

PITCH STEREOTYPES IN THE NETHERLANDS AND JAPAN

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ABSTRACT

Dutch and Japanese female speakers were presented at three pitch levels (low, original, high) to Dutch and Japanese male and female listeners in order to make a cross-cultural comparison of pitch stereotypes. Low pitch was cross-culturally associated with *large, strong, male-like, adult, independent, and arrogant*. High pitch was associated by the Dutch listeners, but not by the Japanese listeners, with *low prestige*. Finally, original pitches were found more *attractive* than either high or low pitches.

INTRODUCTION

Pitch is universally related to sex, women having higher pitched voices than men, and to age, children having higher pitched voices than adults. These relationships can to a large extent be explained in terms of concomitant differences in body size. Body size affects the dimensions, mass, and shape of the larynx, which in turn determine the ensuing pitch: pitch tends to be higher as the vocal cords are shorter and thinner. The relationship between body size and pitch is found not only among (categories of) humans but among other species as well: bears growl, mice squeak. According to Ohala's "frequency code" [1] there would exist a cross-cultural, cross-species form-meaning correspondence, by which low pitch is associated with physical size (tall and strong), and, by extension, with personality attributes such as aggressive, assertive, self-confident, dominant, self-sufficient, etc., and by which high pitch is asso-

ciated with the opposite attributes. This hypothesis has not been tested. The present study examined the cross-cultural consistency of pitch stereotypes related to the frequency code in the Netherlands and Japan.

The Dutch and Japanese cultures were chosen because of the higher pitch which has been found to characterize young Japanese women as compared to Caucasian (American, Western European, Australian) women [2,3]. This difference in pitch has been tentatively explained by assuming the influence of sociocultural factors on pitch. The underlying assumption is that speakers adapt their pitch setting, probably largely unconsciously, so as to approximate vocal images reflecting socio-culturally desired personality attributes. Personality characteristics such as modesty, innocence, domesticity, subservience, and helplessness, according to the frequency code associated with high pitch, are traditionally more highly valued in women in Japanese culture than in Western culture [4]. Young Japanese girls and women might raise their pitch to conform to cultural stereotypes and to project the desired attributes.

In our study eight Dutch and eight Japanese female speakers were presented each at three pitch levels (low, original, high) to Dutch and Japanese male and female listeners to be rated on seven scales derived from Ohala's ideas, namely *short - tall, weak - strong, female-like - male-like, childlike - adult, dependent - independent, modest - arrogant, and low prestige - high prestige*. Assuming a universal basis of

the frequency code, we hypothesized that both the Dutch and Japanese listeners would associate high pitch with the attributes named first and low pitch with the attributes named second (weak hypothesis). More stringently, we expected significant contrasts between all three pitches in the same direction (strong hypothesis). No interactions were expected between pitch and culture of speaker, nor between pitch and culture/sex of listener.

In addition, the scale *attractive - unattractive* was included to examine the subjective evaluations of different pitches in the Netherlands and Japan. We predicted an interaction between pitch and culture of listener in the sense that Japanese listeners would find high pitch more attractive than Dutch listeners. This outcome would fit in with the differences in sex roles in Japan and the Netherlands described above.

METHOD

Eight Dutch and eight Japanese women were selected as speakers; all were highly educated. The mean ages (ranges in parentheses) for the two groups were 33 years (20-48) and 29 years (21-42), respectively. The mean heights were 166 cm (161-171) and 163 cm (155-174). The differences in age and height, tested by means of *t*-tests for independent samples, were not significant at the 5% level.

All speakers read out the same neutral narrative text, the Dutch speakers in Dutch and the Japanese speakers in Japanese. Of each recorded speech sample three pitch versions were made: low, original, and high. The three versions were identical in all respects (tempo, intonation, pronunciation, etc.), except for the mean fundamental frequency. The pitch manipulations were carried out using the PSOLA (Pitch Synchronous Overlap and Add) technique [5]. To obtain the high and low pitch versions, the origin-

al pitches of the speakers were uniformly raised and lowered by .65 ERB [6]. The average pitches in the three pitch versions were 150 Hz (low), 180 Hz (original), and 212 Hz (high) for the Dutch speakers, and 155 Hz (low), 185 Hz (original), and 218 Hz (high) for the Japanese speakers.

The 8 (speakers) x 2 (cultures) x 3 (pitch versions) = 48 speech samples were presented to 30 Dutch subjects, 15 male and 15 female students at the University of Nijmegen, and 30 Japanese subjects, 15 male and 15 female students at Dokkyo University. Subjects rated each speech sample on eight seven-point scales, either in Dutch or Japanese: *short - tall, weak - strong, female-like - male-like, childlike - adult, dependent - independent, modest - arrogant, low prestige - high prestige, attractive - unattractive* (from now on the scales will be referred to by the attribute named second).

