SPEAKING CLEARLY FOR THE HARD OF HEARING

by

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ABSTRACT

It is obvious that the intelligibility of a given speech message depends strongly on how the message is spoken. Not only does the intelligibility vary with the identity of the speaker, but also, for a given speaker, with the effort to speak clearly. Assuming that the variations in intelligibility associated with such factors are substantial, detailed knowledge of these factors could prove useful in the development of signal processing schemes for hearing aids. Implications also exist for speaking in noisy environments, improving intelligibility of synthetic speech, and developing theories of speech perception.

The research described in this thesis consisted of three components. The first component was concerned with estimating the magnitude of the intelligibility differences associated with the attempt to speak clearly. Five listeners with sensorineural hearing losses were tested on groups of nonsense sentences spoken clearly and conversationally by three male speakers as a function of level and frequency-gain characteristic. The average intelligibility difference between clear and conversational speech averaged across speaker was found to be 17 percentage points. In addition, to a first approximation, this difference was independent of listener identity, level, and frequency-gain characteristic. Analysis of segmental-level errors was only possible for two listeners, and indicated that the improvement in intelligibility occurred over all phoneme classes.

The second component of this thesis consisted of an acoustical analysis of the differences between conversational and clear speech. The most salient and consistent differences were that in clear speech, word and phoneme durations substantially increased, phonological modifications in the speech materials substantially decreased, and the consonant-vowel ratio substantially increased, compared to conversational speech. Vowel formant frequencies and selected short-term spectra also changed in clear speech, but the change was neither as large or as consistent as that observed in the other parameters. Essentially no change was observed in the long-term spectrum of speech.

The third component of this thesis was a probe study concerned with estimating the contribution of changes in speaking rate to the intelligibility differences between conversational and clear speech. The speaking rates of clear and conversational speech were artificially interchanged with computer processing (subjectively judged to be of very high quality) and intelligibility was tested using the same procedure and impaired listeners as described in the first component. The intelligibility of both the clear and conversational speech dropped after processing, but essentially returned to levels associated with unprocessed speech after the processing was reapplied to restore the original speaking rates. This suggests that there is a strong interdependence between variables associated with differences in speaking rate and variables associated with other acoustic differences between clear and conversational speech (e.g., phonological modifications or CV-ratio). Therefore, future studies that attempt to relate intelligibility differences to acoustical differences between clear and conversational speech will have to take these interdependencies into account.

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ORGANIZATIONAL NOTE

It has become customary in the Communications Biophysics Group to write theses in a form (albeit not a length) amenable for submission as papers to the Journal of the Acoustical Society of America.

SPEAKING CLEARLY FOR THE HARD OF HEARING I: INTELLIGIBILITY DIFFERENCES BETWEEN CLEAR AND CONVERSATIONAL SPEECH

INTRODUCTION

General Remarks

It is obvious that the intelligibility of a given speech message depends strongly on how the message is spoken. Not only does the intelligibility vary with the identity of the speaker, but also, for a given speaker, with the effort to speak clearly. Assuming that the variations in intelligibility associated with such factors are substantial, detailed knowledge of these factors could prove useful in the development of signal processing schemes for hearing aids. Implications also exist for speaking in noisy environments, improving intelligibility of synthetic speech, and developing theories of speech perception. The purpose of the present series of papers is to describe investigations concerning magnitude of these intelligibility differences for a number of hearing impaired and normal listeners and the acoustical factors contributing to these differences. This paper will concentrate on the magnitude of the intelligibility change that occurs when a speaker tries to speak clearly.

Background Information

Clear speech can be defined as that speech which occurs when one is trying to improve communication in a difficult situation (and hopefully succeeding). For example, clear speech might be observed when people are speaking in a noisy environment or to a hearing impaired person. This is to be contrasted with conversational speech, defined as the speech which occurs between people in normal, everyday situations. Intuitively speaking, possible strategies that speakers might use to increase their clarity include manipulations of conversational context, sentence structure, vocabulary, speaking rate and stress, pronunciations of individual words and speech sounds, and vocal effort. This study will only focus on strategies speakers use to increase their clarity for speech messages whose text is specified in advance, and hence will only encompass the last three factors. In addition, the sole communication channel will be auditory; i.e., lipreading will be excluded. The interaction of information derived from multiple sensory channels is likely to be complicated, so the study of the single-channel case is a necessary preliminary to any study that includes lipreading. Given these conditions, previous studies directly concerned with speech clarity have generally focused on communication in noisy environments between normal listeners, and have not tested listeners with hearing impairments.

Numerous studies have demonstrated that substantial intelligibility differences can exist between speakers for normal hearing subjects listening in noise. Relatively few studies have examined to what extent an individual can increase his own intelligibility by speaking clearly. In one such study (Snidecor et al., 1944) approximately 650 naval recruits were divided into small groups and given different instructions for speaking over standard military telephone equipment. The intelligibility of each man's speech before and after training was determined by the extent to which a panel of listeners could hear digits spoken against a background of noise introduced at the speaker's location. The most successful training method was found to be "Mass Drill," in which large numbers of subjects mimicked the "clear" speech of a trained speaker. In another successful technique, the individual speakers were continuously prompted with comments like "louder", "open your mouth more", "speak more clearly", and "talk slowly." Other techniques, such as non-interactive instruction or merely informing the speaker he could not be heard, were not successful.

Abrams et al. (1944) reported on the factors governing the intelligibility of speech in noise. In this study, 47 talkers read lists of words and sentences against a background of noise over standard military telephone equipment to a group of experienced listeners. Only overall

intensity measurements were made on the actual test materials. However, a number of measurements were made on additional speech materials produced by each talker including intensity, speaking rate, and average pitch. In addition, a panel of judges rated this additional material according to a number of subjective criteria such as "intelligibility", "dialect", "consonant strength", and "consonant precision." A positive correlation was found between the intelligibility test scores and intensity measurements made on the additional material, a negative correlation was found for speaking rate, and positive correlations were found for subjective ratings concerned with consonant strength and precision.

Bilger, Hanley, and Steer (1955) selected 88 talkers from a sample of 555 talkers on the basis of extreme intelligibility and lack of intelligibility on a multiple-choice word test. Listeners heard (multiple-choice word) test materials recorded by these talkers mixed with "high level" noise. A number of measurements were performed on the test materials for each talker; it was found that high intelligibility was correlated with intensity and syllable duration.

Tolhurst (1955) found that average intelligibility scores obtained from 48 speakers in a background of masking noise on a multiple-choice word intelligibility test (Black, 1958)

increased by 10 percentage points when the speakers were instructed to speak more intelligibly. In another study using similar test materials, Tolhurst (1957) investigated the effects of speaking rate and articulation clarity (again manipulated by instructions) on word intelligibility in noise. He found that instructions calling for either decreased rate or increased clarity were associated with higher intelligibility scores (9 percentage points maximum across conditions).

The above studies suggest that the intelligibility of speech in noise is correlated with intensity, reduced speaking rate, and increased consonant precision and strength. Although these studies only employed listeners with normal hearing, it is reasonable to assume that some of the results would also apply to hearing impaired listeners. Assuming that the above variables are correlated with intelligibility, it is worthwhile to discuss studies that have investigated the above variables individually, with emphasis on the last two variables.

The effects of variations in speaking rate achieved by explicit speaker instruction have been studied using comprehension tasks administered to normal hearing listeners (Miron and Brown, 1971; Berry and Ericson, 1973). Higher speaking rates were associated with decreased comprehension scores, which may reflect central processing problems in

following rapid speech. However, it is likely that changes in speaking rate achieved naturally are also associated with pronunciation differences (Oshika et al., 1975).

Aaronson, Markowitz, and Shapiro (1971) demonstrated that artificially deleting pauses between digits in a digit-recall task hampered subject performance more adversely than simple time compression (Fairbanks et al., 1954) of the digit sequence. This result suggests that pauses in continuous speech may serve the function of providing time for the perceptual processing of the preceding speech.

Finally, numerous techniques have been devised to artificially alter speaking rate. (Fairbanks, 1954; Scott and Gerber, 1972; Portnoff, 1978; Malah, 1979). Evaluations of such schemes have generally concentrated on the ability of normal-hearing listeners to perceive sped-up (time compressed) speech. Schon (1970) reviewed a number of studies concerned with the effect of speaking rate manipulation obtained with the Fairbanks scheme on intelligibility and described a study of his own in which the effect of rate was examined for several groups of hard of hearing and aged listeners. The intelligibility scores of all groups evidenced some degradation for both time compression and time expansion of the speech waveform (the degradation being most pronounced for the hard of hearing

listeners). However, it seems likely that a significant portion of the degradation was caused by distortions introduced by the signal processing (discarding or repeating short intervals of speech) used to vary the rate.

Most previous research on "consonant strength and precision" has focused on the consonant-vowel ratio (CVR). The CVR is generally defined to be the ratio of the intensity of a consonant to the intensity of the nearest vowel in the same syllable, and is usually expressed in dB. House et al. (1955) measured the CVR for two speakers differing in intelligibility on the Modified Rhyme Test and found that the more intelligible speaker had CVR's 2-4 dB higher than the less intelligible speaker. Williams et al. (1966) found significant correlations between CVR and intelligibility differences in noise for initial /s/-vowel, final/s/-vowel, final /ts/-vowel, final /t/-vowel, and final /k/-vowel ratios. Salmon (1970) found significant correlations between CVR and intelligibility for words containing initial /t/'s, final /t/'s, final /k/'s, initial /s/'s, and final /s/'s. Hecker (1974) attempted to increase the intelligibility of a speaker by splicing out the consonant, increasing its amplitude, and re-splicing it into the word. This procedure artificially increased the CVR. The modified intensities were chosen to match the CVR's of a highly intelligible speaker. Using the Modified Rhyme Test, Hecker found that the intelligibility of the

more intelligible speaker was 88% at 4 dB S/N and 51% at -4 dB S/N. The intelligibility of the less intelligible speaker was 78% at 4 dB S/N and 43% at -4 dB S/N. After processing, Hecker was able to increase the intelligibility of the less intelligible speaker to 81% and 47% respectively - a small though apparently statistically significant increase. The fact that Hecker was not able to match the intelligibility of the more intelligible speaker suggests that his processing may have degraded the signal and/or that the CVR is not an important factor governing the intelligibility of all consonants.

The above studies suggest that an individual can increase his intelligibility by speaking clearly, and that the attempt to speak clearly is associated with numerous changes in the speech waveform. Since no study appeared to investigate the effects of speaking clearly for hearing-impaired listeners, a pilot investigation (Picheny and Durlach, 1979) was performed. Four listeners with sensorineural hearing loss were tested on groups of 50 Harvard sentences (IEEE, 1969) recited conversationally and clearly by a single speaker, and presented at levels chosen by the listeners. For all four listeners, the intelligibility scores (percent words correct) for clear speech were substantially higher than those for conversational speech (average of 18 percentage points). In another experiment, two impaired listeners were tested at

raised presentation levels; substantial improvements were again demonstrated for clear speech. Acoustic analysis of the speech materials revealed that clear speech was associated with reduced speaking rates, increased consonant-vowel ratios, and vowel-formant frequencies that more closely approached hypothetical target values. Another experiment investigated the effects of speaking clearly using nonsense sentence material (described below) presented to eight normal hearing listeners unprocessed, and sharply low-pass filtered at 1 KHz (Picheny, Durlach, and Braida, 1980). The intelligibility of the unprocessed clear and conversational speech was high (> 95%). However, for the filtered speech an average intelligibility difference of 15 percentage points between clear and conversational was found. Finally, another study investigated the intelligibility and acoustic characteristics of plosive consonants spoken clearly and conversationally (Chen, 1980) presented to normal hearing listeners in noise. Averaged over signal to noise ratio, the intelligibility difference between the clear and conversational plosive consonants was 17 percentage points. Acoustical analysis revealed that the clearly spoken unvoiced plosive consonants had much longer VOT's and somewhat higher CV ratios than the corresponding conversational ones. In addition, plosive burst frequencies tended to cluster more tightly in clear speech. Although introductory in nature, the above studies suggest that substantial increases in intelligibility can exist when

an individual attempts to speak clearly, and that these increases in intelligibility are associated with numerous changes in the acoustic speech waveform.

EXPERIMENTAL DESIGN

Objective

The goal of these experiments was to estimate the magnitude of the intelligibility differences between conversational and clear speech for a number of hearing-impaired listeners as a function of presentation level, frequency-gain characteristic, and speaker. Presentation level and frequency-gain characteristic were varied because they are known to substantially affect intelligibility for the hearing impaired. It was felt that it was important to examine the sensitivity of the intelligibility differences between clear and conversational speech to such simple variables as a check on their robustness.

Test Materials

Listeners were tested on groups of 50 nonsense sentences similar in structure to those described by Gaitenby and Nye (1974). Sentence material (rather than words or nonsense syllables) was used to permit the speaker to manipulate

prosodic and phonological variables when speaking clearly and conversationally. Nonsense sentences were used so listener errors would be less context dependent and hence easier to analyze; also, it was easy to automate their construction. The sentences were constructed to conform with the following model of a simple English declarative sentence:

article (adj) noun (auxiliary verb) verb (preposition) article noun

Parentheses surround parts of speech that were randomly included in some sentences but not others to increase the amount of intersentence variation. For additional variety, both plural and singular noun and verb forms were employed, and past and present tenses of verbs; however, each sentence was required to be gramatically correct. In addition, only verb-preposition pairs occurring in normal declarative English sentences were included.

Adjectives, nouns, and verbs were selected from lists of one and two syllable words obtained from the Brown corpus (Kucera and Francis, 1964). The ratio of one- to two-syllable words was arbitrarily chosen to be 4:1. Only words occuring more than four times per million (in the Brown corpus) were selected in an attempt to exclude unfamiliar words from the test sentences. Intelligibility was measured

by scoring the numbers of adjectives, nouns, and verbs identified correctly by the listener. A word was marked incorrect if a single sound in the word was omitted or mis-identified. However, if the listener only omitted a plural or past tense suffix (-s, -ed, or -d), the word was still marked as being correct. A sample set of sentences with key words underlined is shown in Table 1; the phonemic composition of the key words in a typical set of 50 sentences is shown in Table 2.

Speakers

Three male college students were the speakers for these experiments. Although none had any professional training, all had some experience in producing clear speech. MM had amateur acting experience and had been on debating teams. MP had substantial amounts of practice recording clear and conversational speech in conjunction with other studies (Picheny and Durlach, 1979; Picheny, Durlach, and Braida, 1980). In addition, he had substantial practice speaking to his father, who is hearing impaired. MS had participated in a study on the effects of speaking clearly and conversationally on plosive consonants (Chen, 1980).

Recording Procedure

Recordings were made in an anechoic chamber using a TEAC

3340 tape recorder with an Electrovoice RE-55 microphone. The microphone was positioned 12 inches from the speaker and 2 inches above the breath stream. Recordings took place in two hour sessions over the course of several weeks. The speaker typically recorded groups of 40 conversational sentences alternating with groups of 40 clear sentences. When recording conversational speech, the speaker was instructed to recite the materials in the same manner in which he spoke in ordinary conversation. During the course of the recording, the speaker was notified if he abrubtly altered his speaking rate or began to speak mechanically. When recording clear speech, the speaker was instructed to speak as clearly as possible; for example, as if he were trying to communicate in a noisy environment or with an impaired listener. During the course of the recording, the speaker was notified if he abruptly altered his speaking rate. The speakers were also instructed to enunciate consonants more carefully and with greater (vocal) effort than in conversational speech and to avoid slurring words together. The speakers were instructed to place stress on the adjectives, nouns, and verbs in both types of materials. Informal testing of a small number of normal hearing listeners indicated high intelligibility of both conversational and clear speech (>94% for a random selection of test lists). This result suggests that the speakers did not make an unusual attempt to be unintelligible when speaking conversationally.

A typical intelligibility test consisted of 50 sentences and was constructed as follows. The list of 50 sentences was broken into groups of ten sentences each and recorded on different days. Level normalization across sentence groups was performed by first obtaining the average level for each group of ten sentences. The average level of a group of ten sentences was defined to be the average of the peak levels of each of the ten sentences measured in dB on a Ballantine RMS meter Model 320 (averaging time of .2 seconds). The average levels of the groups of ten sentences were equalized, and the five groups were dubbed onto the test tape.

Impaired Listeners

Five listeners with stable senorineural hearing loss participated in these experiments. Descriptive information is presented in Table 3. Air conduction thresholds and loudness discomfort thresholds as measured in the laboratory (Bustamente, 1981) are presented in Figure 1. Bone conduction and tone decay tests did not reveal any conductive or retrocochlear components to any of the listeners' hearing losses.

Test Conditions

In addition to speaking mode and speaker, there were two

additional presentation variables: level and frequency-gain characteristic. Two frequency-gain characteristics were chosen: orthotelephonic (ORTH) and octaves-most-comfortable level (OMCL). Both of these characteristics had been investigated by Lippmann, Braida, and Durlach (1981). In the ORTH system, the speech materials were presented with a flat frequency-gain characteristic. The OMCL system was determined by having each subject listen to running speech filtered into the bands 160-630 Hz, 630-1250 Hz, 1250-2800 Hz, and 2800-8000 Hz and adjust the listening level in each band to the highest level comfortable for long-term listening. The frequency-gain characteristic was defined as the ratio of the listener-selected speech levels to the speech levels in the orthotelephonic system as a function of frequency. In these experiments "running speech" consisted of 50 nonsense sentences alternately read conversationally and clearly by all three speakers.

