A Semantics for Honorifics with Reference to Thai

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Abstract

This paper proposes a general framework for the semantics of honorific expressions, including honorific pronouns, morphology, and discourse particles. Such expressions are claimed to indicate a level of politeness which must be compatible with a level of formality fixed by the discourse context together with sociolinguistic factors, and, with their use, to change the range of formality the context specifies. Specific honorifics are taken to introduce expressive content of a kind modeled by real-numbered intervals. This general picture is exemplified with the honorific system of Thai.

1 Introduction

The phenomena of honorification and politeness register have received extensive attention in linguistics, both from formal and informal perspectives. Most of this work has focused on three general topics. First, from a formal perspective, researchers have been concerned with the way in which semantic composition with honorific expressions takes place, and with the kinds of denotations which they have; some main results of these investigations will be summarized later in this paper.[1] A second line of research is found within the sociolinguistic tradition (and also within discourse analysis), and looks at ways in which speakers use politeness expressions to indicate aspects of their social identities and further their general societal goals (Brown and Levinson, 1987; Watts, 2003). Finally, there is a tradition which attempts to situate the use of politeness, including honorifics, within a general theory of rational linguistic behavior; this work begins with Brown and Levinson (1987) and continues to game-theoretic accounts like that of van Rooy (2003).

Given the amount of research done in this area, it is no surprise that significant results have been obtained. However, a problematic feature of the literature is that the three strands of research mentioned above do not engage extensively with each other. Research on honorific meanings tends not to consider observations made within discourse analysis; game-theoretic accounts try to predict rational honorific use without a serious semantics for honorific content. A theory which can bring the various aspects of politeness together seems necessary, especially given the current interest in honorification in formal circles, and further is essential for the automatic generation of appropriate speech in computational pragmatics. The aim of the present paper is to propose a theory of the requisite sort. That said, space limitations preclude doing more than laying the formal groundwork needed; modeling substantial sociolinguistic observations and tying the result to game-theoretic calculation is left for future work.

The paper is structured as follows. I will take the system of politeness marking found in Thai as the empirical domain of the analysis. This system is introduced in §2, though this introduction is necessarily non-exhaustive for reasons of space. Some lessons are drawn here for formal theories of polite-

[1] Work on syntactic aspects of honorification is closely related (Niinuma, 2003), but since morphological affixes with honorific meanings will not be my focus here, I will not consider this aspect of honorification further in the present paper.

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Low		Mid		High
wá,wóoy		*há, há?*		*khá,khráp*

Figure 1: Formality of Thai particles.

ness. I then turn in §3 to past analyses of honorification, showing that they propose denotations that do not perfectly track intuitions about honorific content. My own proposal, an extension and modification of that of (Potts and Kawahara, 2004), is given in §4, and applied to the Thai system in §5. §6 concludes and indicates some directions for future work.

2 Honorification and politeness in Thai

The empirical focus of this paper is Thai. This language has a number of means for indicating politeness. The present paper will not attempt an exhaustive treatment, but will focus on politeness-marking pragmatic particle and pronominal forms. My aim is to show how the different levels of politeness/honorification marked by these terms come together to determine a general level of formality in speech, which is one of the core phenomena which a theory of honorific meanings must consider. My development closely follows that of Iwasaki and Ingkaphirom Horie (1995; Iwasaki and Ingkaphirom (2005) and adopts their description of the levels of politeness indicated by each form.[2]

2.1 Particles

Thai marks speech levels directly using pragmatic particles.[3] Essentially three speech levels are marked: casual speech, formal speech, and a mid-level gray area in between, as shown in Figure 1. With particles, as elsewhere in the domain of honorific expressions, Thai makes a distinction between female and male speech; *khá* is used by women, and *khráp* by men. Both of these particles appear in a range of phonological variants: for instance, the tone of *khá* may vary depending on the clause type the particle appears in, and *khráp* may lose its rhoticity as conversations become less formal.

From these particles, we can already see a need to separate utterances into at least three levels of formality: formal, mid-level, and casual. The simplest theory of honorific meanings might take the particles to directly indicate one of these speech levels. However, the particles can combine with other terms with honorific content, and need not match them perfectly in register, as will be shown in the next section. This means that a theory which marks speech levels directly will fail as it will result in inconsistency in such cases. The facts are more complex.

