Wahlster1997] for further reference.

- The honorific prefix *go* in front of *tsugoo*
- The honorific adjective *yoroshii*
- The honorific copula *deshoo*

A Japanese utterance with the same semantic content in — for example — a family context could be:

(4)	*itsu*	*jikan*	*ga*	*aru*	*no*
	when	*time*	*NOM*	*have*	*QUE*

Information about honorification is – on the one hand – necessary for the description of syntactic phenomena like honorific agreement or relative sentences and – on the other hand – necessary for correct translation. In order to understand the whole meaning of the Japanese utterances it is important to represent the different honorific attributes in the analysis structure. The information can be used to resolve zero pronominalization and topicalized structures. It is even more important for the adequate *generation* of the Japanese utterances. In other investigations on zero pronoun resolution in task-oriented dialogues (cf. [Siegel1997]) we calculated that 23.9% of the zero pronominals can be solved using lexical pragmatic restrictions about honorification.

2 Honorific Forms in Japanese

Honorifics in Japanese express the social relation of familiarity or distance between speaker, addressee and third persons. Consider the situation where the speaker asks if s/he returned a book to the addressee, 'did I return the book to you?'. In a familiar context (s)he would say:

(5)	*hon*	*wo*	*kaeshita*	*no*
	book	*AKK*	*returned*	*QUE*

In a more formal situation with more social distance between speaker and addressee the utterance would be:

(6)	*go-hon*	*ga*	*o-kaeshi-shimashita*	*ka*
	hon-book	*NOM*	*hon-returned-hon*	*QUE*

The book as belonging to the addressee is prefixed by the honorific *go*. The predicate gets the 'humble' extension *shimashita* and the question is expressed by *ka*.

The social relationships that can be expressed are threefold: The first one is the relation between speaker and addressee, in the above example expressed by *no* and *ka*. The second one is the relation between the speaker and the subject of the utterance, in the above example expressed by the verbal form. The third one is the relation between the speaker and other arguments in the sentence. In the above example, book (*hon*) gets the honorific *go* prefix, because it is a book belonging to the addressee being honored by the speaker.

Familiarity or distance between speaker and addressee can be expressed by verbal endings and/or the lexical choice of self-referring pronouns. Verbal endings encoding a relation of distance between speaker and addressee can be, for example, *-masu, -mashita* or *-n-deshoo-ka*. Those encoding a familiar relation can be, for example, *-ru, -ta* or *-no*. The choice of self-referring pronouns also depends on the gender of the speaker. A self-referring pronoun uttered by a woman in a familiar context could be *watashi*, a self-referring pronoun uttered by a woman in a distant context could be *watakushi*. Parallel the appropriate self-referring pronoun for a man in a familiar context would be *boku*, one in a distant context would be *watashi*. I will call the relationship of honorifics concerning the relation between speaker and addressee

AHON and give it a polarity $[-AHON]$ for the plain form in a family context and $[+AHON]$ for the expressions in a context of social distance.

The social relation between the speaker and a subject that is not referring to the speaker is expressed by the lexical choice of verbs, by the expression *o-VERB-ni-naru*, by the honorific prefix *o/go* at nouns referring to entities belonging to the subject and by the lexical choice of pronominals. I will call this relation between speaker and subject **SHON**. A relation of distance between speaker and subject (where the subject is the addressee or a third person) can be — for example — expressed by the verb *irassharu* (to go), while in a familiar situation the verb *iku* with the same semantic content is used. This is expressed by $[+SHON]$ and $[-SHON]$, respectively. Possible referring expressions for the second and third person can be, for example, *sochira* and *X-san* in relations of distance and *kimi* or *X-kun* in relations of familiarity.

The third relation is the one between speaker and objects in the sentence (other than subject). I will call this relation **OHON**. It is expressed by the lexical choice of these entities and by the honorific prefixes *o* and *go*.

3 Interaction of Different Kinds of Honorification in Japanese

The relationship of the speaker and the addressee can be one of three possible constellations:

1. The addressee is the subject of the utterance.
2. The speaker is the subject of the utterance.
3. A third person is the subject of the utterance.