Three presentation levels were selected: most-comfortable-level (MCL), maximum listening level (MAX), and 10 dB below MCL (MCL-10). For MCL, the listener was instructed to adjust the level of input speech to maximize intelligibility while maintaining long-term listening comfort; for MAX, the listener was instructed to set the input level to the highest level at which he would be willing to listen to 50 sentences (one test list). Both MCL and MAX were chosen for each speaker and speaking mode

separately by having the subject listen to groups of 50 nonsense sentences (the same group was used across speaker and mode).

In total, 36 experimental conditions were administered to each listener (2 speaking modes x 2 frequency-gain characteristics x 3 speakers x 3 levels). For each condition, 50 sentences were administered containing approximately 175 key words. Each sentence was presented precisely twice to each listener for the same level, speaker, and frequency-gain characteristic - once spoken conversationally, and once spoken clearly. This procedure was utilized to permit a detailed comparison of listener errors. Although to permit additional detailed comparisons it would have been desirable to present a single sentence many times, it was feared that results might be confounded by listener learning of specific sentences. The order of testing was counterbalanced to minimize learning and fatigue effects across conditions, and is shown in Figure 2. The average time between the presentation of a conversational set of 50 sentences and the corresponding set of clear sentences was approximately one month.

In addition to the main body of experiments described above, a set of 12 additional tests was administered to each listener (Figure 3). Specifically, each listener was retested at MCL for all speakers, frequency-gain

characteristics, and speaking modes. This procedure not only provided additional experimental data at MCL (thus permitting more detailed experimental analysis at this level), but also made it possible to check learning effects.

Experimental Procedure

The experimental set-up is shown in Figure 4. The speech materials were presented to the listener over TDH 39 headphone drivers equipped with .001A cushions using an Otari MX5050 tape recorder. A GR 1925 third octave filter bank was used to adjust the frequency-gain characteristics of the system, and an attenuator was used to adjust the overall system gain. The headphones had essentially a flat frequency response from 200-6000 Hz (DeGennaro, 1978). Prior to each test, the listener heard 10 additional sentences under the same test condition to permit some familiarization with the upcoming test materials. Sentences were played one at a time to each listener; the listener had the choice of either writing down or repeating back the sentence. The listener was given as much time as desired to respond; however, each sentence was played only once. All tests were administered monaurally to the listener, and the listener was allowed to select the test ear. For the case of HS (unilateral hearing loss), 65 dB of masking noise was applied to the contralateral ear (Studebaker, 1970).

RESULTS AND DISCUSSION

Levels and Frequency-gain Characteristics

The OMCL frequency-gain characteristics chosen by the listeners are shown in Figure 5, and the MCL and MAX presentation levels are shown in Table 5. The reported presentation levels are the average peak SPL's at the headphones of the speech before application of any frequency-gain characteristics. The listeners with flat audiometric profiles (MF, VF, LF) tended to select relatively flat OMCL characteristics, while the two listeners (GC, HS) with sloping audiometric profiles selected characteristics with more high-frequency emphasis*. The OMCL frequency-gain characteristic determined for LF was essentially indistinguishable from an ORTH system, and she

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*HS had also been a participant in the experiments described in Lippmann, Braida, and Durlach (1981). In those experiments, he chose substantially more high frequency emphasis (15dB) than in these experiments. Comparison with these data and Lippmann's data suggest possible reasons for the change (besides differences in the speech materials used in system selection) are a degradation in HS's low frequency hearing, and a reduction in tolerance for high intensity sound relative to what was measured at the time of Lippmann's experiments.

was not tested with an OMCL system. The MCL gains for a given listener are generally quite similar across speaking mode and speaker. Two listeners (MF, VF) selected MAX levels within a few dB of their MCL's.

Experimental Results

All five listeners adapted quickly to the test procedure. MF, VF, and LF chose to write their responses, while GC and HS elected to repeat back the sentences. The subjective impressions of the listeners were that the clear speech was more intelligible than the conversational speech, but somewhat tedious to listen to because of a greatly reduced speaking rate. Most listeners commented that the conversational speech was spoken somewhat quickly. Occasionally a listener would complain that a particular sentence was somewhat long (in terms of number of words), but the complaint was infrequent.

The responses of GC, HS, and LF contained a substantial number of word omissions. For certain of the conversational speech tests, word omissions accounted for more than 50% of the errors. The responses of MF and VF contained relatively few word omissions. Excluding word omission errors, typical word errors for all listeners primarily arose from phoneme deletions (e.g., plot--> pot) and phoneme substitutions (plot--> clot). There were essentially no phoneme

insertions.

Intelligibility scores for all five listeners and all test conditions are shown in Table 5. Analysis of variance (Winer, 1963) was performed on the data of listeners MF, VF, GC, and HS to determine significant effects and interactions. LF's data were omitted to simplify the analysis because she was only tested on the ORTH system. (In general, her performance was quite similar to that of VF under the ORTH system.) The fundamental datum for the analysis was a single test score for a given test condition. Data at MCL were obtained by averaging the test results in the main experimental body with those obtained in the supplemental tests. The arcsine transform was applied to the data to stabilize the variances, and the error term used in significance testing was the 5-way interaction term. An effect or interaction was considered significant at the .95 confidence level.

The results of the analysis are shown in Table 6. F-ratios associated with a significance level > .95 are indicated with an asterisk. The proportion of variance accounted for (w#) is also reported. Although several main effects and interactions were statistically significant, five of the effects and interactions account for a large proportion of the variance: Listener (41%), Mode (19%), Level (11%), Listener x Level (8%), and Speaker (7%). The

substantial portion of the variance accounted for by Mode, combined with the relatively low proportion of the variance accounted for by interactions of the other effects with Mode, indicates that substantial differences can exist in intelligiblity between conversational and clear speech, and that these differences are to a first-order approximation, independent of listener, speaker, level, and system. The average increase in scores that can be attributed to speaking clearly is 17 percentage points.

Interactions with mode that were small but statistically significant were Mode x Speaker and Mode x Listener. Figure 6 displays the Mode x Speaker interaction. Speaker MM is the most effective at speaking clearly; MP produces the smallest distinction between conversational and clear speech (and has the most intelligible conversational speech), and MS produces the least intelligible speech overall. Figure 7 displays the Mode x Listener interaction. Listener VF shows the smallest effect of mode (13 percentage points) and MF the greatest (22 percentage points). No obvious difference in performance between listeners with flat losses (MF, VF) and sloping losses (GC, HS) as a function of speaking mode were observed.

There were several interactions not involving Mode, of which the Listener x Level interaction accounted for the largest proportion of the variance. This interaction is

shown in Figure 8. The intelligibility scores of both listeners with flat audiograms (MF, VF) were very sensitive to the 10 dB level decrease relative to MCL, while the scores of both listeners with sloping audiograms (GC, HS) were not. Note also that the intelligibility scores of the sloping-loss listeners at the MAX level were similar to scores obtained at MCL. It should be pointed out that the average MAX levels relative to MCL were substantially different across all four listeners. For the two sloping-loss listeners, the average (MAX - MCL) level was 17 dB (GC) and 8 dB (HS), and for the two flat-loss listeners, 3.3 dB (VF) and .2 dB (MF). If the flat-loss listeners had been able to tolerate higher MAX levels, it is very possible scores at the MAX level would have been substantially higher than at MCL. The insensitivity to changes in level of the scores of the sloping loss listeners may reflect the fact that substantial amounts of low frequency information are available to them for most of the levels in question. Hence, a change in level does not alter the available amount of speech information as much as for listeners with flat losses.

The data from the other significant interactions can be summarized in two figures: System x Speaker x Listener (Figure 9), and System x Speaker x Level (Figure 10). As can be seen from Figure 10, only two of the impaired listeners (MF, HS) substantially benefit from the application of the

OMCL frequency-gain characteristic. Intelligibility scores for GC were not substantially affected by frequency-gain characteristic, and scores for VF actually decreased. In examining the reason for this decrease it appears that VF had less speech energy above threshold for the OMCL system than the ORTH system. By examining her OMCL frequency-gain characteristic and her MCL gain (Figure 5 and Table 4) it is apparent that her strategy was to reduce the levels of the low and high frequencies relative to the levels in the ORTH system while leaving the mid-frequency gain alone. Most previous recent studies (Pascoe, 1975; Skinner, 1976; Lippmann et al, 1981) have demonstrated that high frequency emphasis can significantly improve intelligibility for many hearing impaired listeners. The absence of substantial improvements in intelligibility for two of the listeners (VF, GC) may simply be manifestations of their losses (all hearing impaired listeners do not benefit from high-frequency emphasis), the frequency-gain characteristic selection procedure (enough work has not been done on OMCL-type characteristics to show they always improve intelligibility) or the test materials (Pascoe claimed that differences in intelligibility as a function of gain characteristic were dependent on his choice of test materials). Speaker x Level x System effects were small and may just reflect biases induced by having one measurement observation per cell for the majority of conditions.

Learning Effects and Intelligibilty

In every type of intelligibility task, a listener's performance tends to improve as he becomes more familiar with the test materials. Although each listener in this study was exposed to the test materials before actual testing proceeded, the amount of training was not extensive (two test lists for each speaker, speaking mode, and frequency-gain characteristic were administered at MCL for practice). It is therefore important to determine the magnitude of any learning effects occuring over time. Since two observations per test condition were made at MCL, once at an early stage of the experiments, and once at a latter stage, it was possible to apply analysis of variance to estimate learning effects. The input to ANOVA was a single MCL test score at one of two points in time (early or late) for a single speaker, gain-characteristic, and speaking mode. Again, the five-way interaction term was used in significance testing. Statisticaly significant effects were seen in the Trial x Listener x System interaction (Figure 11). Listeners MF and VF showed substantial improvements (10 percentage points) over time for the OMCL system and listener GC showed a similar magnitude of improvement for the ORTH system. No significant learning effects were seen across speaking mode.

Interlistener Error Correlations

If listener errors were highly correlated (i.e., if all listeners tended to get the same words right or wrong), one could use such knowledge to gain greater insight into factors differentiating clear and conversational speech. For example, the acoustic characteristics of a set of words all listeners tended to get right under clear speech and wrong under conversational speech could be examined for any salient differences between clear and conversational speech. The following procedure was used to obtain an estimate of interlistener error correlation. For each word tested at MCL, the number of listeners correctly responding to the word was noted, yielding a number between 0 and 4. The average probability of n listeners responding correctly to a word could then be computed by averaging data for all words at MCL. This was done separately for clear and conversational speech, and compared to results calculated assuming statistical independence of listener errors using the percent correct word scores in clear and conversational speech presented above. The results are shown in Figure 12. It can be seen that there is some tendency for listeners to all get individual words right or wrong, indicated by higher observed probabilities compared to calculated error probabilities at the endpoints. However, this effect is not very dramatic. This suggests that most listener errors are essentially independent of each other. It should be pointed out that the type and degree of hearing impairments were quite different across listener in this study. If a more

homogeneous group of listeners was employed, a greater degree of interlistener error correlation might have been seen.

Effect of Word Position in Sentence on Intelligibility

Knowledge of significant differences in intelligibility across speaking mode as a function of word position in the sentence might be applied to determine the acoustical characteristics of clear speech most strongly tied to intelligibility increases. For example, one might expect to find low intelligibility scores for words in sentence final position in conversational speech since a speaker might tend to "trail off" at the end of a sentence. In clear speech, the intelligibility of all words might tend to be more uniform than in conversational speech. In such a case, acoustical characteristics most strongly dependent on word position in conversational speech could be contrasted with the corresponding characteristics in clear speech to pinpoint the salient differences.

Percent correct scores for words as a function of word position in the sentence were computed for sentences without adjectives (referred to as Type 1 sentences) and with adjectives (Type 2) for all data at each listener's MCL and ANOVA was applied to determine significant effects. ANOVA revealed that many main effects (mode, listener, speaker)

were significant. However, this section will confine discussion to those main effects that statistically interacted with word position (i.e., whose effect was dependent on word position in the sentence).

For Type 1 sentences, significant interactions with word position were found for Mode, Speaker, Speaker x System, and Listener. For Type 2 sentences, significant interactions with word position were found for Speaker and Listener, and word position itself was a significant effect. Except for the latter effect, however, no interaction or effect in Type 1 or Type 2 sentences with word position accounted for more than 3% of the variance, suggesting none of the interactions with word position were very dramatic.

Figure 13a contains the Mode x Position interaction for Type 1 and Type 2 sentences. Only the Type 1 interaction was significant. Note that the adjectives were substantially more intelligible than the nouns and verbs. This may reflect the fact that there are fewer adjectives than nouns or verbs in English, reducing the number of listener alternatives, or that the prosodic structure of Type 2 sentences is such that the listeners' attention is directed towards the adjective. In Type 1 sentences, the smallest intelligibility difference across speaking mode is seen in sentence final nouns. This effect, which one might attribute to a difficulty on the part of a speaker in

maintaining extreme clarity over the course of an entire sentence, is not seen in Type 2 sentences, inconsistent with such a hypothesis.

Figure 13b contains the Speaker x Position interaction. In Type 1 sentences, the verb for MM is least intelligible, while it is most intelligible for MS. In Type 2 sentences, the order of decreasing intelligibility with word position was adjective, verb, nouns. It is conceivable that such error patterns result from differences in characteristic stress patterns associated with different speakers. Again, it should be pointed out that the actual difference in error patterns is not very large. It will be interesting in future work to examine the stress patterns of the sentences to see if they are consistent with the speaker and position interaction.

Figure 13c shows word position errors for all four listeners. In Type 1 sentences, the two flat loss listeners (MF, VF) have slightly lower scores for words in sentence-final position than in the other two positions, perhaps resulting from a drop in the speaking level at the end of the sentences. Again, however, such an effect is not seen in the Type 2 sentences. Not including the adjective, three of the listeners (MF, VF, HS) achieve the highest scores for the verb in Type 2 sentences; only GC shows higher scores for the nouns. This may suggest that GC

employs a different strategy than the other listeners for for processing the sentences. It should be pointed out that other variables, such as the richness of the sentence structure employed in the construction of the nonsense sentences, may be confounding the analysis. Also, given the small percentage of the variance accounted for by most word position errors, the significance of a detailed study of word position errors is questionable.

Two-Syllable Word Errors

Listeners were tested on both one- and two- syllable words, though the ratio of one-syllable words to two-syllable words was 4:1 and hence all scores reported above primarily reflect performance on one-syllable words. The small number of two-syllable words and the variety of types (spondees, monosyllables with suffixes and prefixes, other two- syllable words) makes error analysis difficult. In general, however, trends observed for overall percent correct scores were very similar to those of one-syllable words, though average two-syllable word scores were approximately 10-15 percentage points higher. The higher intelligibility of the two-syllable words relative to one-syllable words is consistent with other studies (Hirsh et al, 1954).

Phoneme Error Analysis

It is important to analyze phoneme errors to determine if the increase in intelligibility associated with speaking clearly can be attributed to improvements in intelligibility of only a small group of sounds or whether an across-the-board increase occurs. However, analysis of phoneme level errors was confounded by two factors. First, the use of words as test materials introduces biases in listener responses to individual phonemes. Second, as described above, the listener often omitted individual phonemes and entire words when responding to the sentences. Since the errors of three listeners (GC, HS, LF) contained a high percentage of word omissions, it was decided that their data were not suitable for phoneme error analysis. The other two listeners' errors (MF, VF) contained a much smaller percentage of word omissions (<10%), though a substantial percentage of their phoneme-level errors (30-40%) were phoneme deletions. The advantage of a closed response set for obtaining data on consonant confusions is well known (Miller and Nicely, 1955); a concurent study (Chen, 1980) took advantage of this type of experimental design to analyze the effects of speaking clearly on plosive perception. Even given the "noisy" quality of the data, it is very important to at least attempt to analyze phoneme-level errors to insure no obvious error trends or patterns are ignored.

Phoneme-level errors were tabulated by obtaining a

dictionary pronunciation for each word, comparing the listener's response with the dictionary pronunciation, and defining a phoneme error to occur when the listener's response differed from the dictionary pronunciation. Therefore, if the listener responded "tar", and the correct answer was "star", the fact that the /s/ was deleted was recorded. If the listener responded "cap" instead of "cat", a notation was made that the listener substituted a /p/ for a /t/. No attempt was made to analyze listener errors in terms of actual phonetic transcriptions of the spoken sentences. Two types of analyses were performed on phoneme errors. In the first type of analysis, percent correct scores for individual phonemes were computed for all MCL test lists of listeners MF and VF. The scores were weighted by the corresponding frequency of occurence of each phoneme and grouped into categories differing across manner of articulation. The different classes that were tabulated were: fricatives, plosives, semivowels, nasals, and vowels. In the other analysis, confusion matrices were constructed for the following 24 consonants /p, t, k, b, d, g, f, th, s, sh, v, dh, z, zh, ch, jh, m, n, ng, w, r, y, l, h/ and sequential transmitted information (SINFA) (Wang and Bilger, 1973) was computed using the features defined in Table 7 (similar to those used by Miller and Nicely (1955)). Consonant deletions were omitted from this type of analysis and are reported separately.