2.2 Pronouns

Thai has a large number of first and second person pronouns which mark various levels of politeness. These pronouns can be separated into casual, mid-level, and formal pronouns, as indicated in Figures 2 and 3. Within these general classes, the pronouns differ in their precise degree of formality: for instance, within the category of formal pronouns, *kraphŏm* is more formal than the simpler *phŏm*. As with particles, male and female speakers use a partly distinct set of pronouns: thus, ordinarily men use *phŏm* in formal contexts and women use *kháw*.[4]

The simple analysis discussed in §2.1 would predict that, for example, the politeness-marking particle *khráp* is incompatible with pronouns in other levels such as the mid-level formal pronoun *raw*, for the information carried by *khráp* – roughly, that the level of formality is high – is inconsistent with that of *raw* – that the formality level is neither high nor low. Still, Iwasaki and Ingkaphirom Horie (1995) observe that " signs within the same level, as well as those in the contiguous levels in the domains of [particles] and pronominals, are often mixed to create the level and shade of speech formality that participants wish" (p. 528). We would also expect that, assuming that information about discourse levels is consistent, no changes are possible in formality level

[2]There appears to be some variance between native speakers in how these levels are perceived. I put this issue aside, and also do not discuss certain other means of indicating politeness such as other forms of address, as well as the pure honorific speech used in addressing royalty and monks of some ranks. These will be addressed within the current system in a later paper.

[3]For formal work on the topic of particles, see e.g. (McCready, 2008; Davis, 2009).

[4]While this does not mean that use of the other gender's pronouns is necessarily infelicitous, it is the case that special implicatures are produced when a form usually used by the other gender is selected.A useful question here is whether such restrictions correspond to presuppositions or e.g. conventional implicatures. In §5 I will treat them as conventionally implicated. Some useful discussion is in (Sudo, 2012) and (McCready, 2012a).

Low	*kuu* < *kháw*
Mid	*raw* < *chán*
High	*dichán* < *phŏm* < *kraphŏm*

Figure 2: Formality of Thai 1P pronouns.

Low	*mung*
Mid	*raw, tua, naaj, thEE*
High	*khun*

Figure 3: Formality of Thai 2P pronouns.

within a particular conversational exchange; but this is well-known to be false, not only for Thai but for many other languages that mark formality with lexical forms (Kikuchi, 1997; McCready et al., 2013; Asher and McCready, 2013). Something more complex is therefore required.

The facts about pronominals also make it clear that a simple separation into three levels will not be sufficient. Within each level of formality, various gradations can be found, which should carry over to the general politeness of a given discourse move; for instance, the combination *kraphŏm–khun–khráp* should be judged more formal than *phŏm–khun–khráp* even though both of the first person pronouns used are relatively formal. This observation suggests that the range of politeness must be continuous, rather than discrete, something that should be reflected in the honorific content.

2.3 Summary

Thai has several means of indicating formality and deference via the conventional meaning of lexical items. Here, I have focused on particles and pronominal forms.We have seen that combining such forms can lead to different levels of formality, and that not all elements selected must be drawn from the same level. From a formal perspective, then, the question is how to determine the general formality of an utterance from its component parts, and how to integrate the result with a general picture of how formality and honorification works in language and of how different levels of formality are judged appropriate in general. The rest of this paper is devoted to addressing these questions.

3 Earlier work

There has been significant work on honorification within semantics in the past few years. Most of this work has concentrated on composition: how honorific meaning enters into the compositional calculation of sentential meanings, and how it interacts with semantic operators.The main conclusion of this line of research is that honorific meanings are best construed as expressive (Potts and Kawahara, 2004; Sells and Kim, 2007; Horn, 2007; McCready, 2010). The main reasons for thinking so is that honorific meanings do not interact with operators like negation, and appear to resist non-expressive paraphrasing.[5] However, most of this work does not attempt to seriously propose denotations for honorific meanings, instead using dummy expressions like $\lambda x[honor(s, x)]$ to indicate honorification, and showing how these expressions play out in composition (where s denotes the agent of the utterance). The sole exception is Potts and Kawahara (2004), which will be the focus of this section. As we will see, this work gives an excellent starting point for a full semantics of honorifics.

