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This study tested the hypothesis that people from different cultures would form different trait impressions based on the same vocal qualities and that cross-cultural experience would influence trait impressions through adaptive acculturation. Koreans in Korea, Koreans in the United States, and Americans served as subjects with American and Korean male speakers as targets. It was found that vocal loudness universally conveyed power. The effects of vocal rate and tenseness differed across cultures. A fast voice conveyed power and competence to Americans, but not to Koreans. Koreans in the United States converged with Americans in perceiving a positive relationship between vocal speed and the competence of American and Korean speakers. However, unlike Americans, they did not perceive a positive relationship between vocal speed and power. Koreans in the United States perceived a positive relationship between a tight voice and the power of both Korean and American speakers more so than Koreans in Korea did. These results are discussed within theories of ecological perception and linguistic accommodation.

THE IMPACT OF CULTURAL BACKGROUND AND CROSS-CULTURAL EXPERIENCE ON IMPRESSIONS OF AMERICAN AND KOREAN MALE SPEAKERS

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Individuals often form impressions of others based on their vocal characteristics. When we pick up the phone and hear "Hello," we may form certain impressions of the unknown person at the other end of the line even before we actually have any meaningful conversation. Such voice-based impressions cannot be attributed to the contents of what the speaker says, but rather reflect reactions to paralinguistic vocal qualities such as rate, loudness, and tenseness. This common sense observation is supported by numerous empir-

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ical studies investigating the relationship between vocal features and the perceived personality traits of the speakers (Brown, Strong, & Rencher, 1974; Montepare & McArthur, 1987; Robinson & McArthur, 1982; Scherer, 1979; Street & Brady, 1982; Street, Brady, & Lee, 1984). This phenomenon has been documented not only in Western cultures but also in some Eastern cultures (Lee & Boster, 1989; Montepare & McArthur, 1987).

Past studies suggest that some of the associations between vocal features and perceived traits are culturally universal, such as a tendency for loud voices to be associated with the impression of power or competence (Montepare & McArthur, 1987). Other associations seem to be culturally specific, such as a tendency for faster speakers to be judged as more competent by Westerners (Street, Brady, & Putman, 1983) but less competent by Easterners, although the latter effect held true only for impressions of male speakers (Lee & Boster, 1989).

These cultural differences can be understood within the theoretical framework of ecological perception (McArthur, 1988; McArthur & Baron, 1983). According to this theory, individuals should be sensitive to those vocal features that convey traits or affects whose perception is crucial for survival or for establishing maintaining efficient social interaction. Cultural differences in voice-based impressions may reflect cultural differences in the traits that actually covary with particular vocal features. Taking the association of speech rate with power or competence as an example, the differences between Westerners and Easterners may reflect people's adaptive sensitivity to differences in the vocal qualities that actually communicate power and competence in the two cultures.

The difference in age-related social status in Western and Eastern cultures is one factor that may yield difference in the vocal qualities that communicate power and competence. In Western cultures, youthfulness is emphasized. Getting old is associated with decreasing self-sufficiency and lower social status (Helfrich, 1979), whereas younger adults may achieve higher social positions. Because rate of speech decreases with aging (Helfrich, 1979; Meyerson, 1976; Ryan, 1972), the association of fast speech with youthfulness may be generalized to powerful traits in Western cultures. On the other hand, Eastern cultures place more value on seniority (Bond & Hwang, 1986). Older people, especially older men, are more likely to be revered and to be found in higher social positions. Thus in these cultures vocal characteristics that represent older people, such as a slower rate (Helfrich, 1979; Ryan, 1972), may be associated with powerful traits, such as dominance.