Significant effects in the first type of analysis were determined using ANOVA. It was found that Mode x Phoneme, Speaker x Phoneme, and Listener x Phoneme x System effects were significant. The Speaker x Mode x Phoneme interaction is shown in Figure 14. The intelligibility of all phoneme classes increased in clear speech for all speakers, with the sole exception of MP's fricatives. The largest intelligibility increases are seen in plosives. Speaker MM showed the most consistent intelligibility increases from conversational to clear speech across phoneme classes. It will be important to analyze his speech and contrast the characteristics of his clear speech with the clear speech of MS (the clear speech with the lowest intelligibility) and the conversational speech of MP (the conversational speech with the highest intelligibility). Figure 15 shows the Listener x System x Phoneme interaction. Listener VF's performance on fricative identification was substantially degraded under the OMCL system, consistent with the fact the the OMCL gain at high frequencies was reduced relative to the corresponding gain in her ORTH system. MF shows the greatest improvement for fricatives and plosives, consistent with the additional gain at high frequencies in her OMCL system.

As mentioned above, consonant deletions confound confusion analysis as one cannot hypothesize what the listener might have responded. Averaging data from MF and

VF, the class of sounds with the largest percentage of deletions relative to the total number of errors was semivowels (43%); however, substantial numbers of deletions also occurred for plosives (31%), fricatives (28%), and nasals (33%). There was less of a tendency to delete sounds in clear speech (29%) than in conversational speech (38%), but no Mode x Deletion x Phoneme-Class interactions were observed.

Table 9 presents the results of SINFA analysis on feature perception. Average relative information transmitted for the major features identified by SINFA is reported. Analysis of variance on the features sonorant, voicing, place, and obstruent (sibilance was omitted because its overall contribution to transmitted information was usually less than 1%) revealed significant Feature and Feature x Mode interactions. The Feature x Mode interaction is shown in Figure 16. Perception of sonorance and voicing is better than perception of frication and place; but there is a general improvement in percent transmitted information across all features. As stated above, one must be cautious in the interpretation of these results because of the substantial number of phoneme deletions that occurred and hence not included in this analysis.

DISCUSSION

The above results indicate that substantial increases in intelligibility can occur when an individual attempts to speak clearly to an impaired listener. To a first approximation, these increases are independent of level, frequency-gain characteristic, and listener. Since the increase in intelligibility was relatively independent of level and frequency-gain characteristic, speaking clearly seems to be able to supply improvements in intelligibility in addition to those improvements provided by currently available hearing aids. Recent studies (Lippmann, Braida, and Durlach (1981), Pascoe (1975)) suggest that well-chosen hearing aids can improve word intelligibility scores by 20-30 percentage points; the improvements in word intelligibility arising from clear speech (an average of 17 percentage points in these experiments) were certainly of the same order of magnitude. It should be pointed out that the results of these experiments were speaker-dependent- one speaker's (MS) clear speech was relatively low in intelligibility, another speaker's (MP) conversational speech was relatively high in intelligibility. This might imply that if a device existed to convert conversational to clear speech, the intelligibility improvements might be strongly speaker-dependent. Other studies of hearing aid performance versus speaker identity have been inconclusive. The results of these experiments are particularly encouraging in the light of other studies' failures to improve on currently available hearing aids. Recent

advances in technology have permitted exploration of new types of signal processing schemes for hearing aids that previously would have been impossible to implement and test. Unfortunately, these attempts to improve on the basic hearing aid (which is merely a frequency-dependent amplification system) have so far proved unsuccessful (Lippmann, Braida, and Durlach, 1981 ; Reed, Hicks, Braida, and Durlach, 1978). It is hoped that studying the strategies people use when speaking clearly will provide new ideas for processing speech to increase intelligibility for hearing-impaired listeners.

The most disappointing aspect of this study was the difficulty in analyzing segmental-level errors because of word and phoneme omissions by the listeners. Although the listeners were urged to respond even if they were unsure of the answer, it appeared that some listeners were simply unable to respond in such a case. The use of tests with closed response sets (Miller and Nicely ,1955), or tests in which the listener only has to identify one word per sentence (as in the SPIN test, Kalikow and Stevens ,1977), might be required in future work on clear speech in order to might yield more information on segmental-level errors.

There are a number of additional questions that should be addressed in future work. All phoneme-level error analyses were performed using dictionary pronunciations of the

sentences. It would be interesting to examine phoneme errors with reference to actual phonetic transcriptions of the sentences. All testing of impaired listeners was performed using test materials spoken in a quiet environment. This is not a very realistic testing situation since almost all communication occurs in the presence of some ambient noise and reverberation. In future work, impaired listeners should be tested using materials with some background noise or reverberation. No testing using normal English sentences was performed in this study. Although a preliminary study (Picheny and Durlach, 1979) indicated that there were substantial intelligibility differences between clear and conversational speech using Harvard sentences (IEEE, 1979), it is important to examine the magnitude of the intelligibility differences for sets of normal English sentences in a more controlled fashion. The training procedure used on the speakers to generate clear and conversational speech was very informal and probably not optimal. More structured forms of training (e.g., interactive (Chen, 1980)) should be examined in greater detail. Finally, it would be interesting to compare test results on the impaired listeners to results obtained on normal hearing listeners with simulated losses. Intuitively, it is felt that the results would not be qualitatively different. If this is the case, substantial amounts of future work on clear speech could be performed on normal hearing listeners with simulated losses, thus

simplifying the test procedure.

To summarize, the above results indicate that substantial increases in intelligibility can occur when an individual attempts to speak clearly to an impaired listener. These increases were found to be essentially independent of presentation level, frequency-gain characteristic, and the identity and loss of the impaired listener. At a more detailed level of analysis, improvements seem to occur for all classes and types of phonemes. Future papers will discuss acoustical differences between clear and conversational speech, and attempts to relate acoustical factors to intelligibility scores.

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Her temple strived for the planter.

Her blond shore grins at her manner.

A northern wake throws at your surge.

Our deaf ads traced my ants.

Your better pearl sticks the thresholds.

Their growths would rip my vectors.

Their pail bails my tone.

My witty metal should blame his luck.

The new cross must engage the language.

Our egg waits for his export.

TABLE 1

Examples of typical nonsense sentences with key words underscored.

VOWELS		PLOSIVES				FRICATIVES			
i	25	p	26	b	21	f	26	v	5
I	30	t	66	d	31	th	2	dh	0
e	21	k	27	g	7	s	66	z	4
E	31					sh	7	zh	1
u	1								
U	9		NASALS				AFFRICATES		
a	8		m	17			č	13	
o	11		n	34			ǰ	2	
c	9		ng	3					
ae	17								
ʌ	23		SEMIVOWELS				ASPIRATE		
3	15		w	5			h	10	
yu	1		y	1					
a:	17		r	55					
o:	1		l	41					
aw	3								

TABLE 2

Phonemic composition of a typical set of 50 sentences.

LISTENER	SEX	AGE	ETIOLOGY	TYPE OF LOSS	TEST EAR	W-22	HEARING AID	SRT dB ISO
MF	F	58	Unknown	BF	L	48	Yes	70
VF	F	61	Unknown	BF	L	92	Yes	65
GC	M	64	Noise Exposure	US	R	28	No	15
HS	M	54	Noise Exposure	BS	L	64	No	0
LF	F	24	Congenital	BF	L	52	Yes	45

Table 3

Impaired Listeners Participating in Experiments

Under type of loss,
B = bilateral
U = unilateral
F = flat audiogram
S = sloping audiogram

ORTH SYSTEM

LISTENER

	MF		VF		GC		HS		LF	
	MCL	MAX	MCL	MAX	MCL	MAX	MCL	MAX	MCL	MAX
MM CONV	96	96	100	102	73	99	89	96	98	108
MM CLR	96	96	100	100	70	101	89	96	97	104
MP CONV	94	94	98	98	71	99	88	96	102	106
MP CLR	94	94	98	98	71	99	90	96	103	104
MS CONV	95	95	100	100	72	102	91	93	104	100*
MS CLR	95	95	99	100	72	101	89	99	101	105

OMCL SYSTEM

MM CONV	98	99	98	103	67	72	83	96
MM CLR	98	98	100	106	64	73	87	96
MP CONV	98	98	99	110	65	74	88	97
MP CLR	98	99	102	105	66	73	86	97
MS CONV	99	99	100	108	67	72	90	97
MS CLR	100	100	101	107	66	74	91	97

TABLE 4

Presentation levels (in dB) associated with the two frequency-gain characteristics in the experments. LF was not tested on the OMCL system.

* Although LF had originally chosen a MAX level of 109 dB, at the start of the experiment, she could not tolerate the intensity and insisted on reducing the gain.

ORTH SYSTEM

		CONVERSATIONAL				CLEAR			
		MCL-10	MCL		MAX	MCL-10	MCL		MAX
	MM	12	31	29	32	42	60	65	72
MF	MP	12	33	37	51	30	46	53	56
	MS	6	24	20	19	12	45	47	51
	MM	57	72	70	74	75	86	87	90
VF	MP	55	77	83	84	74	81	85	86
	MS	41	66	72	65	50	81	81	78
	MM	41	32	53	40	61	56	70	64
GC	MP	59	49	56	53	65	52	65	58
	MS	34	35	43	33	61	60	64	49
	MM	54	51	53	66	71	77	82	87
HS	MP	71	63	58	64	69	74	73	77
	MS	49	49	42	32	54	76	59	77
	MM	47	63	65	68	82	81	82	89
LF	MP	61	83	81	78	79	84	83	86
	MS	36	70	61	69	66	77	84	73

OMCL SYSTEM

	MM	18	28	41	51	44	62	75	69
MF	MP	25	52	65	63	36	70	71	65
	MS	15	32	35	27	32	55	63	60
	MM	52	66	65	78	73	87	93	92
VF	MP	40	70	81	82	60	77	84	85
	MS	35	51	64	73	49	68	74	79
	MM	47	46	44	51	63	63	66	67
GC	MP	58	57	59	52	62	57	68	66
	MS	49	36	41	43	57	66	57	58
	MM	49	70	66	72	75	87	83	91
HS	MP	67	73	80	76	82	85	84	82
	MS	62	62	60	67	81	83	82	82

TABLE 5

Intelligibility scores for all listeners (first column) and all speakers (second column). For MCL, test and retest scores are displayed in the order in which the tests were administered.

SUM OF SQUARES	MEAN SQUARE	DF	F	w (%)	FACTOR
2.8966	1.4483	2	190.6*	11.1	LE
1.7247	0.8623	2	113.5*	6.9	SP
0.0604	0.0151	4	2.0	.1	SPxLE
10.0945	3.3648	3	442.7*	40.6	LI
2.0368	0.3395	6	44.7*	8.1	LIxLE
0.1703	0.0284	6	3.7*	.5	LIxSP
0.2190	0.0183	12	2.4	.5	LIxSPxLE
0.4787	0.4787	1	63.0*	1.9	SY
0.0326	0.0163	2	2.1	.1	SYxLE
0.0600	0.0300	2	3.9*	.2	SYxSP
0.1018	0.0254	4	3.3*	.3	SYxSPxLE
0.6245	0.2082	3	27.4*	2.4	SYxLI
0.0897	0.0150	6	2.0	.2	SYxLIxLE
0.1730	0.0288	6	3.8*	.5	SYxLIxSP
0.0318	0.0026	12	.3	--	SYxLIxSPxLE
4.6388	4.6388	1	610.4*	18.7	MO
0.0126	0.0063	2	.8	--	MOxLE
0.5127	0.2564	2	33.7*	2.0	MOxSP
0.0838	0.0210	4	2.8	.2	MOxSPxLE
0.1552	0.0517	3	6.8*	.5	MOxLI
0.0615	0.0102	6	1.3	.1	MOxLIxLE
0.0877	0.0146	6	1.9	.2	MOxLIxSP
0.1099	0.0092	12	1.2	.1	MOxLIxSPxLE
0.0047	0.0047	1	.6	--	MOxSY
0.0403	0.0201	2	2.6	.1	MOxSYxLE
0.0095	0.0047	2	.6	--	MOxSYxSP
0.0152	0.0038	4	.5	--	MOxSYxSPxLE
0.0264	0.0088	3	1.1	--	MOxSYxLI
0.1126	0.0188	6	2.5	.3	MOxSYxLIxLE
0.0439	0.0073	6	1.0	--	MOxSYxLIxSP
0.0912	0.0076	12	---	--	MOxSYxLIxSPxLE
24.8004	0.1734	143			TOTAL

TABLE 6

Analysis of variance of main keyword errors. F ratios whose significance is greater than .95 are marked with asterisks.

MO = Mode, SY = System, LI = Listener, SP = Speaker, LE = Level

	VOICED	SONORANT	OBSTRUENT	PLACE	SIBILANT
p	0	0	1	0	0
t	0	0	1	1	0
k	0	0	1	2	0
b	1	0	1	0	0
d	1	0	1	1	0
g	1	0	1	2	0
f	0	0	2	0	0
th	0	0	2	1	0
s	0	0	2	1	1
sh	0	0	2	2	1
v	1	0	2	0	0
dh	1	0	2	1	0
z	1	0	2	1	1
zh	1	0	2	2	1
ch	0	0	3	2	1
jh	1	0	3	2	1
m	1	1	0	0	0
n	1	1	0	1	0
ng	1	1	0	2	0
w	1	2	0	0	0
r	1	2	0	3	0
y	1	2	0	1	0
l	1	2	0	2	0
h	0	2	0	2	0

TABLE 7

Feature definitions for SINFA analysis.

ORTH SYSTEM

		VOICED		SONORANT		OBSTRUENT		PLACE		SIBILANCE	
		CONV	CLR	CONV	CLR	CONV	CLR	CONV	CLR	CONV	CLR
	MM	55	89	72	87	48	77	43	64	15	17
MF	MP	69	78	71	88	61	56	38	60	4	18
	MS	47	71	71	84	42	59	36	44	0	22
	MM	82	99	96	98	79	89	78	89	16	16
VF	MP	92	93	98	98	86	91	86	87	27	28
	MS	96	96	93	95	75	84	77	80	26	27

OMCL SYSTEM

	MM	61	82	75	88	60	82	38	63	59	23
MF	MP	80	89	85	91	78	77	59	78	13	11
	MS	61	79	79	91	63	68	41	66	18	15
	MM	81	95	92	96	73	95	73	92	13	23
VF	MP	87	88	88	98	84	86	81	84	15	15
	MS	80	80	93	95	71	77	62	70	17	15

TABLE 8

Average relative information transmitted (in %) from SINFA Analysis.

Listener MF

Speaker Sibilance	Sonorant	Voicing	Frication	Place
		CONV-ORTH		
MM	.719	.548	.476	.431	.147
MP	.711	.689	.612	.375	.407
MS	.712	.474	.422	.363	.044
		CLEAR-ORTH		
MM	.866	.890	.772	.643	.167
MP	.875	.782	.557	.595	.079
MS	.836	.705	.590	.442	.215
		CONV-OMCL		
MM	.749	.608	.595	.377	.587
MP	.854	.796	.781	.589	.126
MS	.785	.614	.634	.410	.178
		CLEAR-OMCL		
MM	.875	.822	.819	.629	.229
MP	.912	.888	.774	.783	.109
MS	.909	.794	.693	.660	.149

Listener VF

		CONV-ORTH		
MM	.960	.820	.786	.778	.155
MP	.978	.908	.862	.859	.272
MS	.960	.927	.948	.769	.256
		CLEAR-ORTH		
MM	.977	.989	.894	.892	.161
MP	.983	.930	.905	.866	.248
MS	.963	.950	.841	.795	.268
		CONV-OMCL		
MM	.922	.808	.728	.729	.125
MP	.969	.870	.836	.808	.145
MS	.926	.804	.712	.617	.166
		CLEAR-OMCL		
MM	.960	.953	.950	.913	.231
MP	.965	.977	.855	.840	.151
MS	.953	.800	.765	.703	.146

TABLE 9

Average relative information transmitted (in %) as revealed by the final iteration of SINFA analysis.

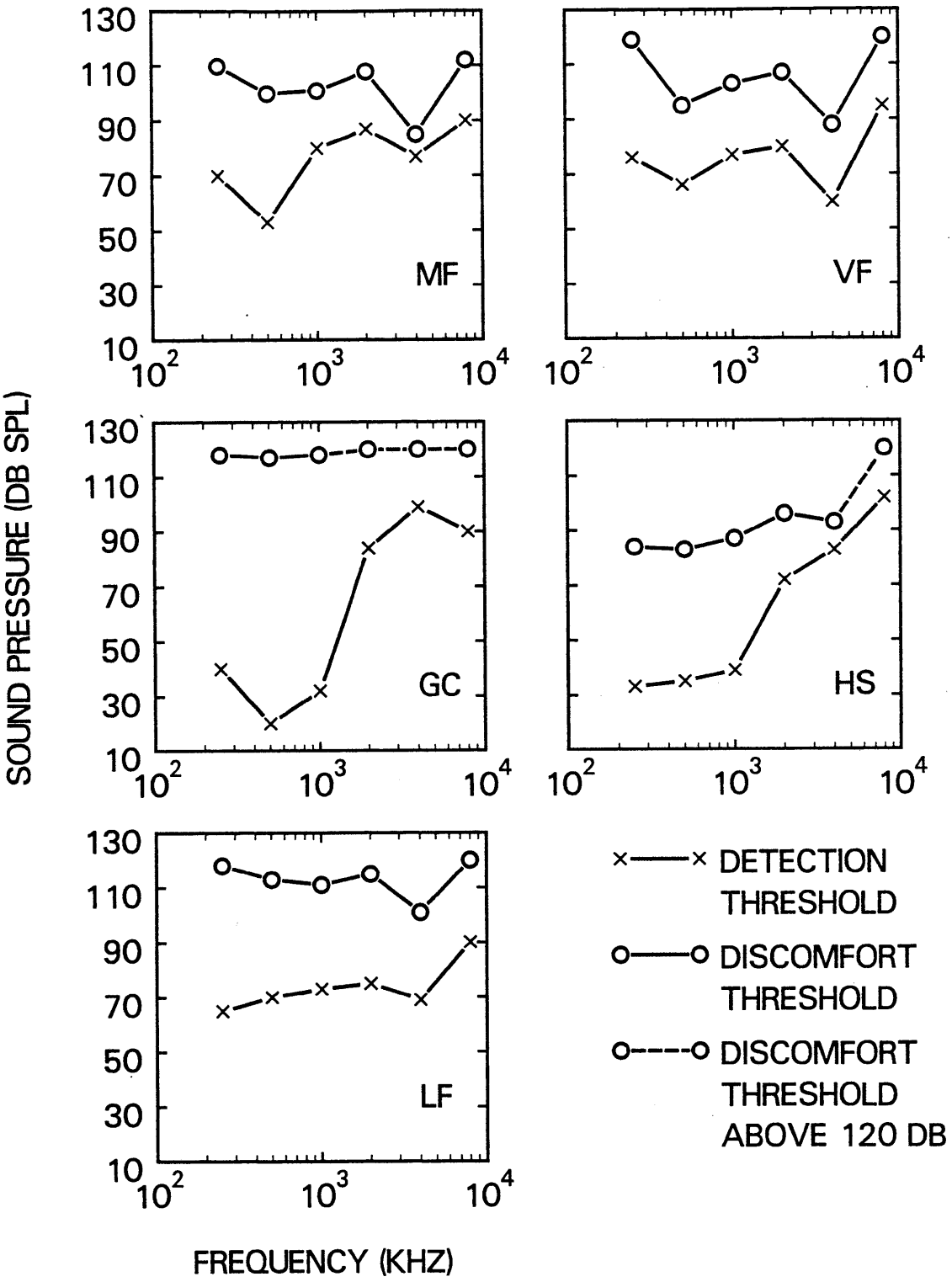

Figure 1. Detection and discomfort thresholds of impaired listeners.