When the addressee is the referent of the sentence subject, the relationships AHON and SHON must have the same polarity. In these cases, in a sentence with AHON there must also be SHON.

In the situation, where the speaker is the subject of the utterance, (s)he uses humble forms of the verbs (a matter of lexical choice), if the AHON relation is a distant one. An example is *mairu* (to go). In this case, both relationships (SHON and AHON) are concerned.

In many cases utterances contain multiple honorification as can be seen in the following example:

(7)	*watakushi*	*ga*	*o-denwa*	*itashi-mashi-ta*
	I	*NOM*	*telephone*	*do(hon)-hon-Past*

The verbal stem *itashi* expresses subject honorification, the verbal ending *mashi* and the pronoun *watakushi* express addressee honorification.

Japanese honorification undergoes different kinds of restrictions. The first kind to mention is called 'pragmatic agreement' by [Pollard and Sag1994]. There must be agreement between the SHON honorification of the subject and the verb, as the following examples show:

(8)	*watashi*	*ga*	*sensei*	*ni*	*o-denwa*
	I	*NOM*	*professor*	*DAT*	*telephone*
	itashi-mashi-ta				
	do(humble-shon)-ahon-Past				

(9)	**sensei*	*ga*	*watashi*	*ni*	*o-denwa*
	professor	*NOM*	*I*	*DAT*	*telephone*
	itashi-mashi-ta				
	do(humble-shon)-ahon-Past				

(10)

sensei	*ga*	*watashi*	*ni*	*o-denwa*
professor	*NOM*	*I*	*DAT*	*telephone*
nasai-mashi-ta				
do(honorific-shon)-ahon-Past				

The pronoun *watashi* can be used with a humble verb form, but not the honorific noun *sensei*. This must be used with a honorific verb form.

Another kind of restriction concerns relative sentences as opposed to complement sentences. See the following examples from [Harada1976]:

(11)

Taro	*wa*	*Hanako*	*ga*	*ki-mashi-ta*	*to*	*it-ta*
Taro	*TOP*	*Hanako*	*NOM*	*come-hon-Past*	*COMP*	*say-Past*

(12)

Taro	*wa*	*Hanako*	*ga*	*ki-ta*	*to*	*it-ta*
Taro	*TOP*	*Hanako*	*NOM*	*come-Past*	*COMP*	*say-Past*

(13)

**Taro*	*wa*	*Hanako*	*ga*	*ki-mashi-ta*	*koto*	*o*
Taro	*TOP*	*Hanako*	*NOM*	*come-hon-Past*	*NOM*	*AKK*
shiranakat-ta						
not know-Past						

(14)

Taro	*wa*	*Hanako*	*ga*	*ki-ta*	*koto*	*o*
Taro	*TOP*	*Hanako*	*NOM*	*come-Past*	*NOM*	*AKK*
shiranakat-ta						
not know-Past						

Complement sentences allow a honorific predicate, while relative sentences do not.

4 Previous Approaches

Investigations of Japanese honorification have been made from the sociolinguistic, the grammatical and the machine translational viewpoint. For the sociolinguistic viewpoint see for example [Ide1986], [Coulmas1987], [Hori1986], [Hill *et al.*1986] and [Hanaoka McGloin1976]. The authors state that honorification is an expression of the social distance or 'perceived distance' ([Hill *et al.*1986]) between speaker and addressee and the belonging to a social group ([Coulmas1987]). They investigate the relation between gender and the use of honorificational expressions ([Hori1986]). Examples for a grammatical investigation of Japanese honorification are [Ikeya1983], [Kuno1973], [Harada1976] and [Hori1992]. [Hori1986] uses honorification for a definition of 'subject' in Japanese. [Kuno1973] classifies honorification concerning style and honorification concerning respect. In our approach, these classes are AHON and SHON, respectively. He shows that there are differences of grade in various expressions of honorification. [Harada1976] gives a classification of honorificational forms that at first sight seems complementary to ours. It can be seen in figure 1. A closer look shows that the difference is only a question of naming. Haradas 'Subject honorifics' is [+SHON] in our approach, the 'Object honorifics' is [-SHON] and the 'Performative honorifics' would correspond to our [+AHON]. What we call [OHON], turns into [SHON], if the entity is used as a subject in the utterance. [Ikeya1983] gives a GPSG account for honorification, where [+SHON] and [-SHON] (called OHON in his approach) are head features, with the head feature principle accounting for the agreement restrictions on subject honorification. [Gunji1987] also gives examples for syntactic restrictions on honorification and introduces HON as a head feature.