RESULTS AND DISCUSSION

The interrater reliability was assessed, separately for the Japanese and Dutch listeners and the Japanese and Dutch speakers, using Cronbach's alpha [7]. 28 out of the 32 coefficients exceeded .80. This means that the listeners agreed well on the distribution of the ratings over the stimuli, not only for in-group speakers but also for out-group speakers. The existence of vocal stereotypes for listeners and speakers speaking the same language has been evident since the 1930's [8]. However, evidence for listeners and speakers speaking different languages is still scarce. Scherer [9] found fair reliabilities for Germans rating American speakers but low reliabilities for Americans rating German speakers. Van Bezooijen [10], presenting Dutch speakers to British, Kenyan, Mexican, and Japanese listeners, obtained high reliabilities in all cultures for attributes similar to the ones examined in the

present study. However, attributes such as *reliability*, *sense of humor*, *openness*, *fairness*, and *attractiveness*, were rated less reliably in some or all of the cultures.

The factor pitch had a significant ($p = .0025$, namely .01/8 (the number of analyses)) main effect on all eight scales. There were no significant interactions of pitch with sex of listener, two of pitch with culture of speaker, and one of pitch with culture of listener. The two interactions with culture of speaker, pertaining to *male-like* and *unattractive*, were due to small deviations from parallelism and will be ignored. The interaction of pitch with culture of listener pertained to *prestige* and will be dealt with separately below.

In Table 1 the mean ratings for the three pitch levels and results of post hoc comparisons (Tukey's HSD) are given. For all seven scales derived from the frequency code the weak hypothesis (hw) was confirmed and for three the strong hypothesis (hs). It thus appears that the Dutch and Japanese listeners have identical associations of different pitch levels with speaker attributes in accordance with the frequency code. As expected, when speaking at a high pitch, speakers are cross-culturally perceived as less tall, less strong, less male-like, less adult, less independent, and less arrogant than when speaking at a low pitch. The perception of pitch is not obscured by listeners and speakers speaking different languages.

The only interaction between pitch and culture of listener, shown in Figure 1, pertains to prestige. The findings for the Dutch listeners are as expected: high pitch is associated with less prestige than low pitch. However, the expected effect is not found for the Japanese listeners, where high pitch seems to even raise prestige. The latter finding probably has to be placed within a more general framework of the

Table 1. Mean ratings for the three pitch levels. In the last two columns it is indicated whether the strong hypothesis (hs) and/or the weak hypothesis (hw) (see text) was confirmed (+) or rejected (-). These hypotheses were not formulated for unattractive.

	lo	ori	hi	hw	hs
tall	4.2	4.1	3.3	+	-
stron	4.8	4.5	3.7	+	-
male	2.7	2.1	2.1	+	-
adult	5.4	4.9	3.8	+	+
indep	4.8	4.5	3.6	+	+
arrog	4.2	4.0	3.4	+	+
prest	4.5	4.6	4.1	+	-
unatt	4.2	3.8	4.0		

role social prestige plays in the Japanese culture. The Japanese social structure is hierarchically structured to a high degree [11]. Pitch is one of the ways in which social differences can be signalled. Thus, the lack of prestige of Japanese women as compared to men has traditionally been reflected in high pitch. Although some changes have taken place in Japan in the direction of more western egalitarian principles, the pressure to conform to the traditional norms still seems to be high. It is not unlikely that in Japanese culture, with its emphasis on group behavior, conformation to norms may convey esteem and prestige. So, although high pitch may symbolize low status in a direct sense, it may in this case indirectly be associated with high status.

The scale *unattractive* was included to assess the subjective evaluation of pitch differences. There was an overall effect, with the original pitch of the speakers judged as the most attractive (see Table 1). If this effect is not due to artifacts of the pitch manipulations,

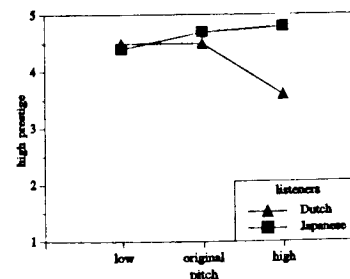


Figure 1. Interaction between pitch and culture of listener for prestige

it has to be concluded that both Dutch and Japanese people, either male or female, are content with the pitch Dutch and Japanese women have. This is a noticeable finding especially for the Japanese speakers included in the present study, as their original pitch was lower than generally reported in the literature. In the introduction we had hypothesized the Japanese listeners to find high pitch more attractive than the Dutch listeners. Of course, the Japanese people serving as listeners in this experiment were young and highly educated. Their ideas may be more oriented towards western egalitarian principles. Further research, with different subjects, may throw light upon this question.

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