A second cultural difference may contribute to differences in the trait implications of vocal qualities is that quickness and readiness for change are more valued in Western society (Rosenmayr, 1985). This would make vocal

rate a more salient feature for people there to detect. To adapt to life in the West, people need to act quickly, to follow a fast pace of life, and to be ready to change. In this context, fast speech may actually reflect competence, efficiency, and power. Although traditional Eastern cultures value harmony between human beings and the environment rather than speed in changing the environment, modern industrialization in these cultures may have produced changes in the valuation of speed. Indeed, research has found that time has become premium in the industrialized Eastern countries and regions, such as Japan and Taiwan (Levine & Bartlett, 1984). Similar changes in the pace of life have also occurred in South Korea. The coexistence of a new fast pace of life together with the traditional valuation of the elderly may yield a differentiated response to vocal speed in these cultures. In keeping with the pace of life, a fast rate may give the impression of competence. In keeping with the valuation of age, a slow rate may give the impression of power.

Research has established that faster speech is in fact positively related to judgments of speakers' power and competence in Western cultures. For example, Ray (1986) employed trained American speakers to read a given message in eight different ways representing all combinations of three variables—fast-slow, great variety-monotonous, and loud-soft. The results revealed that rate had more impact than the other vocal qualities on judgments of competence by American perceivers, with a faster rate being positively correlated with higher perceived competence. These results are consistent with other studies done in America (Brown et al., 1974; Street et al., 1983). Although faster speakers are evaluated more favorably in Western cultures, Lee and Boster (1989) found that Korean listeners rated slower male Korean speakers as more competent.

A cultural divergence in the trait implications of speech rate also emerged in Montepare and McArthur's (1987) research on perceptions of adults with childlike voices in Korean and American cultures. Their original data base showed that despite agreement in voice-based trait impressions across cultures and agreement in associating childlike voice with childlike traits, the Koreans perceived faster male American voices as less dominant and less strong, whereas Americans perceived them as more dominant and stronger. Although the cultural differences in these correlations were not all significant, the cultural divergence is nevertheless intriguing.

Besides the cultural divergence in the speech rate-power association, another culturally specific association observed by Montepare and McArthur (1987) was that Korean, but not American, perceivers associated tense American voices with powerful traits such as dominance and strength. Whereas other research has revealed that tense voices were also positively associated with power (dominant and ambitious) in Western cultures, these

effects were not significant when other vocal characteristics were statistically controlled (Pittam, 1987; Pittam & Gallois, 1986).

The differential impact of vocal tenseness in Eastern and Western cultures may reflect cultural differences in the maintenance of social relationships and the expression of power. In Western cultures, specifically in American society, and egalitarian ideology places a high premium on outgoing, sociable, and cheerful behavior (Bond & Hwang, 1986; Scherer, 1972). People in higher positions do not need to be formal to show their powerful social status. Indeed, they may have the freedom to be more casual than their subordinates, engaging in behavior such as making a joke to give people an impression of equality and to make themselves likable. Because a relaxed voice reflects nonformality, it may be associated with the perception of powerful traits in Western cultures.

In Eastern cultures, on the other hand, social relationships are constructed in hierarchical patterns, which place a high premium on acting in a manner appropriate to one's status (Bond & Hwang, 1986). People in higher social positions are more formal in interpersonal relations. They are likely to convey their status through an unrelaxed and proper voice that is indicative of discipline, control, and distance (Scherer, 1979, 1986). Thus the perception of powerful traits, such as dominance and strength, is more likely associated with a tight voice in Eastern cultures.

Although the foregoing studies have provided some information regarding what vocal characteristics result in particular judgments about a speaker's traits, several questions remain to be explored: First, past research has not systematically compared Westerners' and Easterners' impressions of both Western and Eastern speakers. Ray's (1986) research and several previous studies were conducted only in Western cultures. Lee and Boster's (1989) cross-cultural study focused on within-culture comparisons, that is, Koreans rated Korean speakers, and Americans rated American speakers. Montepare and McArthur's (1987) study varied the culture of the subjects but not the speakers. The present study investigated differences in voice-based impressions as a function of the perceiver's culture, the speaker's culture, and their interaction.