DAY 1	1	2	3	DAY 2	4	5	6
ORTH	CONV	CLR	CONV	OMCL	CLR	CONV	CLR
S1	I1	I2	I3	S2	I2	I3	I1
	SL1	SL2	SL3		SL1	SL2	SL3
DAY 3	7	8	9	DAY 4	10	11	12
ORTH	CLR	CONV	CLR	OMCL	CLR	CONV	CLR
S3	I3	I1	I2	S1	I1	I2	I3
	SL1	SL2	SL3		SL5	SL6	SL7
DAY 5	13	14	15	DAY 6	16	17	18
ORTH	CONV	CLR	CONV	OMCL	CONV	CLR	CONV
S2	I2	I3	I1	S3	I3	I1	I2
	SL5	SL6	SL7		SL5	SL6	SL7
DAY 7	19	20	21	DAY 8	22	23	24
ORTH	CLR	CONV	CLR	OMCL	CONV	CLR	CONV
S1	I3	I2	I1	S2	I1	I3	I2
	SL3	SL2	SL1		SL3	SL2	SL1
DAY 9	25	26	27	DAY 10	28	29	30
ORTH	CONV	CLR	CONV	OMCL	CONV	CLR	CONV
S3	I2	I1	I3	S1	I3	I2	I1
	SL3	SL2	SL1		SL7	SL6	SL5
DAY 11	31	32	33	DAY 12	34	35	36
ORTH	CLR	CONV	CLR	OMCL	CLR	CONV	CLR
S2	I1	I3	I2	S3	I2	I1	I3
	SL7	SL6	SL5		SL7	SL6	SL5

Figure 2
Experimental Plan

CONV -- Conversational Speech
CLR -- Clear Speech
ORTH -- Orthotelephonic Frequency-Gain Characteristic
OMCL -- Lippmann's OMCL Frequency-Gain Characteristic
Sn -- nth Speaker
In -- nth Intensity (I2-->L0 in text)
SLn -- nth Sentence List associated with Ith speaker

Note: When repeating the presentation of a sentence list, the order of the sentences will be permuted.

AFTER DAY 3	1	2	3
ORTH	CONV	CLR	CONV
I2	S1	S2	S3
	SL4	SL4	SL4

AFTER DAY 6	4	5	6
OMCL	CLR	CONV	CLR
I2	S3	S3	S1
	SL8	SL8	SL8

AFTER DAY 9	7	8	9
ORTH	CLR	CONV	CLR
I2	S3	S2	S1
	SL4	SL4	SL4

AFTER DAY 12	10	11	12
OMCL	CONV	CLR	CONV
I2	S1	S2	S3
	SL8	SL8	SL8

Figure 3
Additional Experiments

CONV -- Conversational Speech
CLR -- Clear Speech
ORTH -- Orthotelephonic Frequency-Gain Characteristic
OMCL -- Lippmann's OMCL Frequency-Gain Characteristic
Sn -- nth Speaker
In -- nth Intensity (I2-->L0 in text)
SLn -- nth Sentence List associated with Ith Speaker

Each of the above experiments was performed after the corresponding day in the main body of experiments.

Note: When repeating the presentation of a sentence list, the order of the sentences was permuted.

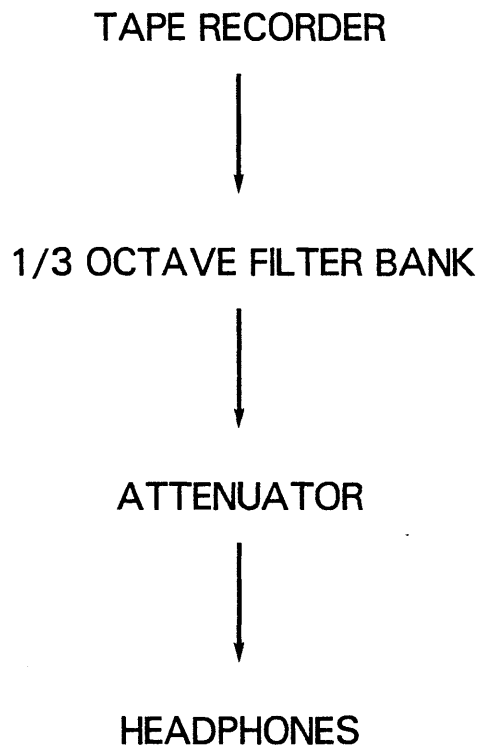

Figure 4. Experimental setup.

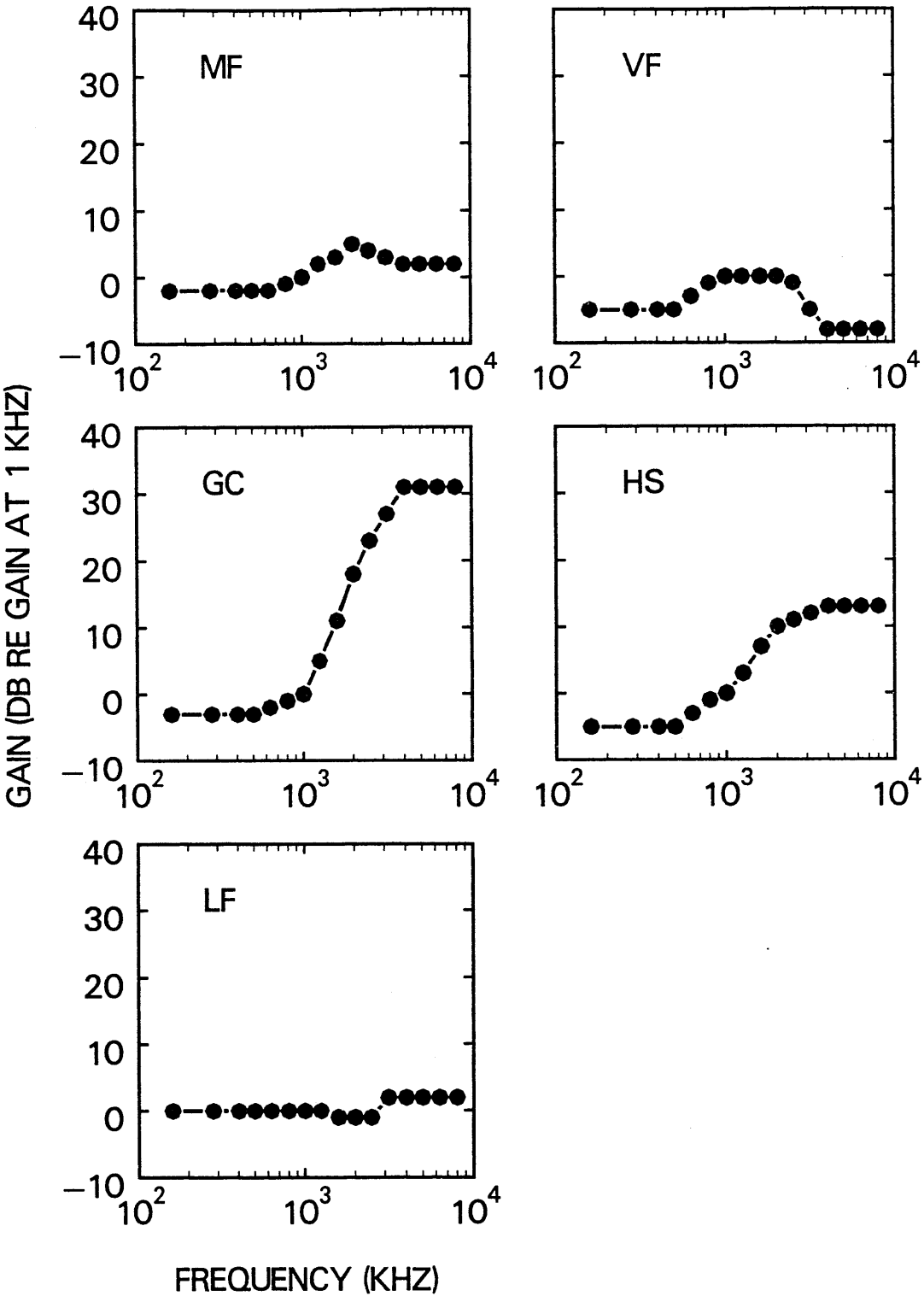

Figure 5. OMCL frequency gain characteristics chosen by impaired listeners.

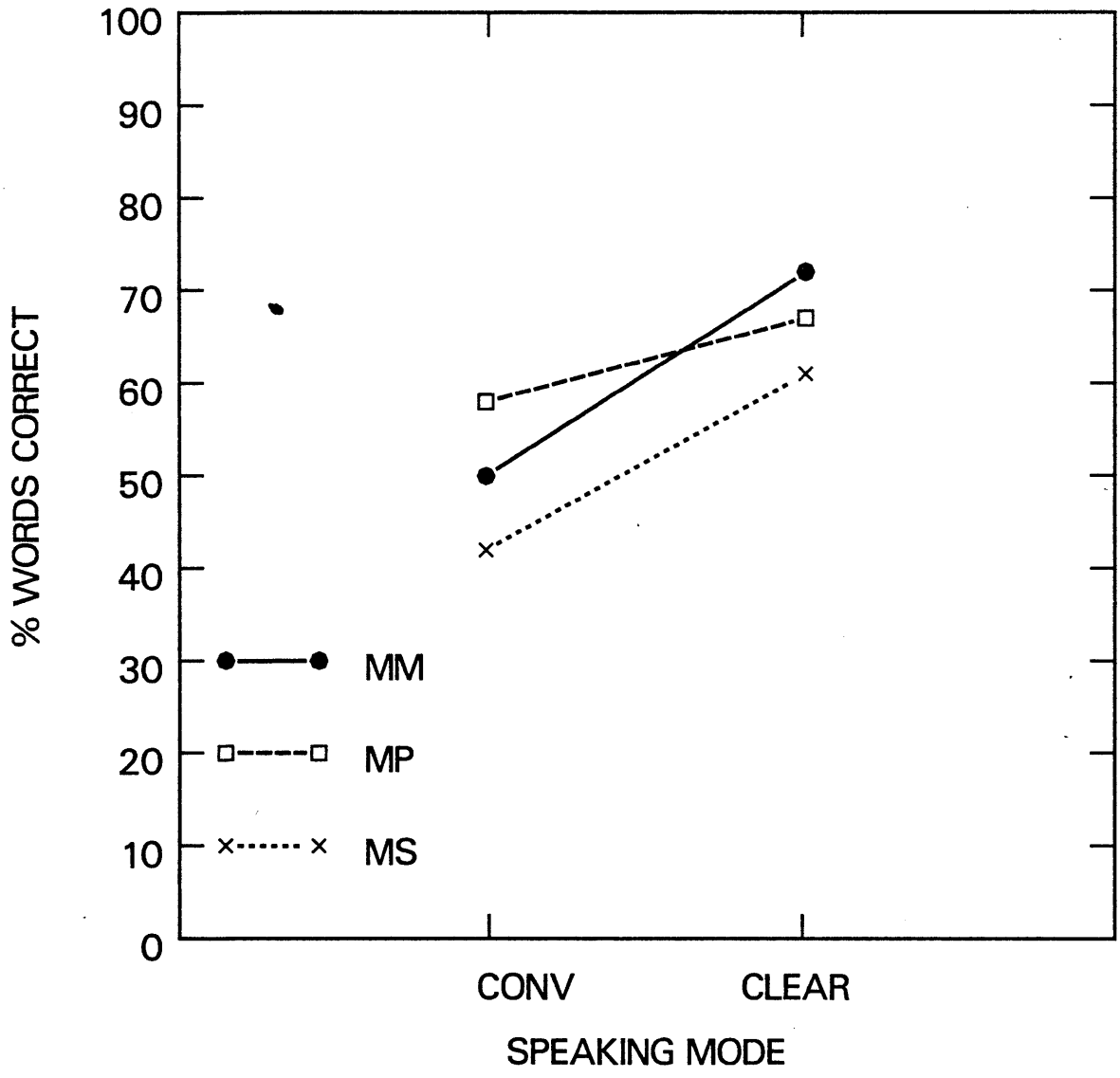

Figure 6. Intelligibility scores as a function of speaking mode for all three speakers.

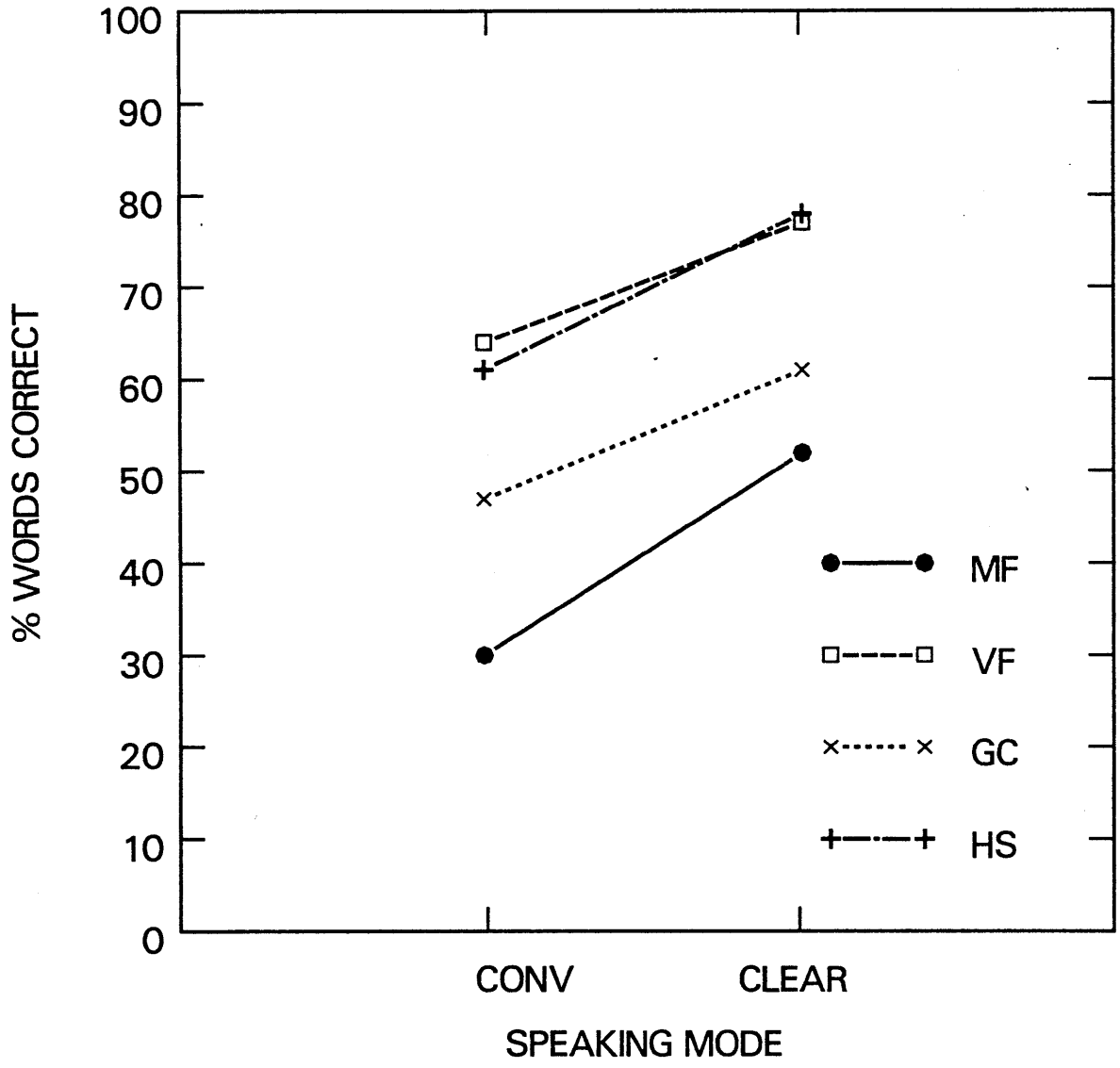

Figure 7. Intelligibility scores as a function of speaking mode for all four listeners.

