CONTRIBUTIONS OF LEXICAL AND PROSODIC FACTORS TO
THE PERCEPTION OF POLITESS

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ABSTRACT
Relative contributions of the two sources of politeness, namely sentence final particle and overall intonation contour, were measured with a paired-comparison procedure, using three distinct age groups of Kumamoto Japanese as subjects.

Application of ANOVA revealed that the effects of the two factors were highly significant, making statistically independent contributions to the perception of politeness. At the same time, an age-related difference of perception was found out: younger subjects tend to rely more upon intonation than the particle, whereas middle-aged subjects rely more upon the particle. This is most presumably due to an ongoing linguistic change of the particle system in the material language. Finally, a mechanism for the perception of intonational politeness is presented.

1. INTRODUCTION
Politeness, or the verbal expression of social relationship between the speaker and hearer, is an important element of our verbal behavior[1]. Although the previous studies of politeness concentrated mostly on the analysis of text, i.e. the choice of lexical items and their arrangement, it is widely acknowledged that prosody plays a crucial role in the manifestation of politeness. Perceived politeness of a text differs widely depending on the characteristics of the accompanying prosody like duration, pitch and so-called voice quality. Unfortunately, however, scientific study of the relationship between the two sources of politeness has been rarely undertaken.

In the rest of this paper, I will report the results of a perception experiment that was designed to clarify the following research questions: does prosody change the perceived degree of perceived politeness, and if so, how much?

2. KUMAMOTO JAPANESE
Kumamoto Japanese (KJ), a regional variety of Japanese spoken in Kumamoto prefecture in Kyushu Island, was chosen as the target language of the experiment. KJ is one of the main dialects of Kyusyu area and has two obvious advantages over Standard Japanese (SJ) as the material of the current experiment.

2.1 Intonational characteristics
KJ is known to be an ‘accentless’ dialect, a dialect that has no specification of pitch accent at the level of the lexicon. Moreover, the intonation of KJ has a so-called ‘wandering H’ tone; the H tone that marks the pitch peak of an accentual phrase can be aligned to any of the constituent syllables of the phrase [2]. Consequently, KJ’s intonation contour has much a higher degree of freedom than SJ’s, whose intonation is determined largely by the choice of lexical items[3]. At this point, it is important to note that the pragmatic factors that govern the alignment of the H tone have not been fully examined, but some speakers of KJ reported to me that the politeness of an utterance can vary considerably according to the location of the H tone. Figure 1 shows an example of the tone structure of a simple KJ utterance consisting of one accentual phrase.

![Figure 1. Tone structure of one accentual phrase utterance in Kumamoto Japanese. ‘Wandering H’ can be aligned to any syllable, but when it is aligned to the last syllable, accentual phrase final L tone is deleted (See section 3.1.3)](image)

2.2 Question particles
Secondly, KJ has a highly developed morphological system of hororifics, and can make a finer distinction of the degrees of politeness than SJ. With regard to the current experiment, it is important to note that KJ has three sentence-final question particles, to, na and ya, whose choice is determined mostly by reference to the formality of the utterance.

According to the description of particle usage by traditional KJ speakers, the rank order of the three particles in terms of their politeness was na > to > ya in descending order[3]. However, in the urban area of the city of Kumamoto where the current experiment was conducted, younger speakers have a different ordering. Roughly speaking, KJ speakers in their forties or younger feel that to is the most polite.

3. EXPERIMENT
3.1 Material
3.1.1 Text A WH-question sentence of /dore ni noboru/ (Which one do you want to climb up?) was used as the text. There are two reasons for using a WH-question as material. First, the prosodic structure of WH-questions was examined extensively in a preceding study [2]. Second, a question utterance is good material for the current experiment, because we naturally pay attention to the politeness of utterance when we ask something of the listener.
3.1.2 Particle The 3 question particles mentioned above were used to control the lexical politeness of utterances. This results in three sentences differing only in the sentence final particles: /dore ni noboru to/, /dore ni noboru na/, and /dore ni noboru ya/.

3.1.3 Intonation Six intonation contours shown in Figure 2 were used as the levels of the prosodic factor of politeness. The three sentences described above can be uttered naturally with any of these intonation contours.

Three contours marked as EF, LF, and SF are characterized by the presence of final lowering, whereas other three contours, ER, LR, and SR, are characterized by final rise (Note that in Japanese a question is not necessarily associated with final rising, especially when a question particle is used). These two final pitch renditions were abbreviated as F and R respectively.