A second question addressed in the present research concerned the effects of cross-cultural experience on voice-based impressions. Considerable research on language and communication has found that individuals, including bilinguals, can readily accommodate their own linguistic and paralinguistic characteristics to those of their conversation partners for the purpose of efficient communication (Giles & Coupland, 1991). To integrate this accommodation theory with the ecological adaptation theory, it was assumed that

just as bilingual speakers can adjust their paralinguistic features in social interactions in their host cultures, so should they be able to adjust their perceptions to detect the culturally specific meanings of these features. Thus social accommodation should occur not only in speech generation but also in speech perception. To test this assumption, perceptions of Korean students studying in America were compared with the perceptions of Americans and their peers in Korea, who had less exposure to American culture. It was hypothesized that in adapting to a new culture, Koreans in the United States would be "educated" to be attuned to the vocal qualities that convey competence and power in that culture. More specifically, the following hypotheses were tested:

- Hypothesis 1: Americans would rate Korean and American male speakers with faster, more relaxed, or louder voices as more dominant, stronger, and shrewder.
- Hypothesis 2: Koreans in Korea would rate Korean and American male speakers with slower, tighter, or louder voices as more dominant, stronger, and shrewder.
- Hypothesis 3: Koreans living in the United States would be consistent with Americans in their rating of American male speakers, but with their Korean peers in Korea in rating Korean male speakers.

METHOD

SUBJECTS

Subjects were 48 Korean undergraduates (24 males, 24 females) enrolled in an introductory psychology course in a university located in Seoul, Korea, 32 American undergraduates (16 male, 16 female) enrolled in an introductory psychology course in a Boston area university, and 32 Korean graduate students or student spouses (16 males, 16 females) studying in the Boston area. On average, the males in this latter group were 30 years old, the females were 27 years old, and they had been in the United States for about 2.7 years. Korean student's spouses were included because there were few Korean female students available.

Background information obtained from Koreans in the United States revealed no significant sex differences in the length of time in America, time living with American roommates, or hours of watching TV on weekdays and weekends. The only significant sex difference was self-reported frequency of speaking English. On a 5-point scale ranging from "seldom" to "always," males reported speaking English between "often" and "quite often" ($M = 3.25$, $SD = .89$), and females between "sometimes" and "often" ($M = 2.25$,

$SD = .71$), $t(14) = 2.5$, $p < .05$. None of the American subjects reported any exposure to the Korean language. Although Korean subjects in Korea may have heard English in the media, they had little, if any, personal experience with native American speakers. The Korean university where the present study was conducted had no foreign students and only a handful of foreign faculty visitors. Indeed, a graduate student serving as an experimenter informed the second author that he was the first person with whom she had ever spoken English.

Korean students and their spouses were recruited by means of letters asking for their participation in a study about "cultural influences on people's perception of different voice characteristics and impressions of the speakers based on their voices." A brief description of the main features of the experimental procedure was also included in the letter. These students were paid \$10 for their participation in this study. For their participation, American students in the United States and Korean students in Korea received experimental credit toward a course requirement. In addition, Korean students in Korea received a gift worth \$2.00. Ethical procedures of the American Psychological Association, the Brandeis Ethics Committee, and the Committee on Using Humans as Experimental Subjects at MIT were followed.

VOICE SAMPLES

American voice samples were recitations of the English alphabet by 16 American men between the ages of 21 and 36 ($M = 27$ years). These samples had been used in an earlier study by Montepare and McArthur (1987). Korean voice samples were recitations of the Korean alphabet by 16 Korean men between the ages of 19 and 23 ($M = 22$ years). These voices were recorded in Korea. Both American and Korean voice recordings followed the same procedure, in which speakers' voices were recorded individually as they recited their own alphabet for approximately 25 seconds while walking back and forth across a room. Male speakers were used as targets because prior research had found that Koreans' association of a slow vocal rate with competence and a tight voice with power was significant only for impressions of male speakers (Lee & Boster, 1989; Montepare & McArthur, 1987), which is consistent with the Eastern cultural tradition that people of high status are primarily men.

Standardized speech content, such as recitations of the alphabet, has both advantages and disadvantages in research on paralinguistic determinants of impressions. Alphabet recitation provides a more natural voice stimulus than content-filtered speech or randomized spliced speech (Scherer, 1982), because synthetic speech may reduce the believability and naturalness of a

voice (Street & Brady, 1982). Moreover, alphabet recitation maintains both voice quality and temporal sequence information (Montepare & McArthur, 1987). A potential disadvantage is that subjects may get tired when they are presented repeatedly with meaningless alphabet recitations, with a consequent risk of unreliable ratings.