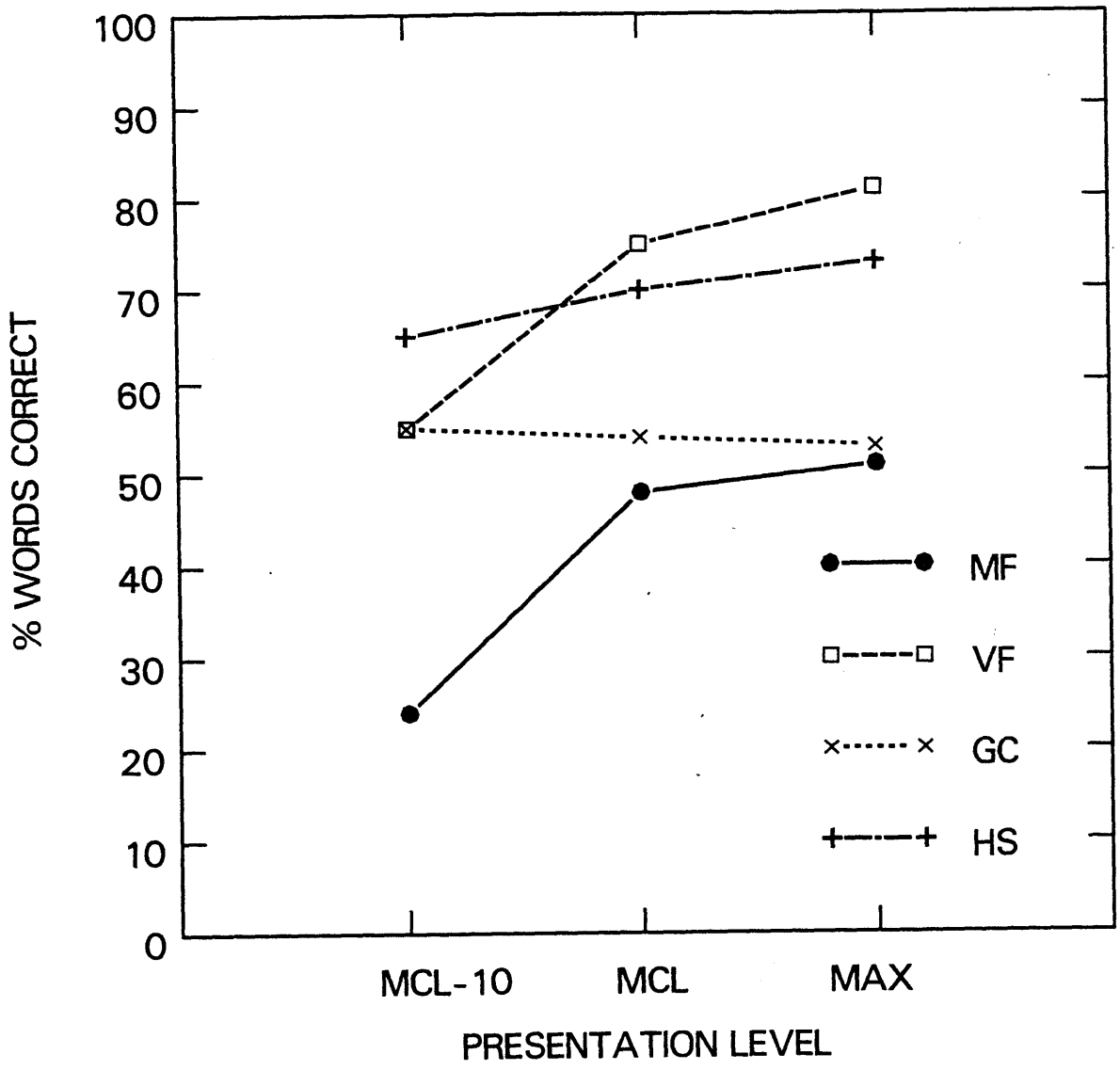

Figure 8. Intelligibility scores as a function of presentation level for all four listeners.

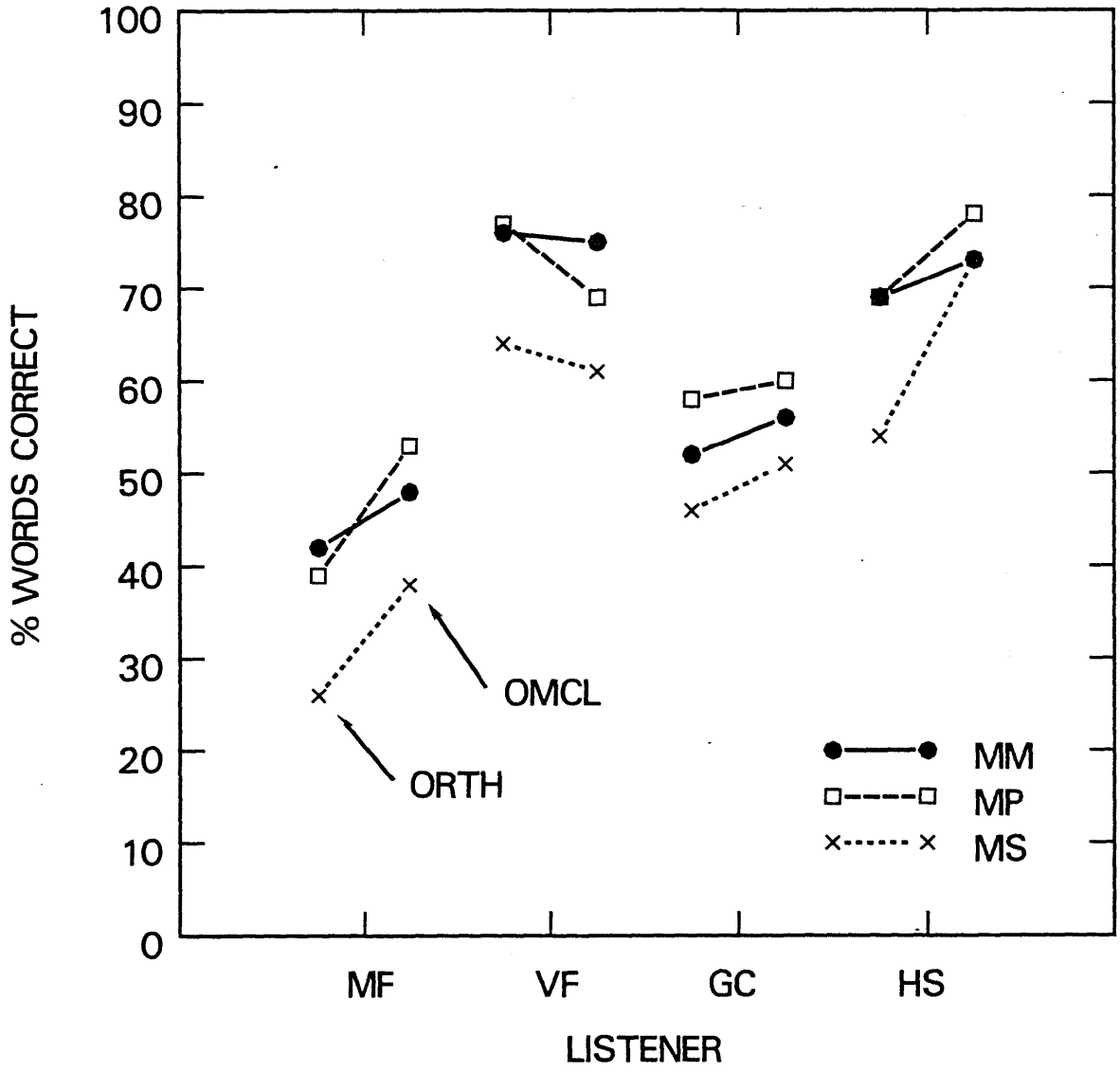

Figure 9. Intelligibility scores as a function of listener and frequency-gain characteristic for all three speakers.

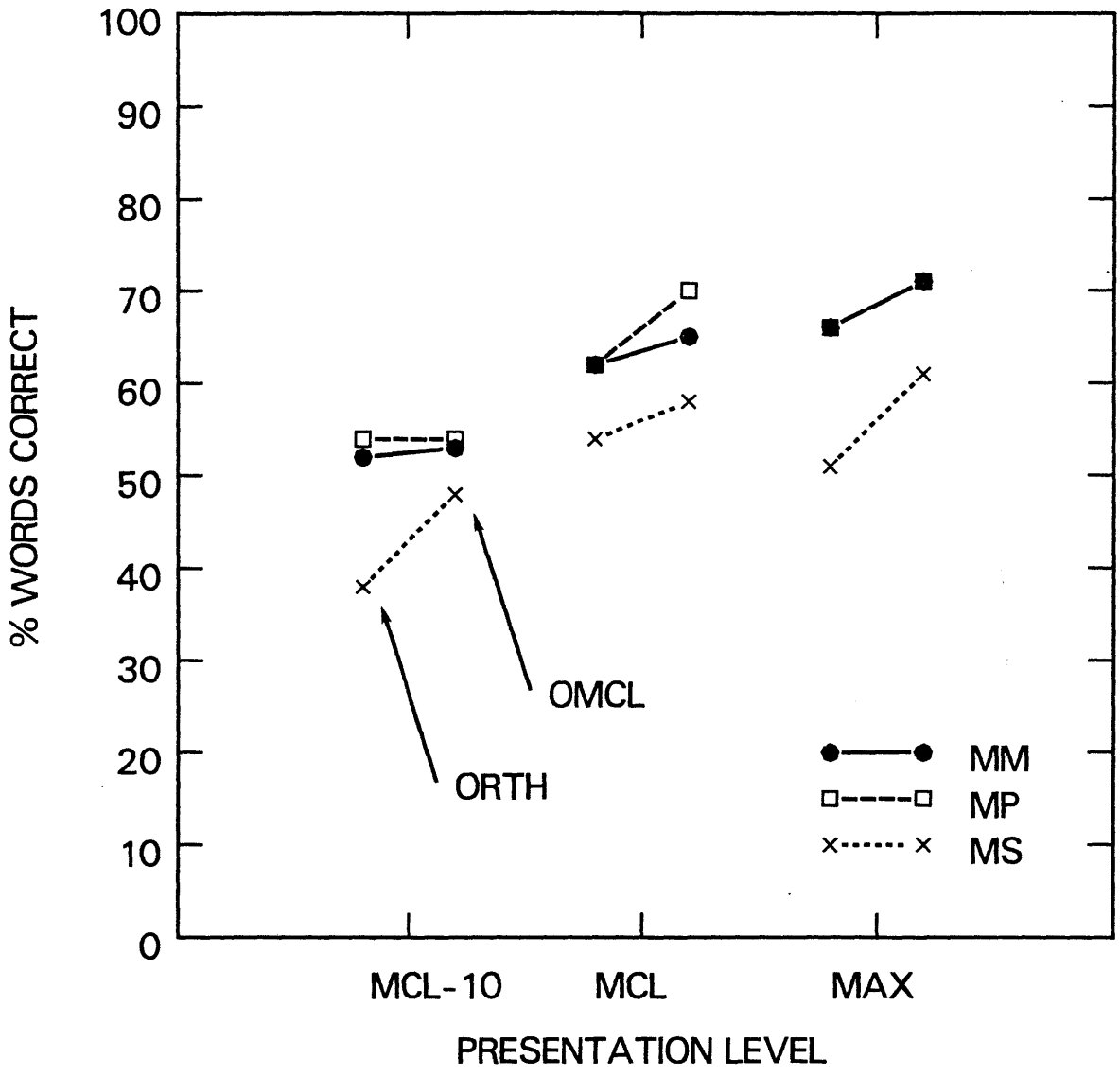

Figure 10. Intelligibility scores as a function of presentation level and frequency-gain characteristic for all three speakers.

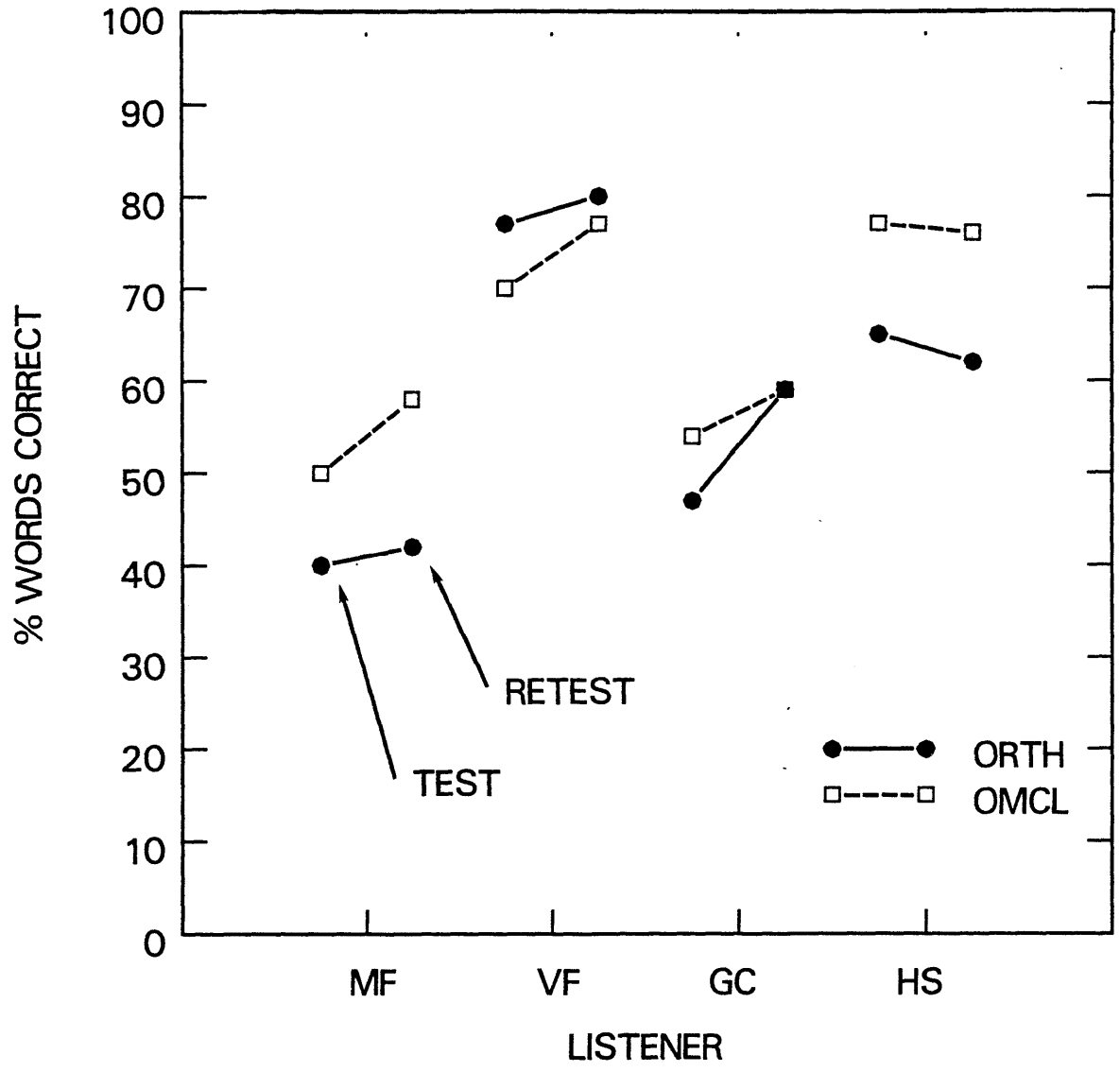

Figure 11. Learning effects as a function of listener and frequency-gain characteristic.