The compositional semantics given by Potts and Kawahara is set within type theory. It begins with the proposal of a new expressive type ε, which denotes relations between individuals and attitudes. These attitudes are expressed by real-number intervals, $I \sqsubseteq [-1, 1]$, which indicate positive (> 0) and negative (< 0) attitudes in the obvious way, which relate two individuals, and thus have the form aIb. These intervals are used to model the meanings of both honorifics and expressive adjectives like *damn*. The combinatorics of the ε-types follow the usual Pottsian rules for composition, which ensures that they are independent of operators.[6]

Potts and Kawahara provide the following sample denotation for a Japanese subject honorific. Subject honorifics are taken to denote functions from individuals to expressive types, and to state that the speaker s has a highly positive attitude toward x, as indicated by the closeness of the interval to 1, and by its specificity. This, of course, is not quite

[5] Detailed argumentation can be found in the works cited in the main text.

[6] For extensive discussion of these rules and their problems in this context, see (Potts, 2005; McCready, 2010; Watanabe et al., 2014).

right; on this semantics, emotive attitudes and honorification are conflated, so that the subject honorific has a meaning close to the positive interpretation of *damn* (or even the stronger *fucking*) (cf. (McCready, 2012b)). But it is clear that speakers can use politeness markers without having any kind of emotive attitude at all, or even when they have a negative one.

(1) $[\![SH]\!] = \lambda x.s[0.8, 1]x : \langle e, \varepsilon \rangle$

Definitions of this kind have the drawback of only indicating an attitude toward a specific individual. The facts about Thai honorifics are a bit more complex: they seem to jointly indicate the speaker's level with respect to a particular individual, and also indicate the speaker's assumptions about the formality of the context of speech. When honorifics are used, they change the context; the speaker indicates a particular level of formality (perhaps with respect to some individual, as in (1) above). This point is neglected by Potts and Kawahara (2004), but Potts (2007) models it by assuming that discourse contexts contain a set c_I of indices of the sort above. This set can be updated by a newly introduced index aIb in two ways: (i) if c_I does not contain any index of the form $aI'b$, then $c'_I = c_I \cup \{aIb\}$, and (ii) if it does contain such an index of the form $aI'b$, then aIb replaces $aI'b$, where it is also required that $I' \sqsubseteq I$. This last clause is problematic in that it certainly seems possible to indicate altered attitudes as opposed to simply further specifying existing ones.

A fully adequate semantics for honorifics and politeness markers must satisfy the following criteria. Given the force of the above arguments that honorific meaning is expressive, the proposed meanings must be expressive in nature, both in denotation and in terms of the means by which they compose with other content; they must, of course, also yield the intuitively correct meanings. Further, the result of semantic composition must be able to support analysis of the rational use of honorifics and politeness markers in communication. The proposals of Potts and Kawahara (2004) and their followers do not appear to fully satisfy these criteria, for they equate honorific content with emotive attitudes, which is intuitively odd, and further seems to give wrong results when input to game-theoretic analysis. Still, the notion of scales of politeness and the general notion of expressivity at play seem highly useful; I will take them as a starting point for my proposal, which is given in the next section.

4 Denotations and domains for honorifics

To give a semantics for honorifics it is first necessary to decide the domain of meanings over which they operate, and the kinds of effects which they have.

Iwasaki and Ingkaphirom Horie (1995) propose that politeness behavior in Thai operates along three dimensions: psychological distance, social distance, and formality. Psychological distance is the perceived interpersonal closeness of the discourse participants. Social distance is determined by the societal roles of the participants. Formality is determined by the situation of utterance together with the purposes and topic of the conversation. These three dimensions are obviously not completely independent, but for the purposes of the present paper I will treat them separately. The exact manner in which they interact is an empirical question too complex to address here.

These considerations prompt the use of denotations for honorific expressions which reference these three dimensions. I will thus take the domain associated with the semantics of honorifics to be a 3-tuple of intervals of the form [0,1].

(2) **Politeness domains.**
$\mathcal{D}_\varepsilon =_{df} \langle P, S, F \rangle, X \in [0, 1]$ for $X \in \{P, S, F\}$.