DEPENDENT MEASURES

To ensure that differences in ratings of American speakers by Koreans in the United States and Koreans in Korea reflected differences in their exposure to American culture rather than differences in the dependent measure, the trait and voice scales were presented to all Korean subjects in their native language. The trait and vocal feature scales were initially translated from English into Korean and subsequently translated back into English. The same scales were presented to American subjects in English.

Trait Ratings

Subjects rated speakers on six 7-point bipolar trait scales. The trait scales were consistent with those that have previously proven valid in research assessing personality impressions based on voice qualities (Lee & Boster, 1989; Montepare & McArthur, 1987; Ray, 1986). These bipolar trait scales were dominant-submissive, physically strong-physically weak, shrewd-naive, competent-incompetent, trustworthy-not trustworthy, or cold-warm.¹

Voice-Characteristic Ratings

Subjects rated speakers' voices on six 7-point scales: loud voice-soft voice, slow voice-rapid voice, relaxed voice-tight voice, deep voice-high-pitched voice, clear voice-unclear voice, and changing tone voice-monotone voice. In addition, they rated the speaker's vocal maturity, masculinity, and age.² The validity of the first three vocal ratings has been supported by previous research showing that subjective ratings of speed, loudness, and tightness are highly related to their respective objective measures of rate, intensity, and a complex spectrum containing parameters of fundamental frequency, amplitude, and high frequency (Scherer, 1982, 1986).

PROCEDURE

Subjects were told that the study was investigating impressions formed on the basis of voice characteristics. Koreans in Korea and in the United

States were given detailed instructions about the ratings procedures and rating questionnaires in the Korean language, whereas American subjects were given the same instructions and rating questionnaires in English. The 16 American voice samples or the 16 Korean voice samples were played four times for each group with a different set of four ratings made each time. Subjects made four trait ratings first, then two trait and two voice-characteristic ratings, followed by four voice-characteristic ratings, and, finally vocal maturity, masculinity, attractiveness, and age ratings. The order of the specific traits and vocal qualities was systematically varied with half of the subjects in each group given each order. All subjects were randomly assigned to rate either American or Korean speakers.³

RESULTS

DATA BASE

Reliability of Ratings

The correlations between the ratings of male and female subjects on all measures were high. For American speakers, the average correlation was .77 for American subjects, .77 for Koreans, and .76 for Koreans in the United States. For Korean speakers, the average correlation was .82 for Americans, .90 for Koreans, and .74 for Koreans in the United States. Reliability was, therefore, assessed across male and female subjects. Cronbach's alpha was calculated for subjects' ratings on each trait and vocal-characteristic measure within each subject-speaker group. The average reliability coefficient across all measures was .87 for both American and Korean speakers. Having shown acceptably high interrater agreement within each subject-speaker group, mean ratings for each speaker on each measure were computed across the ratings by all subjects within that group and employed in all subsequent analyses.

Comparability of American and Korean Voice Characteristics

The comparability of American and Korean voices was evaluated to ensure that the predicted differences in voice-trait associations across subject and speaker groups could not be attributed to differences in perceived voice characteristics. This was accomplished by performing 3×2 (Subject Group \times Speaker Group) analyses of variance on ratings of vocal rate, tightness, and

TABLE 1
Means and Standard Deviations of Perceived
Vocal Features of American and Korean Speakers by
Americans, Koreans, and Koreans in the United States