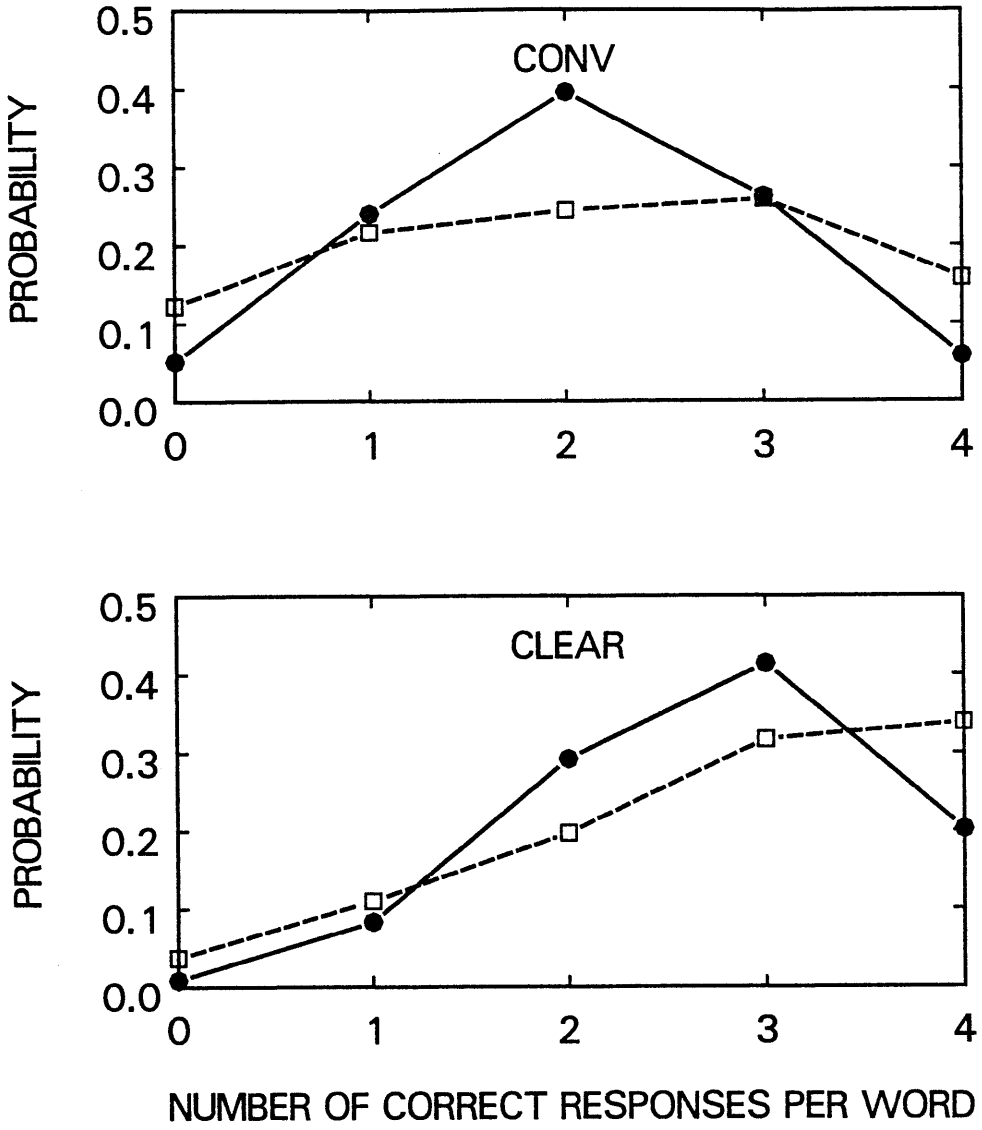

Figure 12. Probability of the number of correct responses per word summed across listener observed in the intelligibilty tests (□) and calculated from percent correct scores (●) in conversational and clear speech.

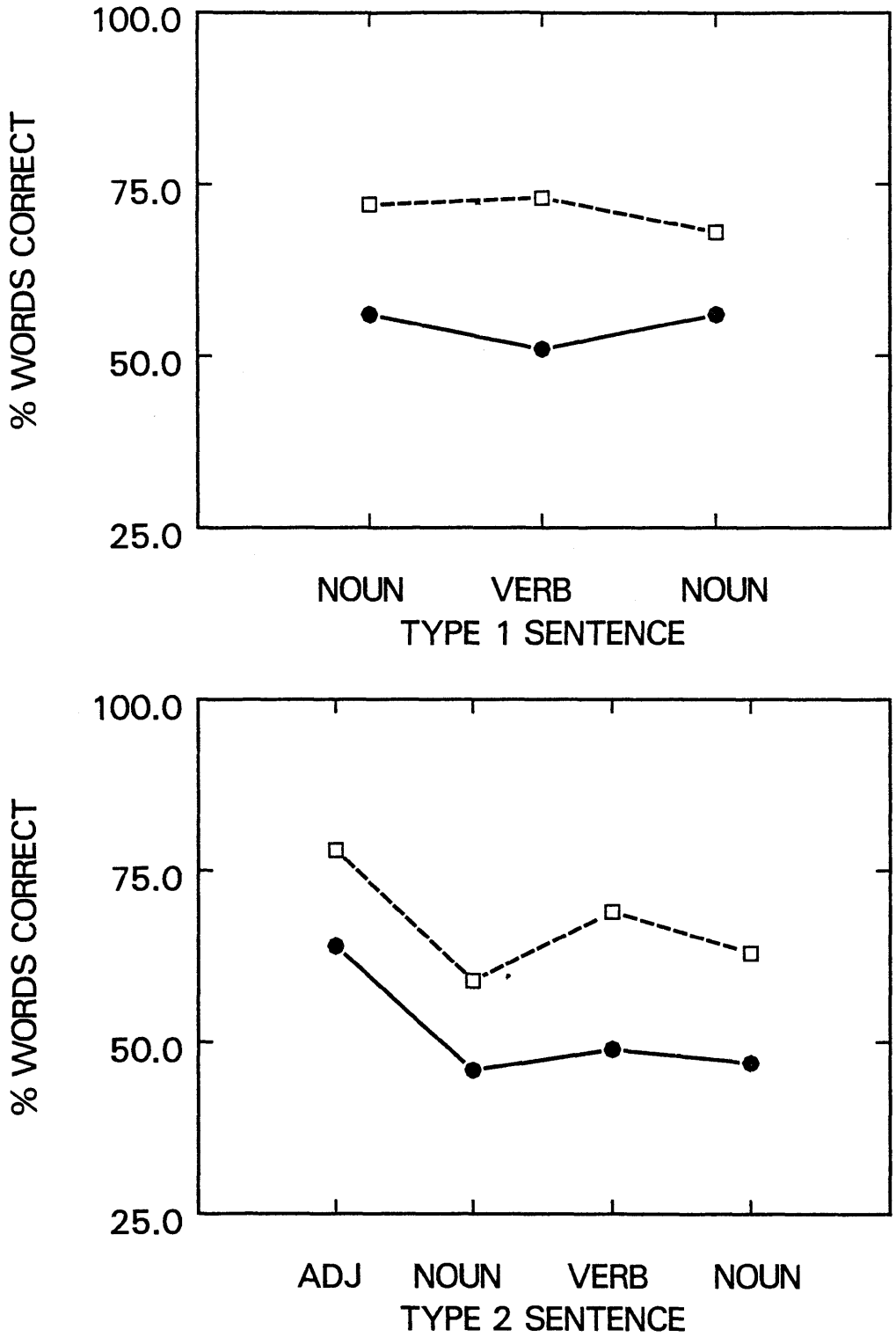

Figure 13a. Intelligibility as a function of word position and speaking mode for type 1 and type 2 sentences. (CONV(●) CLEAR(□))

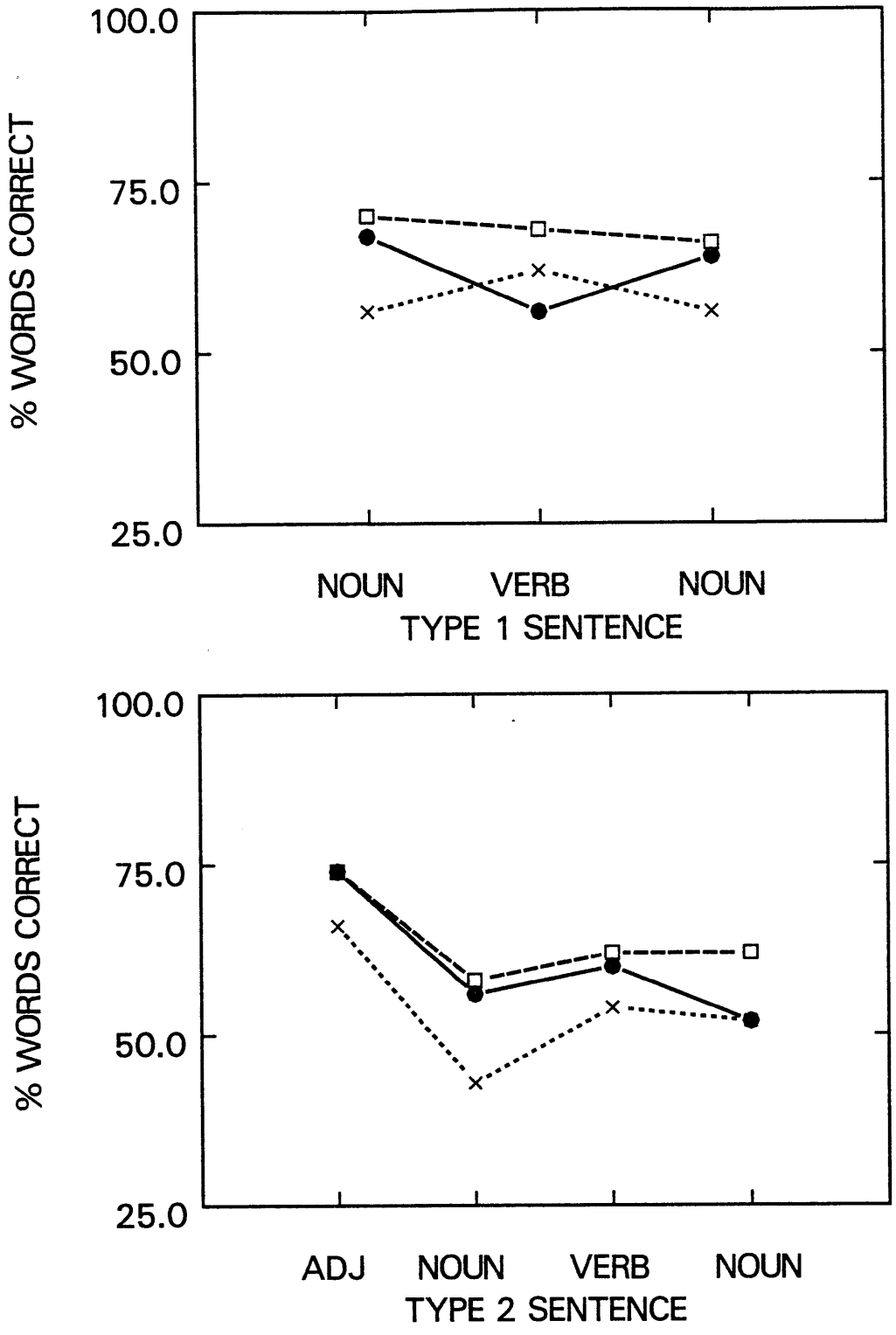

Figure 13b. Intelligibility as a function of word position and speaker for type 1 and type 2 sentences. (MM(●) MP(□) MS(×))

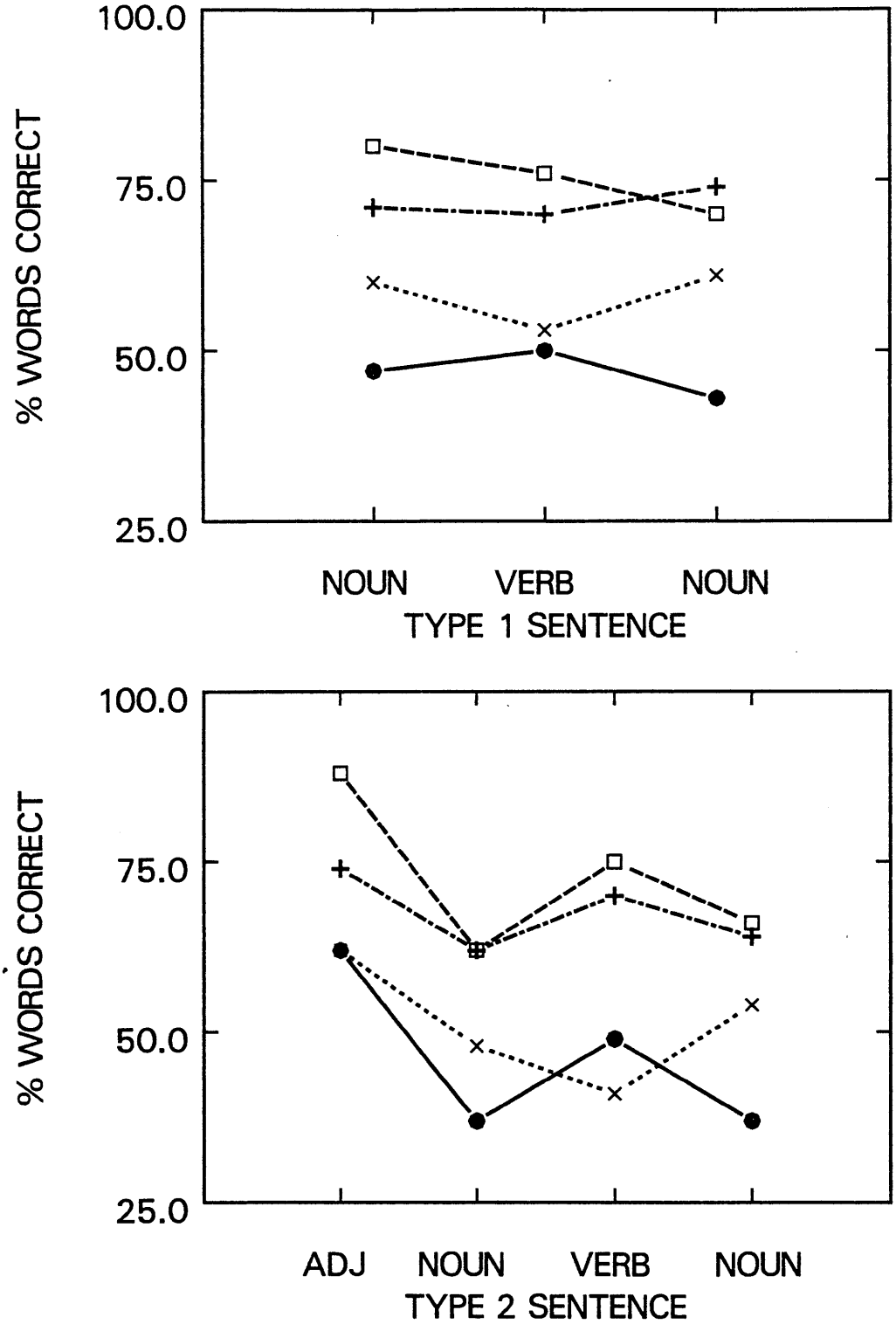

Figure 13c. Intelligibility as a function of word position and listener for type 1 and type 2 sentences. (MF(●) VF(□) GC(×) HS(+))

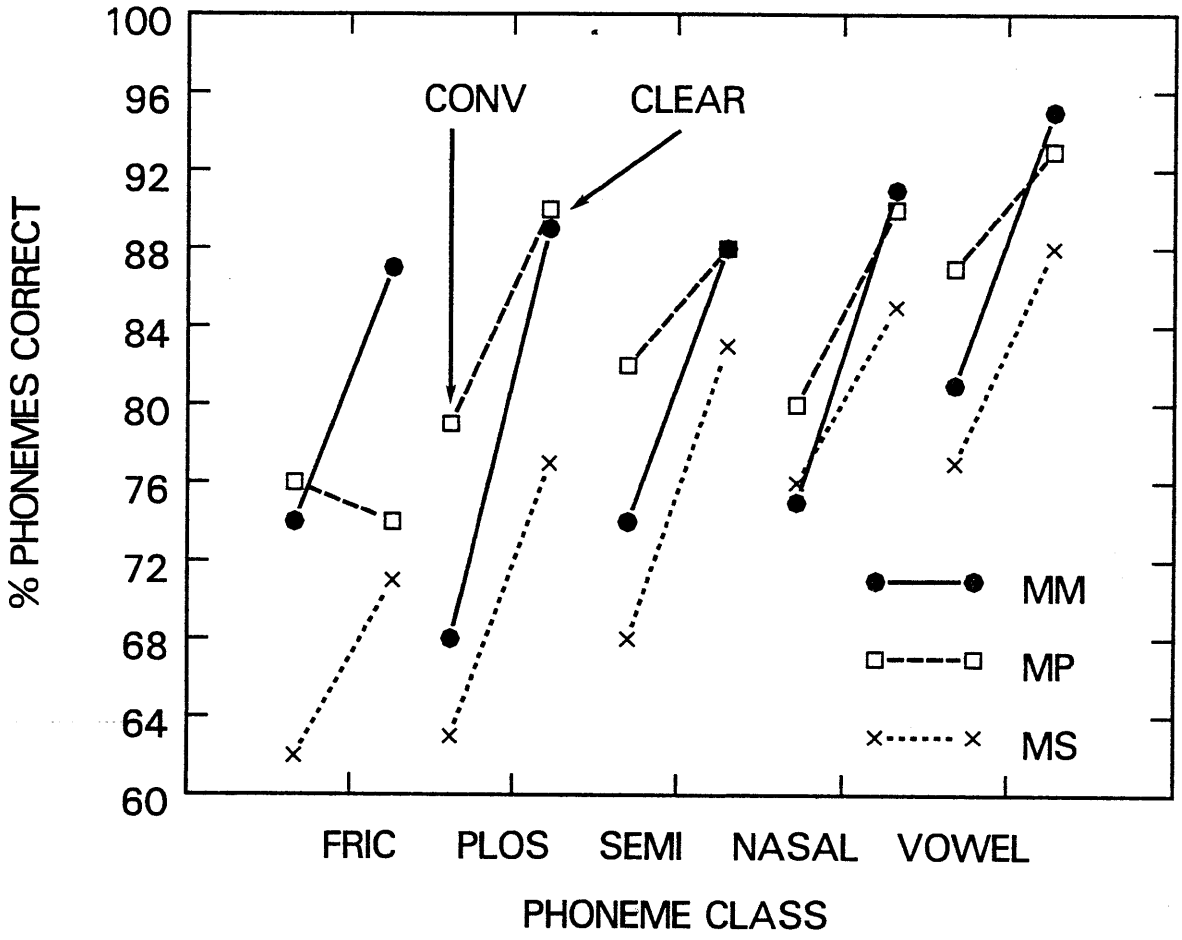

Figure 14. Percent phonemes correct scores as a function of phoneme class for all three speakers and both speaking modes.

