The Effect of Foreign Accent and Speaking Rate on Native Speaker Comprehension*

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This study investigated the effect of foreign accent and speaking rate on native speaker comprehension. The speakers for the study were three native speakers of Chinese, with TSE (Test of Spoken English) comprehensibility scores of 180, 200, and 260, and one native speaker of American English. The speakers each read passages at three different speaking rates. The tape-recorded passages were then presented to native speakers of American English who responded to them by taking a listening comprehension test and rating the speech samples. The results showed that the comprehension scores were significantly higher for the native passages than for the nonnative passages and significantly higher at the regular rate than at the fast rate for all speakers. It was also found that the increase in speaking rate from the regular to the fast rate resulted in a greater decrease in comprehension for the most heavily accented speaker than for the other speakers, indicating that speaking rate is more critical for the comprehension of heavily accented speech. In addition, the results suggested that prosodic deviance may affect comprehension more adversely than does segmental deviance.

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Until recently, second-language researchers have been concerned mainly with learners' interlanguage systems and their strategies for learning and communicating. Although research in these areas is still very active, some attention has recently been directed toward another aspect of the second-language learner's communication: its effect on the native listener. Much of the interest in this area of research has grown out of the concern in North American Universities with communication problems arising in classrooms in which the instructor is a foreign teaching assistant.

American undergraduate students in these classes have sometimes complained that their instructors' command of English is not adequate for teaching. One of the most frequently heard complaints is a lack of comprehensibility due to poor pronunciation. Other complaints concerning comprehensibility are related to fluency and speaking rate. While some complaints have been reported about nonnative speech that is halting and labored, more frequent complaints have been voiced about nonnative speech that is too fast to understand. These complaints about nonnative speech being too fast have been substantiated by the observations of some faculty members. For example, an engineering professor at Iowa State University reported that he was able to understand the halting English of a recently arrived Chinese advisee better than he could understand his speech a year later when he was speaking more fluently and rapidly.

These anecdotal reports suggest that an increase in speaking rate may be a critical factor in the comprehension of nonnative speech. It may be the case that the native listener needs more time to process nonnative speech and that comprehension is better at a slower rate because of the difficulties of the foreign accent. The

purpose of the present study is to investigate the effects of both foreign accent and speaking rate on comprehension.

BACKGROUND

Although a review of the literature does not reveal any studies investigating the effects of both speaking rate and foreign accent on comprehension, studies were found dealing with each of the factors separately: those dealing with the comprehensibility of nonnative speech and those dealing with the effects of speaking rate in native speech.

Only a few studies have been reported in the literature on the comprehensibility of nonnative speech and these have each approached the problem of comprehensibility in different ways. Hinofitis and Bailey (1981) investigated evaluational reactions to nonnative communication. Ten first-year students from the University of California at Los Angeles, who had had minimum contact with other cultures and languages, listened to samples of nonnative TAs' (teaching assistants) speech presented on videotape. Afterwards, they rank-ordered twelve subcategories of the TAs' performances. The categories included linguistic and speech variables such as pronunciation, vocabulary, grammar, and fluency as well as nonverbal variables such as eye contact and confidence in manner. The results indicated that pronunciation was the single most important factor in the evaluation of the TAs' performances. Among the other linguistic and speech variables investigated, fluency was ranked fourth in order of importance, but grammar and vocabulary were rated much lower, at seventh and eighth, respectively. In addition to eliciting the undergraduates' rankings, rankings were elicited from trained ESL raters, who also ranked

pronunciation as the single most important factor in performance.

Varonis and Gass (1982) investigated the comprehensibility of nonnative speech in a series of four experiments. Similar to the Hinofitis and Bailey study, they used an evaluational approach. Phonologically deviant sentences, both grammatical and ungrammatical, were presented on tape to native listeners who evaluated their deviance and comprehensibility. The findings of the study showed an interactive effect between grammar and pronunciation on comprehensibility.

A later study on comprehensibility departed from the earlier work in that certain listener variables were investigated. Gass and Varonis (1984) investigated the effect of the listener's familiarity with topic, speaker, and foreign accent on comprehensibility. They found that while the most important variable was familiarity with topic, the other familiarity variables all had facilitating effects on comprehension.

Although speaking-rate studies have not yet appeared in the second-language literature, several studies investigating the speaking-rate effects of native speech have been reported in the speech and phonetics literature. These studies, in the main, have investigated the relationship between speaking rate and both comprehension and preferred listening rates. The methods used for altering speaking rate in these studies have been either the subjective method, in which the speaker consciously varies his or her own rate, or the artificial method, in which speech rate is manipulated by either a speech compressor-expander or by a speech synthesizer. The advantage of the artificial methods is that they control the alterations in the speech signal that the speaker does not consciously control when changing his or her rate of speech. When speaking faster

or slower, the speaker unintentionally changes the relative durations of consonants, vowels, and pauses and the coarticulatory interactions between neighboring sound segments (Daniloff & Hamarbarg, 1973). In addition, as the rate increases, the speaker tends to reduce unstressed vowels and delete weak syllables (Dalby, 1986). However, although the artificial methods control certain speech variables, the speech signal they produce does not always sound natural.

Some of the studies investigating the relationship between speaking rate and comprehension have used the natural method of speech rate manipulation while others have used the speech compressor-expander. These studies have generally used extended discourse, rather than sentence stimuli, to test for comprehension, and the tests used have been objective, such as multiple-choice tests. The results have generally shown a decrease in comprehension as speaking rate increases, regardless of the method of speech rate manipulation used; however, the rate at which comprehension began to decrease varied considerably from one study to another, perhaps due to the differences in the difficulty of the material presented as well as to differences in experimental procedures (Goldstein, 1941; Nelson, 1948; Harwood, 1955; Foulke, 1966, 1968; Sticht, 1968). Studies investigating preferred listening rates also varied in the preferred listening rates reported (Nelson, 1948; Foulke & Sticht, 1966; Lass & Prator, 1973).

In summarizing the studies reported above, it can be seen that pronunciation is a major factor in comprehensibility. Other factors that also affect comprehensibility have been grammar, which interacts with pronunciation, and familiarity with topic, speaker, and the speaker's accent; however, these factors may represent only part of

the picture. Because the studies on speaking rate in native speech have shown that an increase in speaking rate is associated with a decrease in comprehension, it is reasonable to expect that the same effect should occur in the comprehension of nonnative speech, and the degree to which the effect may differ when the speaker is nonnative is worthy of investigation.

Another factor not yet investigated that may also affect the comprehension of nonnative speech is the listener's background and attitude toward members of other cultural/linguistic groups. A more positive attitude might mean that the listener is more willing to understand the speaker despite any difficulties of foreign accent.

The present study investigates the extent to which comprehension of nonnative speech is affected by pronunciation, speaking rate, and the background and attitudes of the listener. Specifically, the study asks (1) whether native listeners of English will have significantly more difficulty understanding nonnative speech than native speech, and whether any such difficulty found will be related to degree of accentedness; (2) whether an increase in speaking rate more adversely affects the comprehension of nonnative than native speech; and (3) whether the listener's background and attitude toward members of other cultural/linguistic groups is related to comprehension.

To determine if the listener is aware of any speech factors related to comprehension, the study also investigates the listener's perceptions of foreign accent and speaking rate. The specific questions asked are (1) can untrained native listeners discern degrees of foreign accent, and if so, are their evaluations consistent with those of trained ESL evaluators, and (2) can native listeners discern degrees of speaking rate, and if so, do they perceive speakers with more pronounced accents as speaking faster.