Measures	Speakers	Subject Groups					
		Americans		Koreans		Koreans in the United States	
		M	SD	M	SD	M	SD
Loud	American	3.67	1.4	3.71	0.7	3.70	0.9
	Korean	3.75	0.9	3.62	0.9	3.78	0.8
Rapid	American	3.91	1.6	4.30	1.7	4.06	1.5
	Korean	4.57	1.3	4.44	1.4	4.33	1.5
Tight	American	4.10	1.0	4.29	0.9	4.36	0.7
	Korean	4.21	0.9	4.11	1.1	4.07	1.0
Masculine	American	5.13	0.8	4.66	0.9	4.57	1.1
	Korean	5.19	0.8	4.60	0.9	4.20	1.0
Mature	American	4.57	0.9	4.31	0.9	4.48	0.9
	Korean	4.68	0.9	4.42	0.8	4.24	0.9
Age	American	24.99	4.0	24.98	3.5	29.90	4.0
	Korean	23.41	3.4	24.95	3.4	24.68	3.1

loudness as well as ratings of vocal maturity, masculinity, and age. The means and standard deviations of these ratings are presented in Table 1. These analyses revealed only one significant difference between Korean and American speakers. Although the speakers' ages were accurately perceived ($M = 25.5$ as compared with the actual mean age of 24.5), a significant Subject Group \times Speaker Group interaction, $F(2, 90) = 4.2, p < .05$, revealed that only Koreans in the United States correctly judged American speakers as being older than Koreans, $t(30) = 3.8, p < .01$. These results indicate that the American and Korean speakers' voice qualities were comparable.

Trait Composite

Because ratings of dominance and strength were highly correlated within each subject-speaker group (range .82 to .96, $M = .91$), a power composite was constructed by averaging the two ratings. Shrewdness was not included in the power composite for two reasons. First, shrewdness was conceptualized to reflect the dimension of competence, which is presumably indepen-

dent from power for Koreans, as discussed above. Second, ratings of shrewdness were not significantly correlated with the other two trait ratings across all subject-speaker groups.

Regression Analyses

To test hypotheses concerning the relationship between voice characteristics and perceived traits, vocal loudness, speed, and tightness were entered as predictors of ratings of power (dominance and strength) and competence (shrewdness) in multiple regression analyses for each subject-speaker group. The forced-entry method was used so that the effect of each predictor could be examined while the other two were statistically controlled.

Given that various vocal qualities are likely to covary and therefore to contribute simultaneously to impression formation when nonmanipulated voices are used as stimuli, multicollinearity among the predictors is a potential problem. To evaluate this, tolerance, which is the proportion of variance of a variable in the equation that is not accounted for by other independent variables in the equation, was calculated. Tolerance levels are presented in Tables 2, 3, and 4 along with the other results of the regression analyses.

HYPOTHESIS 1

The prediction that American perceivers would rate American and Korean speakers with louder, faster, or more relaxed voices as being more powerful (dominant, strong) and competent (shrewd) was partially confirmed. Louder speakers from both cultures were rated higher on power and competence. Faster American speakers were rated higher on power and competence, whereas faster Korean speakers were rated higher only on competence. More relaxed speakers from both cultures were perceived as being more competent, but not significantly more powerful (see Table 2).

HYPOTHESIS 2

The prediction that Korean perceivers would rate Korean and American speakers with louder, slower, or tighter voices as being more powerful and competent was confirmed only for loudness (see Table 3). Contrary to prediction, a slower rate did not predict Koreans' impressions of the power or competence of speakers from either culture. Although speakers with tighter voices were not perceived as more powerful or competent when vocal rate and loudness were controlled, the zero-order correlation between tightness and perceived power was significant when Koreans judged Korean

TABLE 2
Regression Coefficients for American
Subjects Rating Korean and American Speakers

Traits	Predictors	B	SEB	Beta	Tolerance	T	p	R ²	F(3, 12)	p
Korean speakers										
Power	Rapid	.10	.12	0.15	.49	0.9				
	Relaxed	.19	.19	0.18	.42	1.0		.83	19.2	***
	Loud	.99	.15	0.99	.62	6.6	***			
Competence	Rapid	.23	.09	0.54	.49	2.5	*			
	Relaxed	.35	.16	0.51	.43	2.2	*	.73	10.9	***
	Loud	.67	.12	1.04	.62	5.5	***			
American speakers										
Power	Rapid	.23	.11	0.40	.96	2.2	*			
	Relaxed	.14	.21	0.14	.72	0.7		.61	6.3	**
	Loud	.54	.14	0.80	.71	3.8	**			
Competence	Rapid	.16	.07	0.47	.96	2.1	*			
	Relaxed	.34	.15	0.59	.72	2.3	*	.43	3.1	.07
	Loud	.19	.10	0.48	.71	1.9				

* $p < .05$; ** $p < .01$; *** $p < .001$.