This essentially follows Potts (2007) but differs in two respects: (i) I assume a multidimensional domain for honorifics, and (ii) these dimensions, while real-numbered intervals as in Potts's work, inhabit the space between 0 and 1, as I take it that it does not make sense to have a negative degree of (e.g.) social distance. These two differences entail that honorific denotations are distinct from what is found in the emotive domain of e.g. expressive adjectives, which was shown to be desirable in the previous section.

How is one to determine which level of speech to use? Here, the three factors above come into play. Iwasaki and Ingkaphirom Horie (1995) indicate a number of different ways in which the appropriate speech register can be determined for a particular utterance. The simplest are what they call 'preset' registers, which are completely determined by a social situation. These can be separated into classes

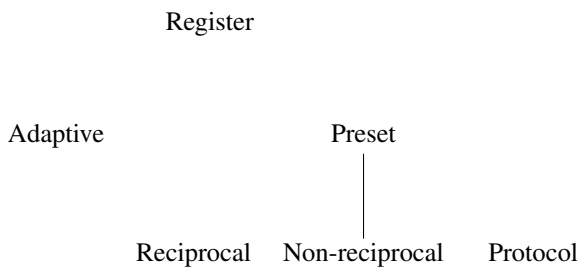

Figure 4: Types of register (I&IH 1995).

as in Figure 4. Here, reciprocal registers are those in which both participants have roughly the same status, so it is appropriate for them to use the same forms, as when close friends meet in an informal setting; non-reciprocal registers are those in which such is not the case, as the interaction of a boss and her employee. Protocol registers arise in formal situations in which a particular register – ordinarily a formal one – is required. Finally, adaptive registers are those in which the proper degree of politeness must be negotiated among the discourse participants.

To analyze register, I will make use of the notion of discourse context. In semantics and pragmatics, contexts are often taken to be sets of worlds or other elements, as with the sets of attitudes utilized by Potts (2007) and discussed above. For honorifics, I will take contexts to simply indicate the formality of the current discourse situation. Situations can be distinguished in terms of formality at an extremely fine-grained level, so they should be analyzed using continuous techniques; I take this to mean that they too should be viewed as subintervals of [0,1]. The exact range of a given context is determined by the three factors mentioned above. So contexts C have the form $\langle P, S, F\rangle$, where each of these elements is a subinterval of [0,1]; but it does not seem to be the case that honorifics directly reference these factors in general. My use of a formal first person pronoun may relate to psychological or social distance, or to the formality of the speech situation.[7] Given this observation, it seems that honorifics need to reference only a single range of values, so a single range must be derived from the context. This can be done as follows, yielding a notion of 'global register' $\mathcal{R}$. Here, $min(C) =_{df} min(\pi_1(C)) + min(\pi_2(C)) + min(\pi_3(C))$, and $max(C)$ is the corresponding function for the upper bounds of the intervals in C, where *min* and *max* are functions picking out the upper and lower bounds of intervals $[i, j]$, respectively.

(3) **Global register.**
$\mathcal{R} =_{df} \left[\frac{min(C)}{3}, \frac{max(C)}{3}\right]$, for $C = \langle P, S, F\rangle$.

Thus the appropriate level of formality for a discourse context is derived from the interpersonal and social distances of a context and its formality, and is itself a subinterval of [0,1]. Here I have given all the same weight; whether this formula needs to be made more complex is an empirical question, and likely differs from culture to culture. It is simple to adjust if such is required.

With the above, the discourse context specifies an interval corresponding to a formality level. But how should this tie to the use of the honorifics themselves? In §2, expressions with honorific content – particles and pronouns – were separated into three general levels of politeness: low, mid, and high. I will therefore define intervals corresponding to those, as follows.

(4) a. High $\sqsubseteq [.6, 1)$
b. Mid $\subseteq [.3, .7]$
c. Low $\sqsubseteq [0, .4]$

Note that the categories overlap: High and Mid share [.6,.7] and Mid and Low share [.3,.4]. The reason is that these forms are compatible: it is possible to use High and Mid forms together, and the same is true for Low and Mid forms. However, doing so indicates a relatively specific degree of formality. The use of Mid and High forms together means that, while the speaker does not take the context to be an extremely formal one, it is still relatively formal. This suggests that honorific use ought to be tied closely to speaker assumptions about the nature of the discourse context, which appears correct.