METHOD

Nonnative and native speech samples were recorded on tape at different speaking rates and were presented to 224 native speaker subjects who listened to the samples, answered comprehension questions, and filled out a questionnaire. Statistical tests were used to determine any significant differences in comprehension. The speakers, materials, experimental subjects, testing procedures, and statistical treatment of the data will be described more fully below.

SPEAKERS

The foreign speakers selected for the study were all male native speakers of Chinese. Speakers from this language background were chosen because Chinese is the native language of many foreign teaching assistants in the United States—at Iowa State University approximately 40% of the foreign teaching assistants are Chinese.

The speakers were selected impressionistically on the basis of their speaking and pronunciation proficiency in English. Speaker 1 spoke somewhat haltingly with poor to fair pronunciation; Speaker 2 spoke less haltingly with fair pronunciation; and Speaker 3 spoke fluently with good pronunciation. This impressionistic ranking of the three speakers agreed with their scores on the Test of Spoken English (TSE). The overall comprehensibility scores were 180 for Speaker 1; 200 for Speaker 2; and 260 for Speaker 3. See Table 1 for their complete TSE profiles. All three nonnative speakers were graduate students at Iowa State University and two of them were being considered for teaching assistantships at the time they were

Table 1
TSE Scores for Speakers 1, 2, and 3

	Pronunciation	Grammar	Fluency	Overall Comprehensibility
Speaker 1	1.1	2.3	1.8	180
Speaker 2	2.0	2.2	1.9	200
Speaker 3	2.6	2.3	2.7	260

Interpretation of Scores

Pronunciation

0.0 to 0.4	Frequent phonemic errors and foreign stress and intonation patterns that cause the speaker to be unintelligible.
0.5 to 1.4	Frequent phonemic errors and foreign stress and intonation patterns that cause the speaker to be occasionally unintelligible.
1.5 to 2.4	Some consistent phonemic errors and foreign stress and intonation patterns, but speaker is intelligible.
2.5 to 3.0	Occasional nonnative pronunciation errors, but speaker is always intelligible.

Grammar

0.0 to 0.4	Virtually no grammatical or syntactical control except in simple stock phrases.

0.5 to 1.4	Some control of basic grammatical constructions but with major and/or repeated errors that interfere with intelligibility.
1.5 to 2.4	Generally good control in all constructions, with grammatical errors that do not interfere with overall intelligibility.
2.5 to 3.0	Sporadic minor grammatical errors that could be made inadvertently by native speakers.
Fluency	
0.0 to 0.4	Speech is so halting and fragmentary or has such a nonnative flow that intelligibility is virtually impossible.
0.5 to 1.4	Numerous nonnative pauses and/or a nonnative flow that interferes with intelligibility.
1.5 to 2.4	Some nonnative pauses but with a more nearly native flow so that the pauses do not interfere with intelligibility.
2.5 to 3.0	Speech is as smooth and as effortless as that of a native speaker.
Overall Comprehensibility	
0 to 99	Overall comprehensibility too low in even the simplest type of speech.
100 to 149	Generally not comprehensible due to frequent pauses and/or rephrasing, pronunciation errors, limited grasp of vocabulary, and lack of grammatical control.
150 to 199	Generally comprehensible but with frequent errors in pronunciation, grammar, choice of vocabulary items, or with pauses or occasional rephrasing.
200 to 249	Generally comprehensible with some errors in pronunciation, grammar, choice of vocabulary items, or with pauses or occasional rephrasing.
250 to 300	Completely comprehensible in normal speech, with occasional grammatical or pronunciation errors in very colloquial phrases.

selected for the study. In addition, a male native speaker of English was selected as the native speaker control. He was a graduate student from Iowa with little trace of a regional accent.

The method used to alter speaking rate was the subjective method in which the speakers consciously altered their own rates of speaking. It was felt that this method produced more natural sounding speech than the speech compressor-expander, which we had experimented with and found to be unsatisfactory. The speech synthesis method was not considered because a speech synthesizer was not available.

PASSAGES

Six reading passages were selected from different fields of study and were judged impressionistically to be of approximately the same level of difficulty; however, no attempt was made to systematically evaluate the passages on their difficulty before the experiment was conducted because many of the comparisons made in the study were between speakers reading the same passages. In other cases, numerical adjustments for passage difficulty would be made, if necessary, based on the scores for the native speaker, who read every passage. Care was taken to select passages that reported somewhat arcane information (e.g., the defensive behavior of tarantulas) which the subjects were not likely to have learned elsewhere. The passages ranged in length from 310 to 475 syllables. See Appendix A for the text of each passage.

The native speaker read all six passages and the nonnative speakers were each randomly assigned to two of the passages. The speaking rates were determined empiri-

cally. The *slow* rate was based on what the native speaker was able to do without sounding abnormally slow. The *fast* rate was based on what the lowest proficiency nonnative could do without sounding too rushed. The rates were calculated by dividing the length of time (in seconds) that it took each speaker to read the passage by the number of syllables in the passage. The range for the slow rate for the foreign speakers was 2.39 to 2.65 syllables per second; the range for the regular rate was 3.25 to 3.49 syllables per second; and the range for the fast rate was 4.22 to 4.58 syllables per second. In general, the slow rate was about 25% slower than the regular rate; and the fast rate was about 30% faster than the regular rate.

The native speaker read all of the passages at almost exactly the same rates as the corresponding passages for the nonnative speakers. He accomplished this by listening to the nonnative passages with headphones and reading the same passage almost simultaneously. See Table 2 for the speaking rates for all speakers and passages. The speakers were recorded in a soundproof booth using a Nagra tape recorder employing quarter-inch full-track recording. It should be noted that the range of speaking rates investigated in this study (approximately 2.5-4.5 syllables per second) is somewhat lower than the ranges used in most native speaker studies. This is because the least capable nonnative speaker was not able to read any faster.

TEST

Six multiple-choice questions were written for each of the passages and six forms of the test were prepared, each with an accompanying tape. Each set contained the following combinations of speakers and speaking rates:

Table 2
Speaking Rates for Fast, Regular, and Slow Versions of the Passages

Speaking Rate	Passage A		Passage B		Passage C		Passage D		Passage E		Passage F	
	Spkr	Syl/ Sec	Spkr	Syl/ Sec	Spkr	Syl/ Sec	Spkr	Syl/ Sec	Spkr	Syl/ Sec	Spkr	Syl/ Sec
Fast	2	4.22	3	4.54	1	4.51	2	4.29	3	4.57	1	4.58
	N	4.39	N	4.42	N	4.51	N	4.39	N	4.66	N	4.70
Regular	2	3.25	3	3.46	1	3.45	2	3.36	3	3.49	1	3.35
	N	3.28	N	3.50	N	3.48	N	3.42	N	3.54	N	3.41
Slow	2	2.54	3	2.65	1	2.39	2	2.64	3	2.54	1	2.45
	N	2.56	N	2.69	N	2.42	N	2.66	N	2.62	N	2.47

Spkr=Speaker
Syl/Sec=Syllables per second
N=Native speaker

(1) native-fast, (2) native-regular, (3) native-slow, (4) nonnative-fast, (5) nonnative-regular, and (6) nonnative-slow. Each of the nonnative speakers read one of the nonnative passages for each set. Thus, each tape presented all of the speakers, all of the passages, and all of the speaking rates, though the combination of passages with speakers and speaking rates was different for each set. On each tape the order was such that no two nonnative passages ever appeared contiguously; there was always a native passage intervening between them. In addition, to control for order effect, the passages were presented in two different orders with regard to speaking rate: (1) fast, regular, and slow, and (2) slow, regular, and fast. See Table 3 for the combination of passage, speaker, and rate on each tape; see Appendix B for the test questions for the six passages.