The machine translational viewpoint is shown by [Dohsaka1990]. Dohsaka describes, how information about honorification can be used in the machine translation system to resolve zero pronominal references to human entities. He builds up a model of social relations during processing the dialogue, where the pragmatic relations honorification, speaker's point of view and territory of information is on the one hand

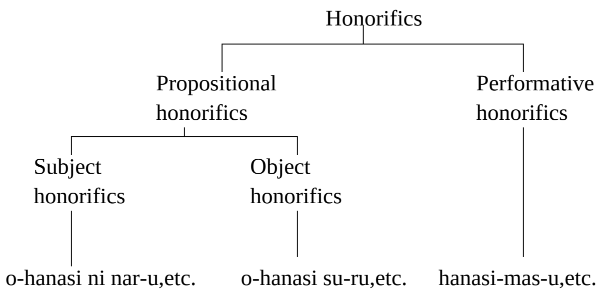

Figure 1: Classification of honorifics by Harada

extracted from the dialogue and on the other hand restricts the interpretation of zero pronominals in the dialogue. This approach shows that the extraction of information about honorification from the dialogue is urgently needed for the interpretation of zero pronominals.

5 Japanese Honorification in HPSG

[Pollard and Sag1994] analyze honorification as a pragmatic fact. They describe the problem as 'pragmatic agreement' and introduce a relation $owe - honour$ in the BACKGR feature:

$$BACKGR \left\{ \begin{bmatrix} RELATION & owe - honour \\ HONORER & 1 \\ HONORED & 2 \\ POLARITY & 1/0 \end{bmatrix} \right\}$$

Still, the approach lacks for the fact that there are different kinds of honorification as we described above. It describes only subject honorification. [Green1997] elaborates the CONTEXT feature and introduces information about social ranking of the participants. We would, though, propose to leave the inference of the social relations to other components of, e.g., a machine translation system. The reason is that all necessary information is not always directly accessible in the analysis procedure. An example is given by [Coulmas1987]: The secretary in a company is asked by an employee, when the boss comes back. He or she would answer:

(15)	raishuu	kaette	irasshaimasu
	next week	come back	SHON

If the same secretary would be asked by a customer, the answer would be:

(16)	raishuu	kaette	mairimasu
	next week	come back	-SHON

In this example, we would represent the fact that the secretary honors the boss in the first example, but not in the second one. The interpretation of the complex social relations must be left to a module that has access to the information about the actual social relations of the participants in the context.

To account for the fact that Japanese honorification has more dimensions, we propose the following CONTEXT feature structure:

$$\begin{bmatrix} C-INDS & \begin{bmatrix} SPEAKER & [1] \\ ADDRESSEE & [2] \end{bmatrix} \\ BACKGR & \left\{ \begin{bmatrix} addr-honor-rel & \\ HONORER & [1] \\ HONORED & [2] \\ POLARITY & +/- \end{bmatrix}, \begin{bmatrix} subj-honor-rel & \\ HONORER & [1] \\ HONORED & [3] \\ POLARITY & +/- \end{bmatrix}, \begin{bmatrix} obj-honor-rel & \\ HONORER & [1] \\ HONORED & [4] \\ POLARITY & +/- \end{bmatrix} \right\} \end{bmatrix}$$

The C-INDS contain indices for speaker and addressee, as proposed by [Pollard and Sag1994]. The value of BACKGR is a difference list that sums up the occuring honorificational relations in the utterance. Each occuring relation gets classified into *addr-honor-rel*, *subj-honor-rel* and *obj-honor-rel*. The HONORER is co-indexed with the speaker in all cases here. This must be different in cases of indirect speech that we will describe later. The HONORED value is co-indexed with the addressee in C-INDS in the *addr-honor-rel* case, with the subject's CONTENT.INDEX value in the *subj-honor-rel* case and with the CONTENT.INDEX value of the argument that introduces the relation in the *obj-honor-rel* case.