Now we are ready to consider the denotations and discourse effects of the honorifics themselves. I will take honorifics to denote subintervals of $\mathcal{R}$, higher

[7] This may not hold for all politeness expressions, but I will assume it in this paper for simplicity. If it is false, for instance for certain kinds of honorifics which may directly reference the formality of a context without regard for the other elements, we need only allow honorifics to reference one or the other element of a discourse context as defined here.

intervals for more formal expressions, and lower intervals for less formal ones. The context will determine whether a given expression is appropriate or not. Since these denotations are expressive, appropriateness cannot be stated in terms of truth, but rather must involve conditions of use. I follow Gutzmann (2012) in taking use-conditional judgements to involve two values, '√' and '×', indicating appropriateness and inappropriateness respectively.

(5) **Appropriateness for honorifics**.

$$\text{Utter(S) in } C = \begin{cases} \surd \text{ if } Hon(S) \sqcap \mathcal{R} \neq \emptyset \\ \times \text{ else} \end{cases}$$

The above says that an utterance of a given sentence is honorific-appropriate if its honorific level is compatible with the global register. This seems right, but requires the derivation of a sentence's honorific level. Recall that the use of multiple honorific expressions in a sentence gives a different result from using a single one; this means that honorific levels must be fairly nuanced, but still derivable from the honorific levels of the expressions involved. However, since denotations are expressive, we need not worry about interactions with semantic operators (Potts, 2007). Thus it will be sufficient to take the average of all expressions used in the sentence, with the proviso that their denotations also be compatible (in order to rule out illicit combinations). This last condition serves to implement an observation made by (Iwasaki and Ingkaphirom Horie, 1995), according to whom high and low-level items cannot be used together, though combinations of high- and mid-level items are possible, as are combinations of and mid- and low-level items. This is predicted in the present theory, as only adjacent speech levels have non-empty intersections.[8] (6) defines the honorific level of a sentence with n honorifics.

(6) **Honorific level of a sentence.**
$Hon(S) = \left[\frac{min(1)+\cdots+min(n)}{n}, \frac{max(1)+\cdots+max(n)}{n}\right]$
if $Hon_1 \sqcap \cdots \sqcap Hon_n \neq \varnothing$, else 0.

[8]Interestingly, Thai behaves differently from Japanese in this respect; in Japanese, such things are common, though they have special discourse effects (Asher and McCready, 2013). I have to leave the reason for this difference for future work. I should also note that combining nonadjacent levels is possible for particles in at least the case of *wá* together with *khráp/khá*, which is interpreted as an attempt to curse or be aggressive toward someone while still being polite (U. Tawilapakul, p.c.).

The above seems a reasonable characterization of how the appropriateness of a given honorific will be determined. If the context is formal, use of an extremely informal pronoun will be inappropriate; in the context of casual speech among friends over drinks, extremely formal pronouns will sound very unnatural. I will give more detail in section 5 in conjunction with the semantics of particular honorific items in Thai.

This proposal also is able to account for changes in honorific use over the lifespan of a conversation or long-term social interaction. It is well known that, in many social situations, one tends to begin speaking formally and then move to informal speech. This is reflected in the use of honorifics: often, formal pronouns and other markers are initially used, and then at some point speakers jointly move to the use of informal markers.[9] In the present context, it corresponds quite simply to a change in the parameters comprising C: as the measure P of interpersonal distance becomes smaller, a corresponding diminishment of the value of $\mathcal{R}$ occurs, given sufficiently low values for F and S (i.e. a context which does not automatically specify formal speech). Honorific use thus depends on external, social, parameters in the expected manner.

One issue has been left unaddressed. While ordinarily changes in speech level are determined by the external context (or so the model above has it), it is also the case that the use of honorifics can impact the formality level of the discourse continuation. Specifically, there are points at which it is obvious that the speech level should be changed; but sometimes the use of an informal form causes a switch to an informal level, although if the informal form had not been used, the level would not have changed. This is a kind of performative effect and should be captured by the semantics. However, at present the semantics simply assumes that the level of the honorifics is checked against the context, and makes no provision for honorific-induced context change.