QUESTIONNAIRE

The purpose of the questionnaire was to elicit background information, attitudes about foreigners and foreign accent, and perceptions of foreign accent and speaking rate. The questions that elicited background information were objective rather than open-ended, and the attitude questions elicited responses on a five-point scale.

A five-point scale was also used to elicit responses on evaluation of foreign accent. The first four points were based on the pronunciation scale used on the TSE (Test of Spoken English); however, technical terms were not used as they were on the TSE. Instead descriptive terms such as *heavy foreign accent* and *slight foreign accent* were used. A fifth point was added for native speech because all speakers, including the native speaker, were evaluated.

To elicit responses on speaking rate, the subjects were asked to indicate which point, along a five-point scale ranging from *too slow* at the lowest extreme to *too fast* at the highest extreme, best corresponded to their perception of the speaker's rate of speaking. See Appendix C for the questionnaire.

SUBJECTS

All 224 subjects were native speakers of American English in their first or second year of academic study at Iowa State University. They were all students in Introductory Composition classes during the experiment.

TESTING PROCEDURE

The subjects were all tested during regular sessions of their Introductory Composition classes. They were told that the purpose of the study was to determine their listening comprehension of certain material, but they were not informed in advance that any of the speakers were foreign. The teacher was present during the testing which lasted about 45 minutes. Although the students were told that their participation was voluntary, they all agreed to take the test and generally appeared to be interested and motivated.

The testing procedure consisted of three parts: (1) the listening comprehension test, (2) the evaluation of speaking rate and foreign accent, and (3) the completion of the questionnaire.

Twelve sections of Introductory Composition were tested, every two of which were given a different set of passages to respond to. The numbers of students respond-

ing to each of the six sets of passages are presented in Table 3.

STATISTICAL ANALYSIS

Three types of responses were considered. The first was the measure of comprehension obtained by asking six multiple-choice questions about the content of each of the six passages. One point was given if the answer was correct and no points were given if either the answer was incorrect or no answer was selected. Hence, each respondent received a score between 0 and 6 for each passage.

The other responses of interest were perception of foreign accent and speaking rate. Each respondent evaluated on a five-point scale both the speaking rate and accent of each speaker for each of the six passages.

The method of unweighted means was used to make comparisons because the number of respondents for each of the six combinations varied somewhat. A preliminary analysis of the data suggested that the variation in responses was about the same for all factor combinations in the experiment. Consequently, a mixed-model analysis of variance was used to estimate within-subject and among-subject variance (Bancroft, 1968).

In addition, responses to the background and attitude questions from the questionnaire were correlated with the test scores.

RESULTS AND DISCUSSION

Both among-subject variance (A^2=3.340) and within-subject variance (W^2=1.197) were computed. These values are used to compute standard errors for differences in

Table 3
Combinations of Passages, Speakers, and Rates, and Numbers of Respondents for Each Combination

Order	C1	C2	C3	C4	C5	C6
1	Passage B Native Slow	Passage B Native Fast	Passage A Native Slow	Passage D Native Fast	Passage F Native Slow	Passage F Native Fast
2	Passage E Speaker 3 Slow	Passage E Speaker 3 Fast	Passage D Speaker 2 Slow	Passage A Speaker 2 Fast	Passage C Speaker 1 Slow	Passage C Speaker 1 Fast
3	Passage C Native Regular	Passage A Native Regular	Passage B Native Regular	Passage F Native Regular	Passage D Native Regular	Passage E Native Regular
4	Passage F Speaker 1 Regular	Passage D Speaker 2 Regular	Passage E Speaker 3 Regular	Passage C Speaker 1 Regular	Passage A Speaker 2 Regular	Passage B Speaker 3 Regular

Order	C1	C2	C3	C4	C5	C6
5	Passage A Native Fast	Passage C Native Slow	Passage C Native Fast	Passage E Native Slow	Passage E Native Fast	Passage D Native Slow
6	Passage D Speaker 2 Fast	Passage F Speaker 1 Slow	Passage F Speaker 1 Fast	Passage B Speaker 3 Slow	Passage B Speaker 3 Fast	Passage A Speaker 2 Slow
Number of Respondents	38	38	39	43	38	28

mean scores. Two means are considered significantly different: (1) at the .05 level if they differ by at least twice the size of the standard error and (2) at the .01 level if they differ by at least 2.6 standard errors. (It was not necessary to use more formal *t*-tests for which the appropriate degrees of freedom are somewhat complicated to approximate because the resulting degrees of freedom are always large, exceeding 200.)

The experiment was designed so that adjustments could be made if the passages were not all of equal difficulty. The relative difficulty of the passages was assessed by comparing the mean comprehension scores for the native speaker because the native speaker delivered each passage. These scores, some of which are significantly different from each other, are presented in Table 4. In the discussion below, when comparing the passages for the nonnative speakers with each other, the scores will be adjusted for passage difficulty by using the native speaker scores. It is not necessary to make such adjustments, however, when comparing the scores for the same speaker across different rates or when comparing the native passages to the nonnative ones, because each passage read by a nonnative speaker was delivered at each of the three rates by the native speaker, and for every nonnative score, there is a corresponding native score for the same passage at the same rate.

WITHIN-SPEAKER COMPARISONS

Table 5 presents mean comprehension scores for each speaking rate and for each speaker. Mean scores were computed by averaging across the passages used by each speaker. The mean scores for Speaker 1 are computed from responses to Passages C and F; mean scores for

Table 4
Mean Scores for the Native Speaker Passages Fast, Regular, and Slow Rates Combined

	Passage					
	A	B	C	D	E	F
Mean Score	5.35	4.28	4.68	4.42	4.69	4.87
Standard Error for the Mean	.08	.12	.11	.14	.11	.10
Sample size	115	115	115	109	109	109

Table 5
Mean Comprehension Scores for Each Speaking Rate and Each Speaker

	Speaking Rate			Standard Error for Difference
Speaker	Slow	Regular	Fast	in Means
1	3.99	3.52	2.56	.36
2	3.87	3.82	3.02	.36
3	4.18	4.34	3.60	.36
Native	4.84	4.74	4.52	.10

Speaker 2 are computed from responses to Passages A and D; and the mean scores for Speaker 3 are computed from responses to Passages B and E. The mean scores for the native speaker were computed from responses for all six passages. The table also contains standard errors for the differences in any pair of means for each speaker.[1] The standard error is smaller for the native speaker because more responses are involved.

The results show that for each speaker the mean comprehension score for the fast speaking rate is significantly lower than is the mean score for the regular speaking rate. The differences in these scores are rather consistent for

the nonnative speakers (0.74 to 0.96) and are about four times larger than is the corresponding difference for the native speaker (about 0.2). No significant differences were found between the slow and regular rate for any speaker.