TABLE 3
Regression Coefficients for Korean
Subjects Rating Korean and American Speakers

Traits	Predictors	B	SEB	Beta	Tolerance	T	p	R ²	F(3, 12)	p
Korean speakers										
Power	Slow	0.03	.13	.05	.38	0.2				
	Tight	0.35	.21	.49	.23	1.6		.75	12.1	***
	Loud	0.39	.18	.49	.41	2.2	*			
Competence	Slow	0.17	.24	.24	.38	0.7				
	Tight	0.03	.40	.03	.22	0.1		.47	3.6	*
	Loud	0.69	.33	.67	.41	2.1	.06			
American speakers										
Power	Slow	0.02	.16	.03	.41	0.1				
	Tight	0.05	.29	.04	.39	0.2		.66	8.0	**
	Loud	1.22	.33	.81	.57	3.7	**			
Competence	Slow	0.15	.10	.57	.41	1.5				
	Tight	0.20	.19	.44	.39	1.1		.24	1.2	
	Loud	0.38	.21	.61	.57	1.8	.09			

* $p < .05$; ** $p < .01$; *** $p < .001$.

speakers, $r(14) = .77, p < .01$, but not when they judged American speakers, $r(14) = .33, p > .10$.

HYPOTHESIS 3

It was hypothesized that, due to their exposure to both cultures, Koreans living in America would show adaptive acculturation, rating American speakers like American subjects and rating Korean speakers like Koreans. As predicted, Koreans in the United States, like Americans, judged faster American speakers as being more competent. However, unlike Americans, Koreans in the United States did not perceive faster-speaking Americans as significantly more powerful. Consistent with the valuation of age in Eastern cultures, Koreans in the United States perceived slower Korean speakers as more powerful. However, slower Korean speakers were also perceived as less competent, which runs contrary to the valuation of age but is consistent with the changing pace of life in South Korea (see Table 4).

Consistent with the formality of high-status individuals in Eastern cultures, Koreans in the United States perceived Korean speakers with tighter voices as more powerful and competent. Contrary to the predicted effect of acculturation, more power was also attributed to American speakers with tighter voices. Louder American speakers were rated higher on power and competence, as predicted. Although loudness in Korean voices did not emerge as a significant predictor of power in the regression analysis, the zero-order correlation showed that louder Korean speakers received higher power ratings, $r(14) = .71, p < .01$.

DISCUSSION

Do people from different cultures focus on different vocal features and form impressions of speakers that vary with their own cultural background? Most pertinent to our present discussion is the question of whether voice-trait associations reflect adaptation to the culture to which one has been exposed. The answer is yes, as revealed in the convergences and divergences of Koreans in the United States with Americans as well as with Koreans in Korea.

VOCAL RATE AND IMPRESSIONS

Sensitive to speed, American perceivers judged American speakers according to speech rate. The association of a fast vocal rate with power and

TABLE 4
Regression Coefficients for Koreans in the
United States Rating Korean and American Speakers

<i>Traits</i>	<i>Predictors</i>	<i>B</i>	<i>SEB</i>	<i>Beta</i>	<i>Tolerance</i>	<i>T</i>	<i>p</i>	<i>R</i> ²	<i>F</i> (3, 12)	<i>p</i>
Korean speakers										
Power	Slow	.31	.11	.51	.59	2.8	*	.76	12.9	***
	Tight	.69	.19	.77	.43	3.6	**			
	Loud	.28	.21	.25	.55	1.3				
Competence	Rapid	.31	.11	.48	.59	2.8	*			
	Tight	.57	.20	.58	.42	2.9	*			
	Loud	.12	.21	.09	.55	0.6				
American speakers										
Power	Rapid	.06	.09	.08	.92	0.6		.83	22.0	***
	Tight	.68	.22	.44	.65	3.0	*			
	Loud	.73	.18	.59	.62	4.0	**			
Competence	Rapid	.28	.10	.59	.92	2.6	*			
	Tight	.18	.27	.18	.65	0.6				
	Loud	.23	.22	.28	.62	1.0				