The relations all get a value of POLARITY, to account for the fact that there can be forms that are honorific, humble or neutral. A negative SHON polarity, e.g., reflects the situation where the speaker or a third person that socially belongs to the innner circle of the speaker is the subject of the utterance. [McGloin1987] describes this situation sociolinguistically as "positive politeness", because it expresses social closeness.

The question is: how does the information enter into the BACKGR? Let us start with the *obj-honor-rel*. This relation is encoded in the nouns that express honorification. The entry for *o-uchiawase*, e.g., contains:

$$\begin{bmatrix} CONTENT|INDEX & [1] \\ CONTEXT & \begin{bmatrix} C-INDS & \begin{bmatrix} SPEAKER & [2] \\ ADDRESSEE & [3] \end{bmatrix} \\ BACKGR & \left\{ \begin{bmatrix} obj-honor-rel & \\ HONORER & [2] \\ HONORED & [1] \\ POLARITY & + \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

A verb that has restrictions on the honorification of its subject, contains the following in its lexical entry:

$$\begin{bmatrix} CONTENT|KEY.ARG-1 & [1] \\ CONTEXT & \begin{bmatrix} C-INDS & \begin{bmatrix} SPEAKER & [2] \\ ADDRESSEE & [3] \end{bmatrix} \\ BACKGR & \left\{ \begin{bmatrix} subj-honor-rel & \\ HONORER & [2] \\ HONORED & [1] \\ POLARITY & + \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

If it happens to be the case that an entity with an *obj-honor-rel* in its BACKGR becomes the subject of the sentence, the mother node must get the *subj-honor-rel* from the predicate, identified with the index of that entity. It is, though, necessary to prove the honorificational restrictions on predicate and subject. Since this is a syntactic process, we decided on representing honorification on the syntactic level, too. [Gunji1987] gives reasons for the syntactic approach[2]. He describes in his JPSG-account of Japanese syntax honorification as a kind of agreement:

> *"Since Japanese does not have syntactic agreement phenomena such as number, person,etc., the honorification system is more or less a counterpart."*

He introduces the feature HON as a head-feature (with values +/-), underlying the head feature principle. This accounts for the fact that the value of the HON-feature passes from the head to the mother node. Gunji's HON, though, is only a representation of subject honorification. Honorification concerning the addressee or objects is not considered. The values of SHON can be either plus or minus, but neutral forms also exist.

Therefore we expanded the syntactic part of the representation of honorification. The lexical entries get a HEAD feature called FORMAL:

$$\left[\ FORMAL \quad \left[\begin{array}{ll} AHON & +/- \\ SHON & + \end{array}\right]\ \right]$$

Only the connection of representing honorification on the syntactic **and** contextual level makes it possible to account for all phenomena. The pure syntactic representation cannot account for the representation of honorificational relations between speaker and addressee, for OHON and for multiple honorifications, while the pure contextual representation cannot account for the syntactic restrictions on subjects and relative sentences. The CONTEXT level gives information about felicity of an utterance, while the CAT level gives information about syntactical correctness of an utterance. For honorification in Japanese, we need both. With the fundamental concept of HPSG, the sign, it is possible to incorporate **both** levels of linguistic analysis.