NATIVE-NONNATIVE COMPARISONS

Comparisons between nonnative- and native- speaker scores for the same passages are presented in Table 6. Scores from Passages C and F are used to compare Speaker 1 to the native speaker; scores from Passages A and D are used to compare Speaker 2 to the native speaker; and scores for Passages B and D are used to compare Speaker 3 to the native speaker. It can be seen that there are significant differences in comprehension between the native speaker passages and the nonnative passages at all speaking rates except the regular rate for Speaker 3, the highest proficiency nonnative. The differences between the native and nonnative passages are largest at the fast rate, and the differences are largest for Speaker 1, the lowest proficiency nonnative.

NONNATIVE COMPARISONS

Before comparing the scores for the nonnative passages with each other, it is first necessary to examine the speech samples because the nonnative speakers differed from each other in speaking proficiency, and they did not all make exactly the same adjustments when they varied their speaking rate. To facilitate comparison, a seven-point scale was used to impressionistically rate the speech samples on segmentals, syllable structure, and prosody (stress, rhythm, and intonation). The first point on the

Table 6
Comparison of Mean Comprehension Scores Between Each Nonnative Speaker and the Native Speaker for Each Speaker Rate

Nonnative Speaker	Speaking Rate	Mean Score for Nonnative Speaker	Mean Score for Native Speaker	Standard Error for Difference
1	Slow	3.99	4.54	.18
Passages	Regular	3.52	4.82	.17
C and F	Fast	2.56	4.89	.19
2	Slow	3.87	4.90	.19
Passages	Regular	3.82	5.00	.18
A and D	Fast	3.02	4.76	.17
3	Slow	4.18	4.73	.17
Passages	Regular	4.34	4.39	.19
B and E	Fast	3.60	4.27	.18

scale represents least native-like pronunciation while the seventh point represents near-native pronunciation. The standard against which the speech samples were compared was native American pronunciation used in informal connected speech. Thus, certain kinds of weak syllable deletions and final consonant cluster reductionswere not counted as errors. The first author, who has been trained in phonetics and phonetic transcription rated the samples. The ratings are presented in Table 7.

It can be seen that at the regular rate, Speaker 3 was rated 6 on sound segments, 5 on syllable structure, and 6 on prosody. The other two nonnatives at the regular rate, on the other hand, showed considerably more segmental and syllable structure errors, both scoring 4 and 3 on sound segments and syllable structure, respectively; however, what the rating scale does not show is that Speaker

Table 7
Speech Characteristic Ratings of Nonnative Speakers at the Slow, Regular, and Fast Rates[a]

Speaker	Speech Characteristics	Speaking Rates		
		Slow	Regular	Fast
1	Sound segments	4	4	4
	Syllable structure	3	3	2
	Prosody	3	3	2
2	Sound segments	4	4	3
	Syllable structure	3	3	2
	Prosody	4	4	4
3	Sound segments	6	6	6
	Syllable structure	5	5	5
	Prosody	5	6	6

[a]A seven-point scale is used to rate sound segments, syllable structure, and prosody. (1=least native-like pronunciation; 7=most native-like pronunciation)

1 used epenthesis as a syllable-simplification strategy much more often than did Speaker 2 although the dominant strategy for both speakers was consonant deletion.

Another difference between Speakers 1 and 2 can be found in their prosody scores. The rating for Speaker 1 on prosody was 3, while the rating for Speaker 2 was 4. Speaker 1 tended to read the passages word by word without using good linking, phrasing, and information focus. His rhythm was more syllable-timed than stress-timed and this, with a tendency for epenthesis errors and glottal-stop insertion at word boundaries, gave his speech a staccato-like quality not apparent in the speech of the other two nonnatives.

When the speakers varied their speaking rates, they were fairly consistent in their pronunciation across the three rates with a few notable exceptions. (1) Speaker 3

used a less native-like intonation pattern at the slow rate than at the faster rates. In addition, his rhythm and phrasing were not as native-like as they were at the faster rates. Thus, his score on prosody at the slow rate was only 5, while at the faster rates the score was 6. His less native-like intonation pattern at the slow rate was probably due to the fact that he was the most fluent of the three nonnatives, and thus found it more difficult to speak slowly. (2) Speaker 2 showed somewhat more segmental and consonant deletion errors at the fast rate than at the other two rates. These facts are reflected in a lower score on segmentals and syllable structure at the fast rate. (3) Speaker 1, whose scores on prosody and syllable structure were lower at the fast rate than at the other two rates, showed more epenthesis errors and his rhythm was poorer at the fast rate than at the slow and regular rates. The increase in epenthesis errors made the staccato-like quality of his speech noted at the regular rate even more pronounced at the fast rate.

To compare the comprehension scores for the nonnative passages with each other, it was necessary to adjust the scores for passage difficulty. These scores have been plotted on the graph in Figure 1 for ease of comparison. The speaking rates have been plotted on the horizontal axis, and the comprehension scores on the vertical axis. The scores only go up to 5 on the scale because there were no mean scores over 5. First, it can be seen that the rank order of the comprehension scores corresponds to the rank order of the TSE scores (see Table 1). Generally, the higher the TSE comprehensibility score, the higher the comprehension score. The rank order can also be predicted, for the most part, by the speech characteristic ratings in Table 7. Higher ratings on sound segments, syllable structure, and prosody generally correlate with higher compre-

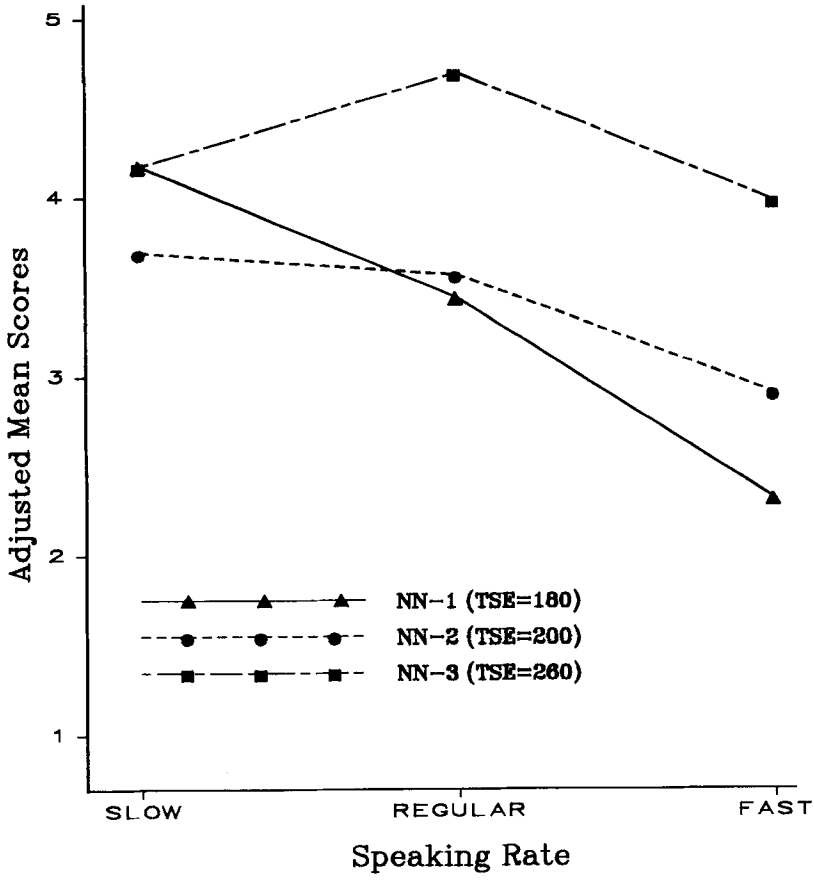

Figure 1. Adjusted mean comprehension scores

hension scores. This agreement between the comprehension scores and the speech ratings indicates that the listeners were affected by the degree of accentedness in the speech samples.