In the present theory, this observation can be

[9]This situation has been analyzed by (McCready et al., 2013) for the binary *tu-vous* distinction on second person pronouns common in European languages, and for a Japanese honorific pronouns by (Asher and McCready, 2013), using the tools of infinitely repeated games and topological analysis of strategy complexity.

made more concrete. Suppose that a sentence S with politeness level $Hon(S)$ is used in context C with register $\mathcal{R}$. Then two cases arise. In the first, $Hon(S) \sqcap \mathcal{R} \neq \varnothing$. In such a situation, S is deemed appropriate. The discussion so far has focused on case 1. In case 2, $Hon(S) \sqcap \mathcal{R} = \varnothing$. Here, use of S is inappropriate. But the use of S can also serve as a proposal to modify the context to one in which S would be appropriate after all. In essence, the use of S aims to move $\mathcal{R}$ upward or downward in a way that makes $Hon(S)$ an appropriate honorific level.

How should this process be modeled in the formal theory? One option is to allow honorifics to modify the context directly and dynamically via their use. For instance, a use of *khráp* could be taken to preemptively change the context to a formal one, irrespective of what it was formerly. However, this view would seem to obviate the analysis so far, in that the definition in (5) would become obsolete; since the use of *khráp* would change the context to one in which *khráp* was appropriate, we no longer have any means to model inappropriate use of honorific elements.[10] Instead of allowing such extreme changes, I will model honorifics as proposals to change the context in an incremental manner, if they were originally inappropriate.

The basic idea is to take honorifics to, as before, denote subintervals of [0,1], which are checked for compatibility with the register currently specified by the context. However, the performative character of honorifics functions as a proposal to change the register to one compatible with the honorific level. Thus, use of a formal particle like *khráp* proposes raising the level of formality, and a particle indexing casual speech like *wóoy* proposes lowering the register. But this register shift cannot be completely unrestricted, as discussed in the previous paragraph. It should be tied to the current formality of the context. I propose the following shift, where $C[(S)]_H$ signifies 'honorific update' of the current register with the honorific content of a sentence, C' is the register arrived at after such update.

(7) **Dynamic registers.** $C[(S)]_H = C'$, where

$$C' = \begin{cases} C \text{ if } C \sqsubseteq Hon(S) \\ \left[\frac{min(C)+Hon(S)}{4}, \frac{max(C)+Hon(S)}{4}\right] \text{ else} \end{cases}.$$

[10] Of course, external constraints could be placed on the update mechanism, but this seems inelegant.

This formula simply averages the honorific content of the current with the elements of the current context unless the honorific content is less specific than the current context. Note that this generalizes the proposal of (Potts, 2007), who allows only restriction to subintervals in the emotive case. In case of change, each of the four elements are given equal say in the ultimate register. This is the simplest option, which can of course be weighted as required by empirical observation, as with (3). Note that this is a proposal, which can be rejected by the hearer, just as with other update operations (Stalnaker, 1978; McCready, 2014). The result of this operation is used to check the appropriateness of an utterance via (5). Some detailed derivations will be provided in §5.

With all this in place, we can provide a semantics for the Thai honorifics discussed in section 2.

5 Semantics for Thai honorifics

The aim of this section is to provide a semantics for the Thai politeness particles, first person pronouns, and second person pronouns. In this paper, I will not examine the details of semantic composition with these terms, or provide detailed sentential derivations. However, I will outline lexical entries for them which can be used in semantic derivations.

From the perspective of composition, the particles are the simplest case. They can be subdivided into categories along two dimensions: the degree of formality they introduce (cf. Figure 1), and whether their use indicates the gender of the speaker. As for the second dimension, *khráp* and *khá* are interchangeable in terms of formality but indicate masculinity and femininity respectively, while the informal particles are generally taken to be masculine in quality. This last, however, appears to be defeasible: like the Japanese *zo* and *ze*, these particles indicate aggression or forcefulness, qualities generally taken in Japanese and Thai society to be masculine; these particles are indeed sometimes used by women, which is not the case for e.g. *khráp*. I thus take the gender implications of *wá* and *wóoy* to be conversational implicatures (Grice, 1975). With these assumptions, we arrive at the following lexical entries. Here t^s is an expressive type somewhat more general than Potts's (2007) ε, and s_c denotes

the speaker of the current context (Kaplan, 1989).[11] I have capped the register associated with ⟦*khráp*⟧ at 0.9 due to the existence of the even more formal masculine particle *khrápphǒm*.