* $p < .05$; ** $p < .01$; *** $p < .001$.

competence is consistent with the high value placed on quickness and youthfulness in Western culture. Because a decline in speech rate is the most important indicator of the aging voice (Helfrich, 1979), and because aging in Western society is associated with lower efficiency and lower social status, people in American culture positively evaluate faster speakers. This result was consistent with previous research (Brown et al., 1974; Ray, 1986; Street et al., 1983). American perceivers also responded similarly to vocal speed among Korean speakers, rating faster Korean speakers as more competent, albeit not more powerful.

In contrast to the effect of speed on Americans, vocal rate was not a significant predictor of Koreans' impressions of either American or Korean speakers. This result differs from the findings of Lee and Boster (1989), who found that Koreans rated slower Korean speakers significantly higher on competence. The discrepancy may be due to differences in the vocal stimuli and the dependent measures used in the two studies. First, Lee and Boster (1989) manipulated wide variations in speech rate, keeping other vocal characteristics constant, which would make this vocal quality more salient than it was in the spontaneous uncontrolled speech in the present study. Second, Lee and Boster's (1989) "competence" measure consisted of four

traits—experienced, expert, wise, and competent—the first three of which may be more sensitive to the age-induced association of slowness and competence in Eastern cultures than the measure of shrewdness, dominance, and strength used in the present study.

Koreans in the United States showed differentiated sensitivity in perceiving American and Korean speakers. Moving from an Eastern to a Western culture, quickness stands out as a salient feature for adaptation to the new life. Therefore, Koreans in America become attuned to vocal speed. However, this attunement was manifested in the association of speed with competence but not with power. This effect may be understood by considering the contexts in which Koreans in America have been exposed to American culture. They have been living primarily in academic settings in the United States, in which mental competence (shrewdness) rather than social power (dominance and strength) is salient. They have thus adapted their impressions of fast speech to the trait that is crucial for their survival in the universities—competence. Because they have not had much experience in wider American society, such as in business or political contexts, where social power is more salient, the acculturation has not yielded a significant association of fast speech with power. Future research may recruit subjects from wider sources to further examine the effects of acculturation on speed-power associations.

Koreans in the United States not only rated faster Americans as more competent, but also they rated Korean speakers in the same way. This result might be explained in two ways. First, the speed-competence association may be so salient for Korean students' survival in academic settings, that they extended this association from the host culture to their mother culture. Second, speed might indeed indicate competence in industrialized Korea even if there still exist age-related social status differences, which have an impact on power impressions, as in the present study. In short, competence and power may represent *two independent trait dimensions in Korea* with the former related to a fast vocal rate, the latter to a slow vocal rate. Thus the coexistence of industrialization, which emphasizes speed, and Eastern tradition, which emphasized the power of the elderly in a hierarchical social structure, may explain the fast rate-competence association as well as the slow rate-power association shown by Koreans in the United States judging Korean speakers.

It is interesting to note that it was Koreans in the United States, rather than their Korean counterparts, who demonstrated the foregoing differentiation of power and competence. Ratings of shrewdness by Koreans in the United States were independent of their ratings of dominance and strength, whereas ratings of shrewdness by Koreans in Korea were moderately correlated with those of dominance and strength. For Americans, ratings of the three traits

were all highly intercorrelated. Experience with American culture thus seems to have sharpened the sensitivity of Koreans in the United States to the two dimensions of traits in Korean culture.

TIGHTNESS AND IMPRESSIONS

It was argued that the ideology of equality in American culture encourages casual social behavior by high-status people toward their subordinates. As a result, status and power are not shown by a tense voice. Such casual social behavior differs from that shown toward subordinates in hierarchically structured Eastern cultures, which emphasize self-constraint, emotional control, and proper behavior (Bond & Hwang, 1986). It is thus not surprising to find that a tense voice, an indicator of discipline, self-control, and distance (Scherer, 1979), was a more salient marker of power and competence for Easterners than for Westerners.