However, there is some indication that not all of the speech characteristics weigh the same in affecting comprehension. There is some suggestion that prosodic deviance may more adversely affect comprehension at the fast rate than segmental deviancy does. This becomes apparent when examining the speech characteristic ratings in light of the comprehension scores. It can be seen from Table 7 that Speaker 1's prosody was not as good at the fast rate as it was at the slow and regular rates, although there was no notable difference in his scores on sound segments. Speaker 2, on the other hand, showed a notable increase in segmental errors at the fast rate, while his prosody was no worse at the fast rate than it was at the other two rates. When examining the scores in Figure 1, it can be seen that the decrease in comprehension scores from the regular to the fast rate was the most dramatic for Speaker 1. This suggests the listeners may have been reacting more to prosodic deviance than to segmental deviance at the fast rate.

It may be that the listeners found Speaker 1's syllable-timed rhythm more foreign and jarring than the more stress-timed rhythm of the other two speakers. Also, Speaker 1's failure to use good phrasing and information focus may have deprived the listeners of speech cues that are helpful for the comprehension of connected speech. If thought groups are not marked by pauses and important words in the discourse are not marked by a notable change in pitch and longer stressed syllables, listeners may have to work harder to get the full meaning of what is being said. At the faster rate this extra burden on the listener may have resulted in a decrease in comprehension. On the

other hand, the increase in segmental errors at the faster rate for Speaker 2 did not affect comprehensibility as dramatically.

The reversal in the rank order of the comprehension scores at the slow rate is difficult to explain. The scores for the three nonnatives fall within a much narrower range than they do at the regular and fast rates and they are not significantly different from the scores at the regular rate for the same speakers. As mentioned earlier, the slow rate was at the very low end of the speaking rate continuum, and different listener effects, other than responses to speaking rate and accent, may have occurred.

BACKGROUND VARIABLES AND ATTITUDES

Correlations were computed for the background variables investigated (see the Questionnaire in Appendix C) and the comprehension scores. No significant correlations were found. In addition, a factor analysis was done on the six questions eliciting responses about attitudes and two factors were found—one relating to attitude toward foreigners (Factor 1) and the other relating to attitudes toward foreign accent (Factor 2). Correlations were evaluated between the two factors and the comprehension scores for all speakers at all rates combined. These were all near zero and nonsignificant; however, the correlations for each speaker at each rate separately did reveal some significant though small positive correlations. A positive correlation of 0.32, significant at the .005 level, was found between Factor 1 and the comprehension score for Speaker 1 at the fast rate. In addition, a positive correlation of 0.23, significant at the .05 level, was found for Speaker 2 on

Factor 2 at the fast rate. This suggests somewhat of a tendency for listeners with more positive attitudes towards foreigners or foreign speech to make a greater effort to listen and understand nonnative speech when it becomes increasingly difficult to understand—at a faster rate with more errors.

PERCEPTION OF ACCENT

The responses are recorded on a five-point scale with a value of 5 indicating no accent and a value of 1 corresponding to a severe accent. Mean responses are given in Table 8 for each speaker and each speaking rate. First, it can be seen that the accent ratings correspond to the relative severity of accents as measured by the TSE (See Table 1). Speaker 1, who was rated as having the most pronounced accent, had the lowest TSE score, and Speaker 3, who was rated as having the least pronounced accent, had the highest TSE score. Thus, the subjects were not only able to discern degrees of accent, their accentedness ratings agreed with those of expert raters in rank order (a comparison of the numerical ratings used is not warranted because the scales are not comparable).

Secondly, it can be observed that accentedness ratings remained fairly constant across the three rates except for Speaker 2 at the slow rate where a significant difference was found between the slow and regular rates. This was somewhat surprising because there were no differences in the pronunciation ratings between the slow and regular rates for Speaker 2 (see Table 7); however, a further analysis of the speech samples for Speaker 2 revealed somewhat of a difference in intonation between the slow rate, on one hand, and the regular and fast rates, on the

Table 8
Mean Responses for Accent Perception

Speaker	Speaking Rate			Standard Error for Difference in Means
	Slow	Regular	Fast	
1	1.30	1.43	1.19	.153
2	2.18	1.63	1.39	.153
3	2.75	2.65	2.63	.153
Native	4.87	4.88	4.86	.055

other hand. The pitch range seemed somewhat wider at the slow rate, flattening out more as the speaker increased his rate. The raters may have thus received the impression of a somethat more native-like intonation at the slow rate, although pausing and rhythm were judged to be no more native-like at the slow rate that at the faster rates.

PERCEPTION OF SPEAKING RATE

Responses were obtained on a five-point scale with low values indicating that the respondent perceived the speech as being too slow and high values indicating the respondent thought the rate of speaking was too fast. A value of 3 corresponds to the perception of a normal speaking rate. For each speaker a standard error is given which can be used to compare the means for different speaking rates.

The first question was whether the subjects could discern degrees of speaking rate. It can be seen in Table 9 that for each speaker the mean responses are significantly different for all speaking rates. The second question was whether the speakers with heavier accents would be perceived as speaking faster. It can be seen that the are

Table 9
Mean Responses to Perception of Speaking Rates for Each Speaker

Speaker	Speaking Rate			Standard Error for Difference in Means
	Slow	Regular	Fast	
1	2.68	3.69	4.67	.174
2	2.38	3.16	3.68	.174
3	1.69	2.58	3.54	.174
Native	1.37	2.58	3.31	.056

Table 10
Comparison of Mean Responses for Perception of Speaking Rates for the Native Speaker and Nonnative Speakers

Nonnative Speaker	Actual Speaking Rate	Mean Perception		Standard Error for the Difference
		Nonnative Speaker	Native Speaker	
1	Slow	2.68	1.26	.10
Passages	Regular	3.69	2.63	.09
C and F	Fast	4.67	3.36	.10
2	Slow	2.38	1.49	.10
Passages	Regular	3.16	2.63	.10
A and D	Fast	3.68	3.31	.09
3	Slow	1.69	1.35	.09
Passages	Regular	2.58	2.47	.10
B and E	Fast	3.54	3.25	.10

speakers with the most pronounced accents, Speakers 1 and 2, were perceived as speaking faster. This is further analyzed in Table 10 in which comparisons are made between each nonnative speaker and the native speaker. The differences in perceived speaking rates between the native speaker and nonnative speakers are largest for Speaker 1 and smallest for Speaker 3. Because the results

are quite consistent for the native speaker, this is a clear indication that the speakers with the most pronounced accents are perceived as speaking faster in a relative sense.

The perception scores reported above agree with the comprehension scores in that comprehension scores were lower on the passages which were rated as being heavily accented or too fast and scrores were higher when accentedness ratings were more native-like and speaking rate was not judged to be too fast. This indicates an awareness on the part of the listeners of speech factors related to comprehension..