The top two contours share the feature that they have an early peak (abb. E). The ‘wandering H’ is aligned to the first syllable (/do/). The contours in the middle two rows share the feature of a relatively late peak position (abb. L). The ‘wandering H’ is aligned to the penultimate and last syllables in LF and LR respectively. At this point, it is important to note that the contour LR is special in that it was generated by the application of a tone deletion rule.[2] KJ’s tone structure has the restriction that no more than three tones can be associated to a syllable. If, occasionally, three tones collide in one syllable, the intermediate tone is deleted, viz., T1T2T3 => T1T3. Since, in KJ, the last syllable of an utterance is always associated with accentual phrase-final L and an utterance final boundary tone (either L% or H%), the deletion is applied whenever the ‘wandering H’ is aligned to the last syllable. In the case of contour LR, the accentual phrase final L is deleted and yields the sequence of HH%.

Lastly, the contours in the bottom two rows are the ones generated by tone spreading (abb. S). In these contours, the tone of the first syllable is copied to all the following syllables and yields a literally ‘flat’ contour up to the left edge of the last syllable, where the pitch begins to rise or fall depending on the value of boundary tones.

3.1.4 Recording A middle-aged male speaker of KJ pronounced the three sentences in six intonation contours repeatedly in a sound-proof room. Utterances that showed typical prosodic characteristics in terms of their intonation contours were selected as the speech stimuli. Also, care was taken so that 18 stimuli (3 sentences by 6 contours) had nearly the same duration. But as can be seen in figure 2, R contours are slightly longer than the corresponding F contours.

3.2 EXPERIMENTAL PROCEDURE The perceived politeness of the 18 stimuli were measured by a paired comparison procedure. All possible combinations of two stimuli (16C2 = 306) were presented to subjects in a randomized order. The subjects were asked to decide which one of the two stimuli was more polite than the other. Two successive pairs were separated by a 2.5-second interval followed by a 500ms gaussian noise. One minute breaks were inserted each time 50 pairs were presented. The total time required for the experiment was about 35 minutes.

The subjects were recruited in the city of Kumamoto. They were recruited so that they formed three groups differing in age: junior high school students (N=50), college students (N=29), and adults who are working (N=20). After the experiment, they completed a short questionnaire about the three particles. For
each of the three particles, subjects were asked to choose from A) I usually use it, B) I don’t use it but hear somebody use it, or C) I’ve never heard it.

4. ANALYSES

Subjects were screened using the questionnaire data. Those subjects who responded C) to any question were excluded. Some other subjects were screened out because they were born or had spent more than five years in an area where KJ is not spoken. Table 1 shows the distribution of the resultant subjects’ age in the three groups, and Table 2 shows the resultant subjects’ response pattern to the questionnaire. Table 2 shows that *na* is becoming rapidly an obsolete particle among younger subjects.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td>14</td>
<td>49.6</td>
<td>8.5</td>
</tr>
<tr>
<td>College student</td>
<td>21</td>
<td>20.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Junior high school</td>
<td>25</td>
<td>14.0</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Table 1. Mean age and S.D. of subjects in the three age groups after screening.

<table>
<thead>
<tr>
<th>Group</th>
<th>Particle</th>
<th>A)</th>
<th>B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult</td>
<td><em>na</em></td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td><em>to</em></td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td><em>ya</em></td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>College students</td>
<td><em>na</em></td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td><em>to</em></td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>ya</em></td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Junior high school</td>
<td><em>na</em></td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td><em>to</em></td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>ya</em></td>
<td>13</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 2. Resultant subjects’ response to the questionnaire. A) “I usually use it”. B) “I don’t use it but hear somebody use it”.

Figure 3 show the normalized score of politeness as a function of intonation contour (abscissa) and particles (three lines). Normalized score was defined as the total number of wins divided by the total number of the presentation of one stimulus in each age group. Thus the score 1 means that the stimulus in question won in all the N*17 comparisons, and conversely, score 0 means that the stimulus lost in all comparisons. Note that on the abscissa, the intonation contours were arranged so that steadily lowering lines could be obtained. The arrangement is the same for all panels.