Interestingly Koreans in the United States associated vocal tightness with the power and competence of Korean speakers and with the power of American speakers, whereas their counterparts in Korea did not. This result, paralleling perceptions of vocal rate, can be explained by cross-cultural experiences. The equality, freedom, and informality in American culture might have sharpened the sensitivity of Koreans in the United States to the formality of their own culture and the vocal features that convey power and competence there. At the same time, their experience in America may have taught them not to judge American speakers with tighter voices as more competent. However, this acculturation in reaction to tight American voices did not extend to power impressions. Again, the absence of an acculturation effect for impressions of power might reflect experiences limited to academic settings where power is less salient than competence. Thus exposure to the two cultures seems to sensitize perceivers to the differential meaning of vocal tightness across cultures and the extent of acculturation reflects the cultural contexts to which they have been exposed.

American listeners used vocal tenseness as a clue to competence, but in a direction opposite to Koreans. They perceived both American and Korean speakers with more relaxed voices as being more competent. Their association of relaxed voices with competence, but not power, may also reflect adaptation to their major life contexts, academic settings, in which the professors are likely to make jokes in a relaxed voice to show their intelligence and wit.

Finally, it is important to mention that a tense voice tends to sound comparatively louder than a relaxed voice (Scherer, 1979). Indeed, there were significant positive correlations between vocal tightness and loudness

in ratings of Korean speakers by Koreans in Korea and Koreans in the United States. The correlation between these two predictors, reflected by low tolerance, seems to have produced a suppressor effect in the multiple regression analyses that account for the absence of a significant effect of vocal tightness on perceived power when Koreans rated Korean speakers. A suppressor effect could also explain the failure of the regression analyses to yield an effect of vocal loudness on perceived power when Koreans in the United States rated Korean speakers.

LOUDNESS AND IMPRESSIONS

A loud voice seems to be a vocal feature that universally conveys power. It had a positive impact on perceptions of power in all subject groups, although, due to the aforementioned suppressor effect, this effect was not significant in the multiple regression analysis on ratings of Korean speakers by Koreans in the United States. The universal effect of loudness on perceived power may derive from the association of loud voices with emotions, such as joy and anger. The expression of these emotions is accompanied by a high degree of psychophysiological arousal and conveys activation and potency (Scherer, 1986). This explanation is consistent with the finding that a loud voice did not so consistently predict perceived competence, which is less related to highly activated emotional states than is strength or dominance.

In summary, the results of the present study indicate that individuals are attuned to culturally specific meanings of paralinguistic vocal features, and they perceive male speakers in a culturally adaptive manner. The adaptive accommodation that past research has found in speech generation also occurs in speech perception. Cross-cultural experiences sensitize perceivers to differences in the meaning of vocal features in both host and mother cultures. Acculturation occurs primarily in the context to which individuals have been exposed, and which is most crucial for effective cultural adaptation. These results support both accommodation theory and the ecological theory assumption that perception serves an adaptive function.

NOTES

1. Warm, competent, and trustworthy were dropped from further analyses due to the low reliability of these ratings in one subject-speaker group.
2. Vocal attractiveness was also rated by some subject-speaker groups. Only loudness, tightness, and rate were included in the analyses predicting trait impressions both because these were the only vocal qualities for which predictions had been made and also because the number of speakers was too small to include additional exploratory predictors in the regression analyses.

3. Koreans in Korea made trait and voice ratings as all other subject groups did for Korean speakers. Due to a procedural oversight, one group of Koreans rated only traits of American speakers, another rated only vocal features. Despite this asymmetry in the procedure for the two speaker groups, the trait-voice associations were identical. This indicates that the associations found in the various speaker-subject conditions cannot be attributed to carryover effects from trait ratings. Further evidence that voice ratings did not merely reflect carryover effect is provided by the finding that speakers rated as faster did in fact utter more letters per minute than those rated as slower, $r(14) = .89, p < .01$.

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