To summarize the results reported above, the study has shown that (1) the scores on the comprehension test were not only lower for the nonnative passages than for the native ones, they also corresponded to the speaker's degree of foreign accent; (2) comprehension scores for all speakers showed a significant decrease from the regular to the fast rate, and the decrease was the most dramatic for the speaker with the most pronounced accent, suggesting that speaking rate may be more critical for speakers with more pronounced accents; (3) the comprehension scores for Speakers 1 and 2 at the fast rate suggest that certain phonetic features may weigh more heavily in affecting comprehension than others—prosody may be more critical than segmentals for comprehension, especially at the fast rate; (4) a positive attitude toward foreigners and foreign speech was significantly though modestly correlated with the comprehension of the passages that were the most heavily accented and read at the fastest rate, suggesting that listeners with positive attitudes may make more of an effort to understand nonnative speech that is difficult to understand than would listeners who do not possess such attitudes; (5) the listeners were able to discern degrees of accentedness, and their rankings of the

speakers agreed with those of expert raters; (6) the subjects were able to discern different degrees of speaking rate, and the speakers with the more severe accents were perceived as speaking faster in a relative sense.

CONCLUSIONS

In view of certain limitations to the study, its results cannot be extended too far. Comprehension was measured only for three nonnative speakers, all from the same linguistic background. In addition, the study did not control for speech variables when the rate was altered, and although this led to some interesting observations concerning the relative effects of sound segments and prosodic features on comprehension, a more controlled study using a speech synthesizer is needed before the findings can be considered conclusive. Nevertheless, the study has shown rather dramatically that speaking rate is an important factor in the comprehension of the nonnative speech investigated in this study and that it interacted in interesting ways with foreign accent and the listener's attitude toward foreigners and foreign speech. Thus, at least tentatively, speaking rate and attitude toward foreigners and foreign speech can be added to the list of factors that have already been found to affect comprehension—grammar, pronunciation, and familiarity of topic, speaker, and foreign accent (Varonis & Gass, 1982; Gass & Varonis, 1984).

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APPENDIX A

SAMPLE PASSAGE: *Transplanting Trees*

In most cases, you can transplant a tree successfully, at any time, if you follow the instructions for planting a tree. The most important thing is to dig out enough roots, but this process is difficult with a large tree. When you dig out the tree, take a ball of earth measuring about a foot wide for every inch of diameter of the tree trunk. Dig deep enough to avoid cutting too many taproots. It is wise to call in a professional tree expert to transplant a tree more than a few inches in truck diameter.

PASSAGE A: *Tarantulas*

While many insects are known for their excellent eyesight, the eyesight of tarantulas is poor. In fact, tarantulas are limited to a sensing of change in the intensity of light and to the perception of moving objects. They apparently have little or no sense of hearing. We know this because a hungry tarantula will pay no attention to a loudly chirping cricket placed on its cage unless the insect happens to touch one of the tarantula's legs. But all spiders, and especially hairy ones like tarantulas, have an extremely delicate sense of touch. Laboratory experiments prove that tarantulas can distinguish three types of touch: (1) pressure against the body wall, (2) stroking of the body hair, and (3) riffling of certain very fine hairs on the legs called trichobothria. Pressure against the tarantula's body by the finger or the end of a pencil, causes it to move off slowly for a short distance. The touch excites no defensive response unless the approach is from *above* where the spider can see the motion. In this case, it rises on its hind legs,

lifts its front legs, opens its fangs, and holds this threatening posture as long as the object continues to move.

PASSAGE B: *Pre-Columbian Technology*

For many years anthropologists believed that a major technological difference between the Old World and the New in pre-Columbian times was the New World's ignorance of continuous rotary motion and its mechanical applications, like the potter's wheel, the wheeled vehicle, and the millstone. While there was evidence of these inventions in Asia and Europe, such devices had not seemed to exist in the pre-Columbian Americas; however, these beliefs about the pre-Columbian were shown to be incorrect a few years ago, when a man called T. Grieder excavated a burial in the mountains of Peru. The grave, which was near the pre-Columbian village of Pashash, was that of an aristocratic woman who had been buried in the latter half of the fifth century along with a wealth of grave goods, including many wheel-turned clay pots. Because the objects were ceremonial in nature, Grieder thinks that rotary motion was confined to the production of objects for the elite. About two centuries later, there is no longer any evidence of either the potter's wheel or the lathe. So evidently, a revolutionary New World technological advancement vanished without a trace.

PASSAGE C: *Pueblo Culture*

The most famous of the native peoples of the American Southwest are the Pueblos. The Pueblos are known not only because of their spectacular ruins, but because their culture is so well continued by the modern Hopi and Pueblo Indians. The main line of the Pueblos started

along the Colorado and the Utah border, then later moved southward. They built villages of stone houses cemented with adobe, a local clay. In each village there were one or more kivas. These were men's clubs and also centers of religious ceremony. Kivas were built entirely underground and were entered through a hole in the roof. Their basic form derived from an early type of pit house, built before the Southwesterners had learned to be masons.

Anthropologists have found the Pueblo culture was essentially peaceful. There were few indications of fighting, even though we know this civilized people were apparently troubled by nomadic primitive bands that had seeped into the country. The Pueblo culture was also essentially democratic. As evidence of their democracy, we do not find the elaborate, special burials of a few individuals that occur where there is much distinction of rank, nor are there special houses that are finer than others. The modern Pueblo Indians also are peaceful and democratic. The labor they put into building their kivas is a community effort, and they participate voluntarily.

PASSAGE D: *Indian Mythology*

The recorded civilization of India is one of the longest in the course of world history. Indian mythology, which is linked to its religions and to the development of its civilization, spans an even greater length of time. Unlike the mythology of most countries, for Indians, mythology is still a part of the living culture of the people on all levels of society, from the illiterate masses to the educated elite.

The Indians have always tended to retain early beliefs and mold them to reflect new social conditions or to fit these early beliefs into a new philosophical scheme. This tendency has led to a polytheism in which the number of deities and the myths attached to them are constantly

increasing. This increase occurs despite attempts over the centuries of priests and philosophers to impose pantheism or monotheism on the people. The priesthood has also failed to eradicate the caste system, which has been outlawed but which is legitimatized by Indian mythology.

Indian mythology is truly a living mythology. This mythology has evolved as a consequence of historical circumstances such as dynastic changes, economic conditions, and the resultant social upheavals experienced by the Indian people. In other words, the mythology changes to explain and record actual historical events.

PASSAGE E: *The Emergence of Women in American Politics*

During the Progressive Movement, women began to play an increasingly active role in American politics. Women had been interested in reform movements for a long time, but the number of women politically active had been very limited. In the early 1900s, the educated, middle-class woman began to grow tired of her passive role. As a mother, she was concerned over the education and welfare of her children; the city in which they lived; and municipal facilities like playgrounds, schools, and parks. As a consumer, she was interested in political struggles over tariffs, taxes, monopolies, and dishonesty in government. As a concerned and sympathetic human being, she was shocked by the terrible working conditions in the mills and mines of the country and the crowded conditions in which poor people lived in the cities. Women began to develop their own heroines of charitable activity, like Clara Barton of the American Red Cross and Jane Addams, founder of the famous social settlement at Hull House in Chicago. Susan B. Anthony, who had also fought

against slavery and for the prohibition of liquor, served as president of the National American Woman Suffrage Association from 1892 to 1900 and did such to awaken the women to their political rights. Women began to believe that they were better equipped than were men to introduce honesty and human concern into politics, qualities that American politics seemed to need so badly, and so women in increasing numbers began to demand the right to vote. By 1914 they had that right in eleven states. Finally, in 1920, they won the right to vote with the passage of the Nineteenth Amendment to the Constitution.