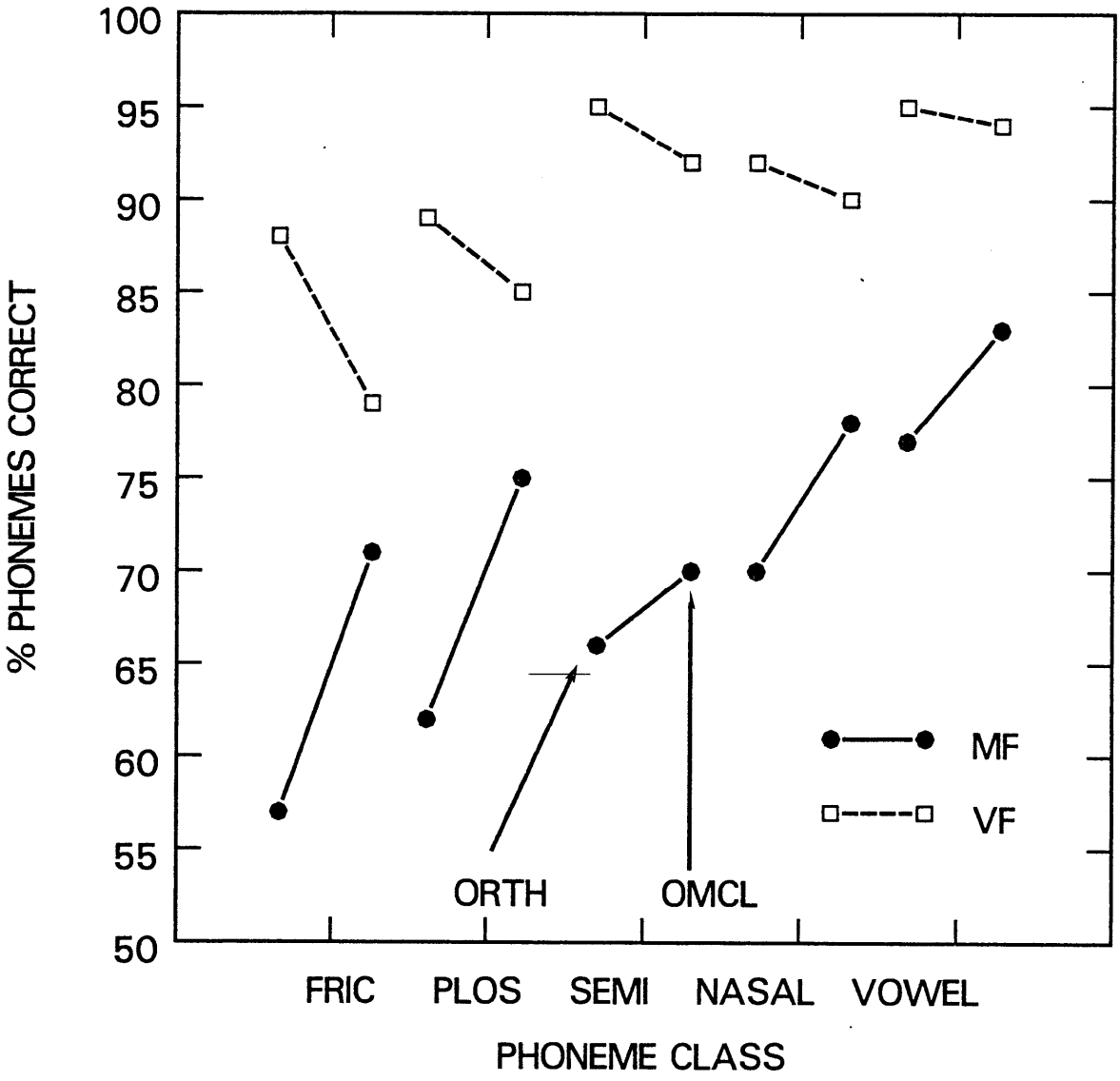

Figure 15. Percent phonemes correct scores as a function of phoneme class and frequency-gain characteristic for listeners MF and VF.

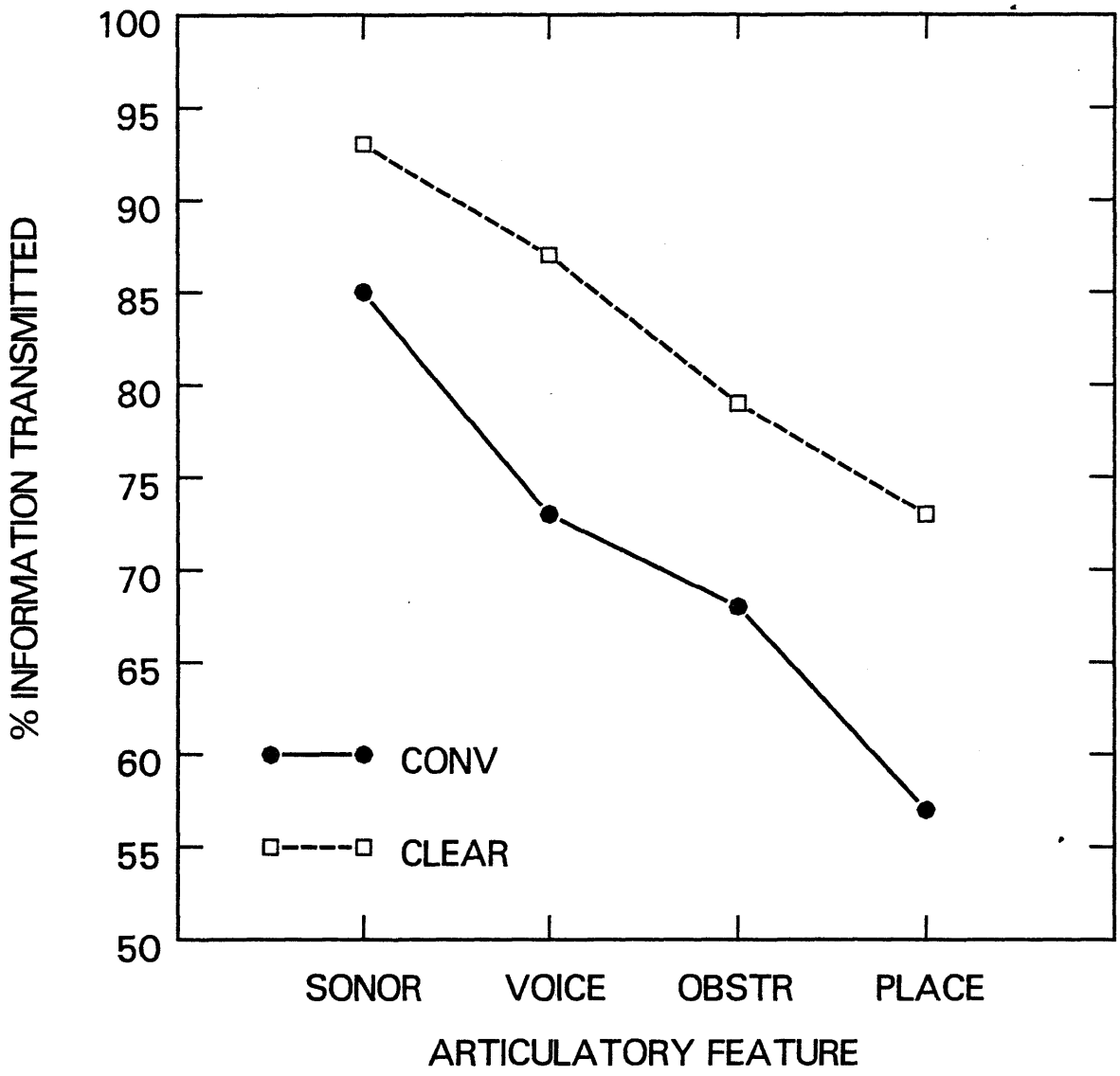

Figure 16. Percent information transmitted from SINFA analysis as a function of articulatory feature in conversational and clear speech.

SPEAKING CLEARLY FOR THE HARD OF HEARING II: ACOUSTIC CHARACTERISTICS OF CLEAR AND CONVERSATIONAL SPEECH

INTRODUCTION

General Remarks

The first paper of this series (Picheny, Durlach and Braida, 1981) presented evidence that substantial intelligibilty differences for hearing-impaired listeners exist between nonsense sentences spoken in a conversational manner and spoken with the effort to speak clearly. Given that substantial intelligibility differences exist, it is important to document the acoustic differences between the two types of speech and understand the contribution of these differences to the differences in intelligibility. This paper will present acoustical analyses of the nonsense sentences used in the above experiments, with emphasis on the key words that were scored in the intelligibility tests.

Materials

Conversational speech can be defined as the speech that arises between people in everyday conversation. This is to be contrasted with clear speech, defined as the speech that arises between people in a difficult communication situation, e.g., in a noisy environment, or when speaking with a hearing-impaired listener. Fifty nonsense sentences spoken

clearly and conversationally by 3 male speakers served as the data base for this analysis*. The sentence structure, recording, and level normalization procedure used were described in Picheny, Durlach, and Braida (1981). A list of the sentences with the key ("content") words underlined is given in Appendix A; note that plural and past-tense suffixes were not scored in the intelligibility tests. Appendix B describes the phonemic composition of the key words based on a dictionary pronunciation of each word. The sentences were phonetically labelled by combining information from the following three sources:

1) Aural repetitions of each sentence.
2) Spectrogram of each sentence.
3) Computer derived parameter display of each sentence including the speech waveform, formants and fundamental frequency, overall RMS energy, energy at the output of three bandpass filters, and two measures of spectral shape. Figure 1 contains a typical display. Appendix C contains a complete

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*Note that none of these sentences were ever actually used in the intelligibility tests. It was felt that for the purposes of acoustical measurements, the same set of sentences had to be employed across speaker and speaking mode, but that a listener should not be tested on six repetitions of a set of sentences to minimize learning effects.

description of each parameter. The display is similar but not identical to one described by Zue and Schwartz (1979).

Labelling criteria were similar to those described in the literature (Peterson and Lehiste, 1960; Umeda, 1975, 1977; Zue, 1976; Klatt, 1975). The phonetic labels for all three speakers and both speaking modes were aligned with a dictionary pronunciation of each sentence to facilitate comparisons of the same phoneme in the same environment across speaking mode and speaker.

General Acoustic Characteristics

For purposes of discussion, it was useful to group the differences between the clear and conversational speech into three broad categories:

1) Prosodic - Changes in tempo and intonation; insertions of pauses; phoneme durations.
2) Phonological - Insertions, deletions, and feature changes of phonemes that occur when a word is actually spoken in a sentence.
3) Phonetic - Changes in the acoustic properties of individual sounds; e.g. their spectra, amplitudes, etc.

It is obvious that the above categories are not independent and somewhat arbitrary; e.g., an increase in frication amplitude (a "phonetic" change) will probably be associated with a change in duration (a "prosodic" change). However, any study of the interactions among the above categories must be preceded by a study of the main effects.

In order to quantitatively describe the changes along the above set of dimensions, a set of specific measurements was selected. To capture prosodic changes, measurements were made of speaking rate, pause and F0 distributions, and durations of individual speech sounds. To capture phonological changes, counts were made of the number of occurrences of specific phonological phenomena. To capture phonetic changes, long and short term RMS spectra, formant frequencies, and amplitudes of individual consonants and vowels were measured. These measurements are logical first choices and are by no means exhaustive.

Before the actual measurements are presented, it is instructive to describe some of the differences between clear and conversational speech using a spectrographic example. Figure 2 shows the sentence, "His quick world must pass in a flag", spoken conversationally and clearly by MM. Broad phonetic transcriptions are displayed below the spectrograms. The most obvious difference between the two sentences is that the clear sentence is roughly twice as long as the

conversational sentence. The difference in duration is accomplished both by adding pauses (e.g. between "pass" and "in") and by increasing durations of speech sounds (e.g. /s/ in "pass", /ae/ in "flag"). Phonological differences encompass vowel reduction (/I/ in "his") and stop burst deletion (/d/ in "world", /t/ in "must"). Phonetic differences include changes in the amplitudes of sounds (/f/ in "flag"), changes in formant frequency movements (/3 / in "world"), and changes in the location of spectral maxima (/s/ in "pass"). The purpose of the following discussion will be to attempt to quantify some of the above phenomena in greater detail.

DETAILED ACOUSTIC MEASUREMENTS

General Remarks

In general, all detailed acoustic measurements were made on the clear and conversational speech of all three speakers. Although data for all three speakers will always be presented, unless there were large differences between speakers, remarks will be confined to trends common across all speakers.

Figure 3, reproduced from Picheny, Durlach, and Braida (1981), contains the average intelligibility scores on conversational and clear speech for all three speakers. MM's

clear speech was most intelligible; MP had the most intelligible conversational speech; and MS was least intelligible overall. Though the sentences analyzed here were never actually used in the intelligibility tests, they are representative of the sentences actually employed in those tests. It is important to keep the relative intelligibility of the speakers in mind when examining the following data to attempt to gain some insight into the acoustical differences that most strongly contribute to the intelligibility differences between conversational and clear speech.

Prosodic Phenomena

Average speaking rates for each speaker in words/minute are shown in Table 1. They range from 160 to 200 wpm for conversational speech and from 90 to 100 wpm for clear speech. The conversational speaking rates are much higher than those usually observed in natural speech (140 wpm; Abrams, 1944 ; MacClay and Osgood, 1967). However, the usual measurements include hesitation and breath pauses, not present in these materials, and hence would tend to yield lower estimates of speaking rate.

Pause distributions are displayed in Figure 4. In this study, a pause was defined to be any silent interval greater than 10 msec between words. However, all silent intervals

preceding word-initial plosives were excluded from these distributions under the assumption that such intervals reflected closure rather than the presence of pauses. It was later observed that the phenomena of burst elimination (below) led to the counting of a certain number of closure intervals in word-final plosives in conversational speech as pauses. If this had been taken into account, the number of pauses in conversational speech would have been reduced, but the number of pauses in clear speech would have been unaffected. Both the number and duration of pauses dramatically increase in clear speech. Note that the average durations are much less than the 250 msec duration commonly used as a threshold for defining a pause in other studies (Goldman-Eisler, 1968). A possible interpretation is that these pauses do not serve to mark syntactic boundaries or phrases as is generally assumed for the longer duration pauses, and primarily result from the speaker's attempt to enunciate both word-final and word-initial consonants as clearly as possible.

Previous studies have shown that when a speaker is asked to decrease his speaking rate, his strategy is to insert more pauses rather than to lengthen individual words (Grosjean and Lane, 1974). In addition, it has been shown that articulation rates (defined as the speaking rate, in syllables/second, for bursts of speech between pauses) are quite similar (4.5 - 5.9 syl/sec.) across speakers

(Goldman-Eisler, 1968), but speaking rates (defined as the total number of words uttered divided by the total amount of elapsed time) can vary by a factor of two or more. Therefore, the primary difference between speaking rate and articulation rate is due to differences in the number and/or duration of pauses. This, however, is not the case for clear speech. To demonstrate this, articulation rates were defined and computed in two different manners. First, articulation rate was defined to be the average number of syllables per second produced by the speaker. Second, articulation rate was defined to be the reciprocal of the average syllable length, in seconds. This case is equivalent to the first case, except that here, all pause time is excluded from the rate calculation. The results are shown in Table 2. The similarity of the results in both methods indicates that the major source of durational variation is not the presence or absence of pauses, but the actual word (and syllable) durations. Articulation rates for conversational speech seem to be slower than those obtained in natural speech, partially attributable to the fact that the sentences are not examples of natural speech, and the great majority of the words are monosyllables*.

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*Articulation rates measured for phrases containing substantial numbers of monosyllabic words are typically less than those measured on polysyllabic words (Huggins, 1968).

Most of the pauses occur after content words. Table 3 displays the probability and average length of pause after each content word in Type 1 sentences (without adjectives) and Type 2 sentences (with adjectives). The average lengths and probabilities of occurrence are quite small in conversational speech. In clear speech, the average pause duration is much longer and the probabilities of occurrence are quite high after all content words. As discussed above, the occasional classification of a stop burst closure as a pause may be responsible for the abnormally short pause durations observed in conversational speech.

Since the duration of the individual sounds increases in clear speech, it is important to determine whether this change is uniform, or is phoneme and environment dependent. Figure 5 displays average durations of function and content words. In addition, the standard deviations averaged across speaker are indicated. The large magnitude of the standard deviation (relative to the mean) is a result of the fact that the words are pooled from multiple environments. However, since the sentences were identical across mode and speaker, the comparison is still a valid one. Each of the three speakers utilizes a slightly different strategy when attempting to speak clearly. On a percentage basis, MM lengthens content words more than function words, MP lengthens content and function words by the same amount, and MS lengthens function words more than content words. Figure

6 shows average content word durations for sentences without adjectives (Type 1) and with adjectives (Type 2). Using a percentage basis as a criterion, in Type 1 sentences, all three speakers' conversational speech shows signs of prepausal lengthening (Klatt, 1976) on the last word of the sentence. However, substantial signs of prepausal lengthening are seen only in MP's clear speech. In Type 2 sentences, all three speakers' conversational speech shows signs of prepausal lengthening on the last word, and for MM and MP, on the first noun as well. In clear speech, prepausal lengthening is reduced substantially for all three speakers. The reduction of relative durational differences across word position in clear speech presumably reflects the speakers' strategy when speaking clearly: each content word is spoken as carefully as possible at the expense of some loss in naturalness.