It is obvious from the figure that both intonation and particle had their effects on the politeness score. Table 3 shows the results of the Particle vs. Intonation two-way ANOVA. Here, it is important to note that the application of ANOVA to the data obtained by paired-comparison requires attention, because, in this procedure, two paired stimuli, say A and B, are judged simultaneously. If A is judged to be more polite, it implies that B is less polite. This means that the two judgments are not statistically independent. Therefore ANOVA was applied only to the judgments on the first elements of all pairs, namely the "A" element in the above example. Note, however, that this is a completely balanced experimental design, except for the order of presentation.

Table 3 shows that the effects of Intonation and Particle were statistically highly significant (P<.001) in all age groups (top 2 rows), and there was no significant interaction between them in any group (the 3rd row).

However, the responses of the three age groups are not completely identical. There is an age-related difference in the relative importance of particle and intonation. In Figure 3, we see that the effect of particle choice (i.e. the distance between the top and bottom lines) is greater in the adult subjects’ group than in the other two groups. Moreover, the effect of intonation, i.e. the distance between the highest and lowest points in a given line, is
larger in two younger subjects’ groups than in the adult subjects’ group. Close examination of the figures reveals that, in the college and junior high school students groups, the line for particle to showed a larger difference of height than the other two lines, while the three lines ran nearly parallel in the adult subjects’ group.

Table 3. Results of two-way ANOVA shown separately for the three age groups.

<table>
<thead>
<tr>
<th>Source</th>
<th>Adult subjects</th>
<th>College students</th>
<th>Junior high school students</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS</td>
<td>DF</td>
<td>MS</td>
<td>F-ratio</td>
</tr>
<tr>
<td>Intonation</td>
<td>2.178</td>
<td>5</td>
<td>0.436</td>
</tr>
<tr>
<td>Particle</td>
<td>4.307</td>
<td>2</td>
<td>2.154</td>
</tr>
<tr>
<td>Int * Ptcn</td>
<td>0.267</td>
<td>10</td>
<td>0.027</td>
</tr>
<tr>
<td>Error</td>
<td>13.970</td>
<td>288</td>
<td>0.049</td>
</tr>
</tbody>
</table>

Table 3. Results of two-way ANOVA shown separately for the three age groups.

5. DISCUSSIONS

5.1 Age-related difference of politeness perception

Most probably, the age-related difference of politeness perception is a reflection of an ongoing linguistic change of the question particle system in KJ. As noted in section 2.2 and verified in table 2, na is rapidly becoming an obsolete particle among younger KJ speakers. Young KJ speakers judged na to be less polite than to, because for them na is an old word used by aged people thus sounding dialectal and vulgar.

The decline of na can be confirmed in Figure 4 which compares the mean politeness scores of the particle na relative to that of to, whose value is set to 1.0. In this figure, the data from 7 new adult subjects is shown as “aged adult” group. These subjects were recruited after the current experiment was completed and were older (mean age 56, S.D. 2.9) than the current adult subjects. The relative score of na is positive only in the new group, and becoming less and less polite as subjects become younger.

To verify this effect, a three-way ANOVA of Age vs. Intonation vs. Particle was carried out based on the current data consisting of three age groups. The sole significant interaction was found between Age and Particle (SS=976, DF=4, MS=.243, F=4.484, P<.001). This strongly supports the interpretation of age-related difference presented above. Note also that Age was not significant as a separate factor.

5.2 Perception of intonational politeness

There is one important problem that has been left untouched in this study, namely the mechanism by which intonation influences perceived politeness. Formerly, I presented a tentative model of the mechanism [5], in which the rank order of the perceived politeness was predicted. Although this model was built based on the data of the adults and college students only, there seems to be no need of fundamental remodelling.

In this model, the politeness of a given intonation contour is computed based on the location of the last intonational prominence and its magnitude. Later prominence and larger magnitude result in higher politeness. Contours ending in rising rendition are more polite than the falling counterparts because in the former contours the prominence is at the end of utterance. But LR is less polite than ER and SR because the magnitude of final rise is less prominent in LR than ER and SR. On the contrary, LF is the most polite of the three falling contours, because LF’s prominence location is the closest to the utterance end. Finally, SF is the least polite of all, because it has no clear prominence at all. The rank order of politeness predicted by the model is ER>SR>LR>LF>EF>SF, which agrees, by and large, with the orders observed in Figure 3.

6. CONCLUSION

To recapitulate, this study confirmed the effect of intonation upon the perception of politeness and its independence from the effect of the lexical factor. At the same time, it was found that the effect of particle can be different depending on the age of subjects. This is presumably because of the ongoing linguistic change of the particle system.

ACKNOWLEDGMENTS

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