PASSAGE F: *Body Heat Collection*

All human beings, no matter what they're doing, give off body heat. The usual problem is how to dispose of it. But the designers of the Johnstown campus of the University of Pittsburgh set themselves the opposite problem—how to collect body heat. They have designed a collection system that uses not only body heat, but heat given off by such objects as light bulbs and refrigerators as well. The system works so well that no conventional fuel is needed to make the campus' six buildings comfortable.

Some parts of most modern buildings, theaters and offices as well as classrooms, are more than amply heated by people and lights and sometimes must be air-conditioned even in winter. The technique of saving heat and redistributing it is called *heat recovery*. A few modern buildings recover heat, but the university's system is the first to recover heat from some buildings and reuse it in others.

Along the way, the university has learned a great deal about some of its heat producers. The harder a student studies, the more heat his or her body gives off. Male students emit more heat than do female students, and the larger a student, the more heat he or she produces. In fact,

it is tempting to conclude that the hottest prospect for the Johnstown campus would be a hard-working overweight male genius.

APPENDIX B

LISTENING COMPREHENSION TEST

Directions: You are about to hear selections from six lectures. You will hear each lecture only once. After listening to each segment, you will be asked to answer a series of written multiple-choice questions. Choose the best answer to each question and mark your choice on the separate answer sheet.

Sample Passage

1. Transplanting a tree is
   a. very different from planting a tree.
   b. so difficult an expert should always be called in.
   c. much like planting a tree.
   d. done successfully in the right seasons.

2. A tree trunk one-half foot in diameter should have
   a. a twelve-foot wide ball of earth.
   b. a three-foot wide ball of earth.
   c. a six-foot wide ball of earth.
   d. a four-foot wide ball of earth.

3. The best time for transplanting a tree is
   a. spring.
   b. fall.
   c. winter.
   d. any season.

Now listen to the selection from Passage A and be prepared to answer the six questions on its content.

PASSAGE A: *Tarantulas*

4. When on the defensive, a tarantula will do all of the following *except*
   a. move off slowly.
   b. open its fangs.
   c. rise on its hind legs.
   d. lift its front legs.

5. A tarantula would probably notice
   a. a constant bright light.
   b. a change from light to dark.
   c. an insect that does not move.
   d. an object in front of it.

6. To escape detection, a cricket placed in a tarantula's cage should not
   a. chirp loudly.
   b. remain motionless.
   c. touch the tarantula.
   d. walk near the tarantula.

7. According to the passage, the tarantula has an acute sense of
   a. smell
   b. sight.
   c. hearing.
   d. touch.

8. Tarantulas respond most strongly to
   a. noise.
   b. darkness.
   c. physical pressure.
   d. intense hunger.

9. A tarantula will most likely attack when it is approached from
   a. below.
   b. above.
   c. the front.
   d. the rear.

PASSAGE B: *Pre-Columbian Technology*

10. What was thought to be lacking in the New World before Columbus?
    a. excavation by an archaeologist.
    b. pottery.
    c. use of the wheel for work.
    d. burial of the dead.

11. Which important items were found in the grave?
    a. wheel-made pottery.
    b. evidence of wealth.
    c. millstone.
    d. apparatus for crushing grain.

12. What does the selection imply was also known in Pashash?
    a. the bow and arrow.
    b. the drill.
    c. technological advances.
    d. the lathe.

13. What happened to knowledge of the use of rotary motion for work in the New World?
    a. It was discovered by Columbus.
    b. It was spread to the Old World.
    c. It was used for trading.
    d. It ceased to exist.

14. T. Greider excavated a burial in
    a. the mountains of Colombia.
    b. the mountains of Peru.
    c. the New World mountains.
    d. a Yucatan village.

15. T. Grieder unearthed
    a. a fourteenth century woman.
    b. a woman buried with precious stones.
    c. a woman buried with her wedding jewelry.
    d. a Pashashi woman.

PASSAGE C: *Pueblo Culture*

16. One reason that Pueblo people are well-known today is that
    a. Pueblo culture has been preserved by Pueblo and Hopi descendants.
    b. Pueblo and Hopi are unrivaled as potters and weavers.
    c. legends of famous Pueblo and Hopi battles remain.
    d. recent archaeological discoveries have renewed interest in Pueblo and Hopi culture.

17. In addition to their use as men's clubs, kivas also served as
    a. fortresses.
    b. storehouses.
    c. meeting houses.
    d. religious centers.

18. According to the lecture, the hole in the roof of a kiva served as
    a. a window.

b. an entrance.
c. an air vent.

19. The *civilized people* referred to in the lecture were the
a. Pueblo
b. Hopi.
c. primitive nomads.
d. enemies of the Pueblo.

20. A modern Pueblo Indian usually builds his kiva
a. by himself.
b. by working with a group.
c. with money from the community.
d. with the help of his family.

21. We can conclude from this lecture that
a. modern Pueblos earn their living as construction workers.
b. modern Pueblos have disregarded the heritage of their forefathers.
c. Pueblos have recently accepted democratic methods of government.
d. Pueblo social institutions and attitudes have changed very little.

PASSAGE D: *Indian Mythology*

22. Indian Mythology
a. is not linked to the development of its civilization.
b. was accepted by the educated elite approximately 2,000 years ago.
c. held sway for centuries but now does not affect the people.
d. still figures in the lives and beliefs of most Indians.

23. Ancient Indian beliefs and myths were
    a. often remolded to fit new historical events.
    b. often discarded when no longer immediately relevant.
    c. made up by the priests.
    d. forbidden by the priests.

24. The caste system is
    a. encouraged by the priests.
    b. encouraged by the governments.
    c. immoral according to Indian mythology.
    d. illegal.

25. The number of gods in Indian mythology is
    a. constantly increasing.
    b. slowly decreasing.
    c. constant.
    d. rapidly decreasing.

26. Indian mythology is
    a. alive and well for all classes of Indians.
    b. dying out for all but the lowest castes.
    c. an important source of social interaction for the educated elite.
    d. unimportant for the educated, but still a part of life for the uneducated.

27. Over the years priests and philosophers have
    a. tried to impose monotheism and pantheism on the people without success.
    b. have almost succeeded in eradicating the caste system.
    c. have tried to introduce Christianity into Indian mythology.
    d. have tried to legitimatize the caste system.

PASSAGE E: *Women in Politics*

28. In the early 1900s, middle-class women as mothers were concerned with all but one of the following:
    a. municipal facilities.
    b. education.
    c. day-care centers.
    d. their city.

29. According to the lecture, women were extremely upset
    a. by inadequate day-care for children.
    b. by organizations such as Hull House.
    c. by attempts to effect political reform.
    d. by working conditions in mills and mines.

30. According to the lecture, Jane Addams
    a. founded Hull House.
    b. spearheaded the Progressive Movement.
    c. worked to improve working conditions in the mines.
    d. worked to gain the vote for women.

31. Susan B. Anthony did all but one of the following:
    a. fought against slavery.
    b. introduced the Nineteenth Amendment, giving women the right to vote.
    c. fought for the prohibition of liquor.
    d. served as president of the National American Women Suffrage Association.