(8) **Semantics of Thai politeness particles:**

a. $[\![khráp]\!] = (Hon = [.6, .9] \wedge masc(s_c)) : t^s$

b. $[\![khá]\!] = (Hon = [.6, 1) \wedge fem(s_c)) : t^s$

c. $[\![há]\!] = (Hon = [.3, .7]) : t^s$

d. $[\![wá]\!] = (Hon = [0, .4]) : t^s$

The pronominals are more complex, as they are instances of what McCready (2010) calls *mixed content*. Mixed content bearers are expressions which introduce both expressive and ordinary truth-conditional content. Clearly, the pronouns are expressive, as they encode politeness (and also gender); equally clearly, they have at-issue content, for they participate in composition by providing discourse referents and arguments for verbs. We thus must use mixed types to give their denotations; mixed types are formed by forming ordered pairs of standard at-issue types σ^a and types for expressive content σ^s, which correspond to mixed terms in the meaning language formed with the operator '◆'.

In this setting, first person and second person pronouns have denotations of the following kind. Here a_c denotes the addressee of the current context.

(9) **Semantics of Thai first person pronouns:**

a. $[\![kraphǒm]\!] = s_c◆(Hon = [.8, 1) \wedge masc(s_c)) : e^a \times t^s$

b. $[\![phǒm]\!] = s_c◆(Hon = [.6, .9] \wedge masc(s_c)) : e^a \times t^s$

c. $[\![chán]\!] = s_c◆(Hon = [.3, .7]) : e^a \times t^s$

d. $[\![kháw]\!] = s_c◆(Hon = [0, .3] \wedge fem(s_c)) : e^a \times t^s$

(10) **Semantics of Thai second person pronouns:**

a. $[\![khun]\!] = a_c◆(Hon = [.6, 1)) : e^a \times t^s$

b. $[\![tua]\!] = a_c◆(Hon = [.3, .7] \wedge fem(s_c)) : e^a \times t^s$

c. $[[mɯŋ]] = a_c◆(Hon = [0, .4]) : e^a \times t^s$

Let us work through several examples. The first, a naturally occurring example, is taken from (Iwasaki and Ingkaphirom Horie, 1995) and is made by a male speaker in a formal context.[12] The expressions with honorific content are in boldface.

(11) **phǒm** kʰɔ mây sâap ná **kháp**
1P.M.Hon FP Neg know PP PolP.M

'I don't know either.'

In this example, the politeness markers used are *phǒm* and *kháp*, which both mark formal speech. I have taken the former to indicate $Hon = [.6, .9]$ and the latter to also indicate $Hon = [.6, .9]$. Thus, the two together yield $Hon(S) = [.6, .9]$ given the formula for calculating the politeness of a sentence in (6). As indicated above, the context in which this sentence was used was a formal one (a communication between parent and teacher), which can be somewhat arbitrarily assigned the register value [.6,.8]. Since the intervals [.6,.9] and [.6,.8] overlap, the sentence is predicted to be appropriate, which is correct. Further, use of this sentence will have an effect on the register value via the formula in (7); in the absence of detailed information about C, we can duplicate the $\mathcal{R}$ value three times for the input to (7), giving the result in (12). Thus, the use of the rather polite forms in (11) brings up the contextual level slightly, as expected given that the speaker in this exchange indicates a willingness or even desire to be highly polite.

(12) $\mathcal{R}' = \left[\frac{.6+.6+.6+.6}{4}, \frac{.8+.8+.8+.9}{4}\right] = [.6, .825]$

The second example, taken from (Iwasaki and Ingkaphirom, 2005), mixes distinct speech levels. The first person pronoun *chán* is a mid-level marker, but the particle used, *wá*, marks casual speech. Note that this example is produced by a female speaker, showing that *wá* is not directly tied to masculinity.

[11] It is open to question whether one ought to use ε-types or simple conventionally implicated truth values; Geurts (2007) brings the distinction into question. One could also ask whether the correct type is t^s or the shunting-type version t^s is to be preferred given that the former option is chosen; here, I have chosen the latter option for consistency with the system needed for the mixed types used for the pronominals. I do not think the difference matters much otherwise for the purposes of this paper.

[12] Here *ná* is a pragmatic particle of the kind studied by (McCready, 2008; Davis, 2009) and *kɔ̂* is a focus particle.