Being a HEAD feature, the value of FORMAL is passed up from head daugthers to mother daughters. A honorific noun therefore contains the value $SYNSEM|\ LOCAL|\ CAT|\ HEAD|\ FORMAL|$ $SHONplus$, as well as a verb with subject honorification. For Japanese, we set up the *principle of subject honorification*:

> *In a honorific lexical structure, the $FORMAL|SHON$ value of the HEAD is identical to the $FORMAL|SHON$ value of the subject's HEAD and the polarity of the* subj-honor-rel *in BACKGR. The values of the subject's $CONTENT|INDEX$ and the HONORED of the* subj-honor-rel *in BACKGR are identical.*

This principle accounts for the compatibility of the information on the syntactic (CAT) and contextual (CONTEXT) levels. While the agreement of subject and verb is checked on the syntactic level, the contextual level gets the information on subject honorification and links it to the semantic entities.

Honorification concerning the addressee inside the sentence is seen as a purely syntactic restriction. As non-addressee-honorific and addressee-honorific verbs may combine, it is not useful to introduce the relation into the context during processing the sentence. The syntactic restriction is needed for relative

[2]See also [Ikeya1983].

sentences, as shown above. At the top-most node (*utterance-type* in our grammar of spoken language), the *addr-honor-rel* is introduced into the $CONTEXT|\ BACKGR$. Its polarity is co-indexed with the value of $HEAD-DTR|SYNSEM|LOCAL|CAT|HEAD|\ FORMAL|AHON$. The HONORER is co-indexed with the speaker, the HONORED is co-indexed with the addressee. Also here it can be seen that it is meaningful to represent the honorification on both levels. Inside the sentence, it is a purely syntactic relation, but outside, it is a contextual relation.

While the syntactic information goes up the tree via the head feature principle, the contextual information underlies different principles. The HPSG principle of contextual consistency ([Pollard and Sag1994],p.333) says:

> *"The $CONTEXT|BACKGR$ value of a given phrase is the union of the $CONTEXT|BACKGR$ values of the daughters."*

This must be modified for our approach, since the head-subject rule takes the $CONTEXT|BACKGR$ value of its head daughter. It can be hold for all structures besides the head-subject rule and the utterance rule, as shown before.

Let us take an example for multiple honorification, 7, that shall be repeated here as 17:

(17)	*watakushi*	*ga*	*o-denwa*	*itashi-mashi-ta*
	I	*NOM*	*telephone*	*do(hon)-hon-Past*

The self-referring pronoun *watakushi* introduces an *obj-honor-rel* with POLARITY *minus*, where HONORER and HONORED are co-indexed with the speaker and the $CONTENT|INDEX$. This is passed up the tree in the head-complement structure of *watakushi ga*. At the same time, the values of $HEAD|FORMAL$ are introduced: AHON *plus* and SHON *minus*. As particles are assumed to be heads (see [Siegel1999]), they must take their SHON value from their objects (which is defined in the lexical type of particles).

The honorific form *o-denwa itashi-mashi-ta* introduces a *subj-honor-rel* in the context with POLARITY minus. The HONORED is co-indexed with the subject's $CONTENT|INDEX$. The $HEAD|\ FORMAL$ values are the same as the ones of *watakushi*. The *principle of subject honorification* sets up the restrictions for the predicate's subject. As this is found in *watakushi ga*, the $HEAD|FORMAL$ values are unified and the *subj-honor-rel* is introduced. The utterance-rule introduces an *addr-honor-rel* with POLARITY *plus*, since the value of $HEAD|FORMAL|AHON$ is *plus*.

This was an example of the special case where the speaker is the subject. Another example with the addressee being the subject is:

(18)	*anata*	*ga*	*o-denwa*	*o*	*kudasai-mashi-ta*
	you	*NOM*	*telephone*	*AKK*	*do(shon)-ahon-Past*

All three types of honorificational relations are introduced here: subject honorification by the addressee-refering pronoun *anata*, object honorification by the honorific noun *o-denwa* and addressee honorification by the *-mashita* ending of the verb. The polarity is *plus* in all cases.