32. The Nineteenth Amendment was ratified in
    a. 1900.
    b. 1914.
    c. 1920.
    d. 1924.

33. The passage talks about women's interest in all of the following except
    a. education.
    b. living conditions.
    c. high prices.
    d. marriage laws.

PASSAGE F: *Body Heat*

34. Until recently, body heat has caused problems because it
    a. was difficult to collect.
    b. came in a variety of forms.
    c. was difficult to get rid of.
    d. tended to be absorbed by physical objects.

35. Which of the following is true of the heating system of the Johnstown campus? The heat is supplied
    a. by human bodies only.
    b. by both human bodies and other heat-emitting objects.
    c. by both human bodies and conventional fuel.
    d. conventionally in most offices.

36. At he Johnstown campus, how many of the buildings are heated entirely by the heat collection system?
    a. None.
    b. Two.
    c. Four.
    d. Six.

37. According to the passage, which of the following would produce the least amount of heat?
    a. A fat female who studies hard.
    b. A thin female who does not study.
    c. A fat male who does not study.
    d. A thin male who studies hard.

38. According to the passage, heat is given off by
    a. candles.
    b. basketballs.
    c. cameras.
    d. refrigerators.

39. The heating system described in the passage
    a. saves heat and redistributes it.
    b. collects and saves heat in summer for use in winter.
    c. disposes of useless heat.
    d. collects energy from humans for supply to lights, refrigerators, etc.

APPENDIX C: QUESTIONNAIRE

PART I: RATING OF SPEAKERS

Instructions: You will now listen to a 30-second segment of each of the lectures you have just heard. As you listen to each speaker, you will be asked to evaluate his (1) accent and comprehensibility and (2) rate of speaking (i.e., whether too fast or too slow). After listening to each speaker, fill in the appropriate spaces on your answer sheet. The following scale will be used:

Foreign accent and comprehensibility
    a. Heavy foreign accent; very difficult to understand.
    b. Heavy to moderate foreign accent; somewhat difficult to understand.
    c. Moderate foreign accent; almost never difficult to understand.
    d. Slight foreign accent; never difficult to understand.
    e. No foreign accent; very easy to understand.

Speaking Rate
a. too slow
b. a little too slow
c. just right
d. a little too fast
e. too fast

Speaker 1

40. Foreign accent and comprehensibility
    a. Heavy foreign accent; very difficult to understand.
    b. Heavy to moderate foreign accent; somewhat difficult to understand.
    c. Moderate foreign accent; almost never difficult to understand.
    d. Slight foreign accent; never difficult to understand.
    e. No foreign accent; very easy to understand.

41. Speaking Rate
    a. too slow
    b. a little too slow
    c. just right
    d. a little too fast
    e. too fast

Speaker 2

42. Foreign accent and comprehensibility
    a. Heavy foreign accent; very difficult to understand.
    b. Heavy to moderate foreign accent; somewhat difficult to understand.
    c. Moderate foreign accent; almost never difficult to understand.

d. Slight foreign accent; never difficult to understand.
e. No foreign accent; very easy to understand.

43. Speaking Rate
a. too slow
b. a little too slow
c. just right
d. a little too fast
e. too fast

Speaker 3

44. Foreign accent and comprehensibility
a. Heavy foreign accent; very difficult to understand.
b. Heavy to moderate foreign accent; somewhat difficult to understand.
c. Moderate foreign accent; almost never difficult to understand.
d. Slight foreign accent; never difficult to understand.
e. No foreign accent; very easy to understand.

45. Speaking Rate
a. too slow
b. a little too slow
c. just right
d. a little too fast
e. too fast

Speaker 4

46. Foreign accent and comprehensibility
a. Heavy foreign accent; very difficult to understand.

b. Heavy to moderate foreign accent; somewhat difficult to understand.
c. Moderate foreign accent; almost never difficult to understand.
d. Slight foreign accent; never difficult to understand.
e. No foreign accent; very easy to understand..

47. Speaking Rate
a. too slow
b. a little too slow
c. just right
d. a little too fast
e. too fast

Speaker 5

48. Foreign accent and comprehensibility
a. Heavy foreign accent; very difficult to understand.
b. Heavy to moderate foreign accent; somewhat difficult to understand.
c. Moderate foreign accent; almost never difficult to understand.
d. Slight foreign accent; never difficult to understand.
e. No foreign accent; very easy to understand.

49. Speaking Rate
a. too slow
b. a little too slow
c. just right
d. a little too fast
e. too fast

Speaker 6

50. Foreign accent and comprehensibility
    a. Heavy foreign accent; very difficult to understand.
    b. Heavy to moderate foreign accent; somewhat difficult to understand.
    c. Moderate foreign accent; almost never difficult to understand.
    d. Slight foreign accent; never difficult to understand.
    e. No foreign accent; very easy to understand.

51. Speaking Rate
    a. too slow
    b. a little too slow
    c. just right
    d. a little too fast
    e. too fast

If your native language is one other than English, blacken 67E on your answer sheet and do not answer any more questions. Remain seated until you receive further instructions from the test administrator.

PART II: BACKGROUND

Directions: Blacken the appropriate letter on the separate answer sheet.

52. How often, if ever, have you heard English spoken with a foreign accent in your own family (parents, grandparents, aunts, uncles, cousins)?
    a. Never (Go to Question 54.)
    b. Once or twice a year
    c. Once or twice a month

d. Once or twice a week
e. Every day

53. For how long has this been true?
a. less than a year
b. more than one year but less than five years
c. more than five years but less than ten years
d. ten years or more

54. How often, if ever, have your heard English spoken with a foreign accent outside your home (at school and at social gatherings)?
a. Never (Go to Question 56.)
b. Once or twice a year
c. Once or twice a month
d. Once or twice a week
e. Every day

55. For how long has this been true?
a. less than a year
b. more than one year but less than five years
c. more than five years but less than ten years
d. ten years or more

56. Have you ever studied one or more foreign language in school?
a. Yes (Go on to Question 57.)
b. No (Go on to Question 58.)

57. For how long did you study one or more languages? (Determine the total number of years for each language—if you studied more than one—and indicate the grand total.)
a. less than a year
b. one-two years
c. three-four years

d. five-six years
e. more than six years

58. Have you ever spoken a foreign language outside of school with a relative, friend, or tutor?
a. Yes
b. No

59. Have you ever traveled or lived in a foreign country in which the native language spoken by most people was one other than English?
a. Yes
b. No

Directions: Mark the number on your answer sheet that most closely corresponds with your reaction to the statements below. Note: The higher the number the stronger your *agreement* with the statement.

60. Foreign students enrich the cultural environment at Iowa State University.

Strongly Disagree				Strongly Agree
1	2	3	4	5

61. The foreigners I have met at Iowa State are competent and bright.

Strongly Disagree				Strongly Agree
1	2	3	4	5

62. The foreigners I have met have been pleasant.

Strongly Disagree				Strongly Agree
1	2	3	4	5

63. On campus I enjoy hearing students speak their native languages.

Strongly Disagree				Strongly Agree
1	2	3	4	5

64. I have little difficulty understanding people who speak with a foreign accent.

Strongly Disagree				Strongly Agree
1	2	3	4	5

65. I enjoy hearing people speak with a foreign accent.

Strongly Disagree				Strongly Agree
1	2	3	4	5

66. Since you've been at Iowa State, have you ever had a foreign instructor?
    a. Yes
    b. No
    c. Not certain

End of questionnaire. Stop. Wait for further directions from the administrator.