(13) **chán** kô é, lɤ̆ man pen lekhăa dûay **wá**
I LP Exc or 3P Cop secretary also PolP
'I was wondering 'Huh? Is she also his secretary?'

The first person pronoun has content $Hon = [.3, .7]$; the particle indicates that $Hon = [0, .4]$. (6) requires the two to be averaged together, yielding [.15,.55]. This sentence is therefore compatible with both casual and mid-level situations given the setting of speech levels in (4). When used in an informal setting, it will raise the contextual level slightly, but when used in a mid-level setting, it will lower it, given the dynamic operation in (7).

The final example involves multiple sentences. Consider the following short discourse, also from (Iwasaki and Ingkaphirom, 2005). The setting is a casual exchange between male friends.

(14) a. A: pen ŋay **m**ɯŋ
Cop how 2P.Inf
'What's up?'
b. B: yêɛ **wà**
terrible PolP
'It's terrible!'

A and B both use items appropriate only in contexts with low formality. Both *m*ɯŋ and *wá* indicate that $Hon = [0, .4]$; but, given that the speakers are already good friends, it is highly likely that the level of formality of the discourse context already does not contain anything as high as 0.4 anyway. Given that, (7) requies the contextual level of politeness to be kept at its more specific current level.

6 Conclusion and extensions

The denotations of honorific expressions are a longstanding yet mostly unaddressed problem in linguistic theory. This paper has proposed a solution using tools from formal semantics and pragmatics. According to it, honorifics have a dual function. They indicate a degree of politeness, which is checked against the external context for appropriateness. Simultaneously, if the level of formality in the external context is distinct from the degree the honorific indicates, the honorific works as a proposal to shift the context to a new degree consistent with the linguistic expression. This theory builds closely on the work of Potts and Kawahara (2004), but improves on it in both theoretical and empirical respects.

There are many avenues for future work. The most obvious is empirical. The range of expressions treated can be extended even within Thai; I have not considered other sorts of terms which can be used to mark levels of formality, such as language used specifically for the royal family, or the various non-pronominal ways in which people can be addressed (nicknames, kinship terms, etc.). It will also be useful to consider other languages. Japanese has a highly articulated system of honorification which shares some characteristics with the Thai system, but also has extensive honorific verbal morphology which Thai lacks (Kikuchi, 1997). Another obvious language to consider is Javanese, which is well-known for having an extensive system of expression which carry honorific information.

Many other formal extensions are likely to be necessary. One is already brought out by example (14): different agents must be associated with different levels of formality. As things stand, the context is taken to indicate a single range of possible values for politeness expressions, but I have already mentioned that every agent need not speak at the same level of formality; in fact, one of the most common situations in honorific use involves non-reciprocal uses where the social roles of the agents are asymmetric, as with teacher and student, or boss and employee (cf. Figure 1). Every conversation should therefore make use of at least two distinct contextual representations, something already expected from formal pragmatic work on context (Gunlogson, 2003). Still more will be required when conversations involve more agents; ultimately, it is likely that contexts as described here must be lifted to context sets, where each agent is associated with a distinct context, and such contexts represent each agent separately.

At the beginning of the paper, I indicated that one motivation for this project is to bring game-theoretic tools to bear on the analysis of honorification; this is another issue for future work. An interesting question here is the way in which manipulation of honorific parameters helps agents to achieve their goals, especially in terms of the analysis of face threats (Brown and Levinson, 1987). For the present analysis to help here, it must be clarified how the parameters referenced by honorifics contribute to decision-

making and the satisfaction of requests through the expression of factors like closeness and deference. There is a great deal of work to be done here, but it is likely that existing sociolinguistic analysis can be of significant help in this area.

A final area of extension is the analysis of discourse-level politeness strategies as studied by (McCready et al., 2013; Asher and McCready, 2013). This line of work uses the topological analysis of infinite games to help understand the complexity of available politeness strategies. This work is useful but up to now has lacked formal underpinnings for the (intuitively correct) strategies it considers, a gap which the present work can rectify. However, it remains to be seen how compatible the continuous operations used by the present approach will be with the analysis of infinite games, where the move from a finite (even countable) alphabet to an uncountable one substantially increases the complexity of the resulting topology.

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