6 Effects

The $CONTEXT|BACKGR$ value passes up the tree, independend which daughter is the head of the phrase. It is even possible to represent the honorification in cases of embedded phrases. There can be more than one relation of *obj-honor-rel* in an utterance, as there can be more than one honored constituents. An effect for the machine translation system is that lexical pragmatic restrictions for zero pronominals can be directly accounted for in the analysis. They are essential to find referents for many zero pronominals, as is shown by [Metzing and Siegel1994]. See for example:

(19) *omachi* *shite-orimasu:*
study *do-hon*

This is part of the structure for this utterance:

$$\begin{bmatrix} CONTENT & \begin{bmatrix} KEY & \begin{bmatrix} ARG-1 & [1] \end{bmatrix} \end{bmatrix} \\ CONTEXT & \begin{bmatrix} C-INDS & \begin{bmatrix} SPEAKER & [2] \\ ADDRESSEE & [3] \end{bmatrix} \\ BACKGR & \left\{ \begin{bmatrix} subj-honor-rel & \\ HONORER & [2] \\ HONORED & [1] \\ POLARITY & - \end{bmatrix} \begin{bmatrix} addr-honor-rel & \\ HONORER & [2] \\ HONORED & [3] \\ POLARITY & + \end{bmatrix} \right\} \end{bmatrix} \end{bmatrix}$$

The structure restricts the subject to one with a subject honorification with negative polarity. Thus, only the speaker or a person of the speaker's social group can be the antecedent of the subject.

Syntactic restrictions for relative sentences can easily be formulated in a way that only verbs with a non-addressee-honorific form can modify nouns.

7 Evaluation

We randomly chose 100 utterances from the Verb*mobil* corpus. Then we tagged these with expected values for SHON, OHON and AHON. The utterances contained 170 occurrences of honorification, with 99 AHON, 32 OHON and 39 SHON. We parsed the utterances and compared the human-made tagging with the parsing result. Then we calculated precision and recall in the following way:

$$Precision = \frac{number\ of\ correct\ assigned\ honorifications}{number\ of\ assigned\ honorifications}$$

$$Recall = \frac{number\ of\ correct\ assigned\ honorifications}{number\ of\ honorifications\ in\ the\ corpus}$$

The results can be seen in table 1.

8 Honorification in Other Languages

Honorification in German concerns only the relation between speaker and addressee, as the following example shows:

(20) *Sie* *sind* *nett*
you *are* *nice*

	PRECISION	RECALL
AHON	1	1
SHON	1	0.86
OHON	1	0.79
HON	1	0.93

Table 1: Precision and recall

The sentence is ambiguous, because it allows a first interpretation where *Sie* is a third person plural pronoun and therefore refers to a group of people and a second interpretation where it is a polite second person singular pronoun and refers to a single person. Honorification in German thus introduces OHON with honorific pronouns, but no special treatment of subjects and no AHON relation. The agreement between subject and verb is a purely syntactic one.

French honorification shows different habits in agreement (as is shown by [Pollard and Sag1994],p.96f.), but as well concerns only the OHON dimension.

Honorification in Korean, as it is described by [Lee1996], is distinct form Japanese honorification in one point: There are no neutral forms of NPs and VPs in respect to subject honorification.

Our approach thus seems to work for different kind of languages that express honorification.

9 Conclusions

The Japanese language has a complicated system to express the social relation between speaker, addressee and subject of an utterance. This relation is expressed by honorification. It concerns verbal forms, verbal conjugations, nominal prefixes and pronouns and undergoes syntactic, semantic, pragmatic and domain-specific restrictions.

We have shown that for Japanese it is necessary to distinguish subject honorification, object honorification and addressee honorification and to introduce polarity for these. The number and kind of the dimensions is language-specific; German and French, for example, have only one dimension, while Korean and Japanese have three. In one utterance different dimensions of honorification can be expressed.

We have given a treatment of honorifics in the HPSG framework that covers all three dimensions of Japanese honorifics and makes it possible to account for honorific agreement as well as restrictions in complement sentences and restrictions for zero pronominals. The approach allows an uniform treatment of honorific dimensions in different languages.

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