Tense and lax vowel durations are shown separately in Figure 7a. (vowels with diphthong nuclei were not included with the tense vowels.) Lax vowels increase substantially less in duration than tense vowels in clear speech. One possible explanation is that the short durations of lax vowels are a fundamental component of their internal representation in the speaker (Nooteboom, 1973) (i.e., they have inherently short durations), otherwise, they would lengthen in the same fashion tense vowels do in clear speech. The behavior of the vowel /ey/ in various acoustic

environments is shown in Figure 7b. /ey/ was chosen since tokens for this vowel spanned the largest number of environments. Even so, some conditions have only one or two data points. However, generally speaking, the smallest durational increases in /ey/ occur preceding unvoiced sounds, and the largest increases occur preceding nasals, voiced stops, and voiced fricatives. For comparison, data from Umeda (1975) on natural speech based on her durational model for speaker "CC" and data from Peterson and Lehiste (1960) for "long" syllable nuclei measured in CNC words are plotted against /ey/ duration averaged across all speakers in Figure 7c. Durations measured in conversational speech are similar to Umeda's monosyllabic and prepausal conditions. However, the magnitudes of some of the durations observed in clear speech are more similar to Peterson and Lehiste's data on isolated words. This suggests that the durational properties of clear speech may sometimes be more similar to durational properties of isolated words that those of natural speech.

Figure 8a displays average overall plosive duration, where overall plosive duration is defined as the sum of the closure, frication, and aspiration intervals of the plosive. As with vowels, there are substantial durational increases in clear speech for plosives. Average overall durations of plosives in conversational speech are less than that reported by Zue (1976) (150 msec) for unvoiced prestressed plosives in nonsense syllables recorded at a 5 syl/sec speaking rate.

This probably reflects that environments other than prestressed initial word position (in which one might expect to observe the longest durations (Umeda, 1977), have been averaged over to obtain the above data. Since a plosive is composed of three distinct intervals, (closure, frication, and aspiration), it is important to determine whether any one interval is responsible for the increase in average duration. The closure interval for the plosive /p/ measured in word initial and postvocalic environments is shown in Figure 8b. To be more specific, only /p/'s immediately following vowels were included in the postvocalic measurement. While it would have been desireable to include, for example, the /p/'s in consonant clusters, enough tokens of /p/ in such environments did not exist to permit such a comparison. Other plosive consonants were plagued with similar problems, though general trends appeared to be similar. The closure interval increases substantially in both environments for all three speakers; though postvocalic /p/'s tend to have somewhat shorter closure intervals overall. VOT measurements for word-initial plosives in prestressed word positions are shown in Figure 8c. Data for this measurement have been pooled across place of articulation. In addition, VOT's for plosives preceding vowels were pooled with VOT's for plosives preceding semivowels, as no difference in VOT's for these conditions was observed. This does not imply that a difference does not exist (Zue (1976) presents data to the contrary), merely that the relatively few data points

available in this data base were not adequate to indicate the difference. Except for MP, only VOT's for unvoiced plosives increase substantially in clear speech. This effect was also seen in Chen's study (Chen, 1980) on plosives spoken clearly and conversationally in a single carrier phrase. Some attempt was made to independently measure the burst and aspiration intervals in the unvoiced plosive releases. However, the frication-aspiration boundary was too ambiguous for detailed measurements to be performed. It appeared as if the duration of frication noise relative to aspiration increased substantially in the plosive releases of MM and MP, but not in MS. In general MS seemed to make the smallest distinctions between his clear and conversational plosives, which suggests a lack of effort on his part to enunciate the plosives clearly. The VOT's reported in conversational speech are longer than those reported by Zue (1976) and Klatt (1975). However, in those studies, speakers were required to achieve articulation rates observed in natural speech. As discussed above, such articulation rates are higher than the rates reported here.

Average fricative durations are presented in Figure 9. Again, substantial durational increases are seen in clear speech. MP's fricatives in conversational speech are longer than those of MM and MS, while in clear speech, MS's fricatives are shortest. Average durations for unvoiced fricatives are longer than for voiced fricatives, consistent

with Umeda (1977), though again, overall durations tend to be longer than those measured in her study. Figure 9b contains data for /s/ in word-initial and non-word-initial position, measured in consonant clusters (/sp/, /st/, etc.) and in singleton form. In general, /s/ in non-word-initial position is shorter in both clear and conversational speech than word-initial /s/. However, the effect of its presence in a cluster appears to be negligible, contrary to the findings of Umeda and Klatt. Again, the relatively few data points, uncontrolled acoustic environments, and associated large standard deviations may be confounding the results.

Average nasal duration is presented in Figure 10a. Substantial durational increases are again seen in clear speech, although less dramatic than the durational increases seen for fricatives and plosives. The largest increases were found for nasals in initial position. However, these accounted for a relatively small proportion of the total data. In general, no clear effect of environment on duration was seen in word medial nasals, except nasals preceding plosives tended to be shorter in duration than other nasals.

Overall semivowel duration is displayed in Figure 10b. Again, substantial increases in duration are seen in all three speakers in clear speech. As a semivowel typically consists of a steady-state segment and a formant transition into the neighboring sound, it is important to determine

which aspect of the semivowel is varying. Second formant transition rates were computed for semivowel-high front vowel utterances occurring in these sentences. High front vowels were chosen since the second formant will undergo maximum motion during this transition. The maximum slope of the second formant was estimated by computing its first derivative, finding the maximum value, and averaging over the surrounding two slope values. The ratios of the transition rates for /l,w,r/ were computed and are displayed in Table 4. In most cases the transition rates were actually faster in clear speech than in conversational speech. Since the second formant frequency in /i/ did not change appreciably between conversational and clear speech (see below), one can conclude that the primary aspect of the semivowel that is changing is the steady-state portion. It would be convenient to be able to generalize this result to other transitions (e.g., plosive-vowel); however, the actual transition rates associated with semivowels may be a fundamental component of the semivowel (Kuehn and Moll, 1976), and hence do not reflect articulator motion in other consonants. Unfortunately, measurements of formant transition rates in other environments (e.g., plosive-vowel boundaries) are usually not very reliable.

The above data indicate that while many phonemes increase in duration in clear speech, the durational increase is by no means uniform and is a function of the identity of the

phoneme and its associated acoustic environment. A simple model for the change in duration, such as a uniform "stretching" of the time axis, is therefore a very crude one.

Besides duration measurements, additional measurements of prosodic phenomena consisted of analysis of fundamental frequency behavior. Histograms of F0 are displayed in Figure 11. For all three speakers, a somewhat wider range of F0 is observed in clear speech, with a slight bias towards higher F0. Figure 12 displays (averaged over all 50 sentences) the maximum value of F0 attained in a sentence and the value achieved 50 msec before the end of the last word of the sentence. The maximum value tends to be higher in clear speech, suggesting that larger amounts of laryngeal tension occur when speaking clearly, while the value on the last word does not show a difference between clear and conversational speech. This may simply reflect the speakers' attempt to signal an end of sentence condition, which in a simple declarative sentence is characterized by a large drop in F0 (O'Shaughnessy, 1976) (perhaps to some natural physiological value).

Phonological Phenomena

Phonological rules describe transformations that speech segments undergo when not spoken in isolation, and encompass substitutions, deletions, insertions, and feature changes

(Klatt, 1976). The number of rules that have actually been tabulated are quite extensive (Cohen and Mercer, 1974; Oshika et al., 1975), and no attempt to enumerate them will be made here. In describing the phonological phenomena that were found in conversational and clear speech, it was convenient to classify them into the following categories:

1) Vowel modification (VM)- in unstressed syllables and function words, vowels become schwa-like. In vowel-sonorant environments, the vowel often merges with the sonorant, producing a syllabic version of the sonorant.
2) Burst elimination (BE)- when followed by a stop consonant differing in place of articulation, a stop burst is often deleted. This tendency is also seen for plosive consonants in sentence-final position.
3) Degemination (DG)- when two identical sounds in word-final and word-initial position are abutted, they frequently merge into one sound.
4) Alveolar flap (AF)- a /t/ or /d/, when preceded by a stressed vowel and followed by an unstressed vowel, frequently becomes a flap.
5) Miscellaneous sound deletion (MSD)- all deleted sounds not accounted for by the above rules.
6) Sound insertion (SI)- in word final position, a voiced consonant is often followed by a schwa

vowel. Sometimes, a schwa vowel is also inserted between an voiced obstruent-semivowel cluster.

Table 5 tabulates the number of times each of the above phenomena occurred as a function of word type (function or content), speaking mode, and speaker. It can be seen that the three most frequently occurring phenomena are vowel modification, burst elimination, and sound insertion.

Vowel modification occurred much more frequently in function words than in content words. Approximately half the function words contain modified vowels; of these, one-half to two-thirds resulted from vowel reduction, the rest resulted from pronunciation changes such as /awr/ -> /ar/. The vowel modifications in content words can also be broken into two categories: vowel reduction, occurring in the unstressed syllables of two syllable words, and sonorant assimilation, occurring when a lax vowel is followed by a sonorant, particularly /l/. In conversational speech, vowel reduction accounted for approximately half of VM. In clear speech, the number of times that vowel reduction occurred decreases by half, but sonorant assimilation occurred approximately the same number of times as in conversational speech.

Burst elimination occurred primarily in content words (which is not surprising, since the function words in this

corpus contain almost no final plosives). BE occured much more often in the conversational speech of MM and MS than of MP. Most of the burst elimination occurred in plosives followed by plosives, fricatives, and sonorants, either in the same word or immediately across a word boundary. Burst elimination occurred in approximately 60% of the possible opportunities that existed in the conversational speech of MM and MS.

Sound insertions occurred almost exclusively in clear speech content words. More specifically, sound insertions occurred following word- final nasals and voiced plosives (all three speakers), and following voiced fricatives (speaker MM). In addition, significant aspiration (not counted as an insertion) was often observed after word-final unvoiced sounds. These insertions, however, may not reflect true phonological phenomena, but may just reflect voicing continuing after the consonant release. Insertions after voiced plosives occurred essentially all of the time for all three speakers. Insertions after nasals occurred one-half to two-thirds of the time. For speakers MP and MS, essentially no insertions occurred after voiced fricatives. However, for speaker MM, the insertions after voiced fricatives occurred almost all of the time.

Phonetic Phenomena

Long-term RMS spectra of conversational and clear speech are displayed in Figure 13. These spectra were obtained from amplitude distributions of the speech measured at the output of third-octave filters. The average RMS in each band was defined as the expected value of the square of the voltage. This value was then converted to dB re a fixed reference (DeGennaro et al., 1981). Silent intervals were gated out; the measurements were made on the entire group of 50 sentences. As is evident from Figure 13, the differences between the long-term spectra of conversational and clear speech are not substantial. Note that these spectra were obtained after level normalization was applied. Figure 14 displays the actual differences in dB for each speaker. MM is the only speaker who displays even moderate differences, and this only at high frequencies. Sound pressure measurements made at the time of the actual recording indicated a 5 to 8 dB difference between conversational and clear speech. The absence of long-term RMS spectral differences given a 5 to 8 dB SPL difference at conversational speaking levels is consistent with other research (Pearsons, Bennett, and Fidell, 1974). In that study, spectral differences were not seen until 20 dB intensity increases were generated by the speaker.

RMS intensity was also measured for different classes of speech sounds. The RMS intensity at a particular point in time was defined as:

$$I(n) = 10 \log \sum_{m} (W(m)\, s(n-m))^2$$

I(n) = log RMS intensity

s(n) = Signal

W(m) = 20 msec Kaiser window (B=7)

(Note effective averaging time is approximately 10 msec)

In this computation, n was updated every millisecond. The RMS intensity for an individual sound was defined as either the maximum or the midpoint value of I(n) measured over the sound in question. The maximum value was used for vowels, plosives, and fricatives. The midpoint value was used for semivowels and nasals.

Figure 15 shows the maximum RMS intensity in the sentence and the RMS intensity in the final vowel averaged over all sentences. A slight drop in intensity is seen at the end of the sentence. The drop in intensity is slightly larger for conversational speech than for clear speech. Note that the average vowel levels are quite similar for all three speakers. This is a reflection of the normalization procedure applied to the sentences before the measurements were made.

Substantial attention has been paid in the literature to the "consonant-vowel ratio" as an index to a given speaker's

intelligibility (Hecker, 1974; House et al. 1965). This measurement is usually defined as the ratio of the RMS intensity of a consonant to that of the nearest vowel in the same syllable. The purpose of this measurement is to eliminate the dependence of measurements of consonant intensity on the actual recording level. For cases in which properties of consonants are measured in isolated words or in syllables (in which one might expect vowel level to remain constant) the use of the vowel level as a reference has obvious utility. However, for consonants embedded in sentential environments in which the vowel level is variable, the utility of this measurement is obscured. This study will report consonant levels with no attempt to measure the CV ratio for individual consonants. However, all measurements on consonants will be referenced to a 4 dB vowel level (the average of the peak vowel level and sentence final vowel levels in Figure 15) to simplify comparisons with other studies.

Table 6 shows the average consonant intensities for prevocalic and postvocalic fricatives and plosives excluding /b/. The VOT for /b/ is short, and it is often difficult to separate the burst from the onset of voicing with a time resolution of 10 msec. MM displays the largest overall increases from conversational to clear speech; MS, the smallest increase, while MP shows an increase for plosives, and a slight decrease in average fricative intensity. In

addition, MP has the highest plosive and fricative intensities in conversational speech. The smaller increases observed in voiced sounds may occur because of the need to sustain vocal fold vibration simultaneous with frication for these consonants. Some drop in the intensity of prevocalic nasals and semivowels was seen; the difference was small (3 dB), and nasals and semivowels did not show any substantial level differences in postvocalic position for any speaker. Postvocalic consonants seem to have lower average intensity than prevocalic consonants, and this effect was most marked for plosives in conversational speech.

Comparisons with other work in this area are difficult for a number of reasons. First, averaging intervals are variable or not reported precisely in work reported in the literature. Second, the high-frequency cutoff of the measurement system can vary. Third, some systems use preemphasis in the signal to accentuate high frequency components or reduce background noise. Finally, in many cases, the consonant-vowel ratio is used, and as discussed above, this is an ambiguous measurement for sentence material. Average plosive intensities for MM and MS in conversational speech (approximately -20 dB) are consistent with other studies (Zue, 1976; Horii et al., 1973; Chen, 1980); as are the data for fricatives (Horii et al., 1973; Fairbanks and Miron, 1957; Williams et al., 1966). Hecker reports postvocalic CV ratios for plosives (approximately -8 dB), that are high

relative to those seen here even in clear speech. Other work (Williams et al., 1966) reports postvocalic CV ratios for plosives ranging from -24 to -32 dB; admittedly, the measurement system (a "graphic-level recorder") is not well defined. The prevocalic plosive intensities for MM and MP in clear speech seem to be higher than those generally observed in other studies, even in Chen's study on plosives spoken conversationally and clearly. Again, however, the wide variety of measurement techniques makes comparisons difficult. Finally, although a speaker spoke more loudly when speaking clearly (5-8 dB), the speaker also increased his CV ratio. Other work has indicated that when asked to increase vocal effort, a speaker's CV ratio decreases, not increases (Williams et al., 1966). Thus, clear speech can not be achieved by merely boosting one's overall vocal output.

Vowel formant frequencies were extracted from each vowel at its midpoint. Figures 16 and 17 display first versus second formants for tense and lax vowels. The formant frequencies for lax vowels seem to be more sensitive to speaking mode compared to tense vowels. In fact, vowel formant frequencies change very little from conversational to clear speech for tense vowels. The results of other studies on relations between speaking rate and vowel formant frequencies are ambiguous. Chen (1980) found that the first and second formant frequencies in tense vowels in nonsense

syllables clustered more tightly in clear than in conversational speech, and tended to move more closely towards target values. In this study, the tightness of clustering of tense vowels did not appear to increase, but sentence materials provide a less controlled environment than do nonsense monosyllables. Lindblom (1963) claimed lax vowels more closely approached "target" values as speaking rate decreased. Gay (1978) observed no such effect, but the range of speaking rates in his study were quite small (< 16%). Ladefoged et al. (1976) found minimal effects of style of speech (implicitly including variations in speaking rate) on vowel formant frequencies. Most probably, the speaking rates employed in conversational speech were not fast enough to perturb the formant frequencies in tense vowels. It is interesting to observe that the durations of lax vowels in clear speech were the same as in conversational speech, but the formant frequencies still changed appreciably. Informal measurements on the steady-state portion of semivowels revealed a tendency for the third formant of /r/ to attain lower frequency values in clear speech, suggesting a greater degree of retroflexion. The first and second formants of /w/ also tended to attain lower frequency values in clear speech than in conversational speech, suggesting a greater degree of lip rounding.

The last set of measurements to be discussed is average short-term spectra of selected plosives and fricatives.

Specifically, the spectra of /t/ and /s/ (the most frequently occurring plosive and fricative) were computed at the point of maximum RMS intensity for all examples of these phonemes by taking the FFT of the signal, computing the energy in a sliding window whose bandwidth was proportional to its frequency (Zwicker, 1980), and averaging over all tokens. The results are shown in Figures 19 and 20. For these cases, an upward shift in the frequency of the maximum spectral peak is seen in clear speech, as well as an increase in overall intensity. One hypothesis for this upward shift in peak frequency is that in clear speech, the size of the cavity in front of the constriction decreases due to abnormal amounts of lip retraction, increasing its resonant frequency and hence the frequency of the spectral peak. Another possibility is that increased airflow associated with clear speech during fricative sounds might cause an increase in the center frequency of the turbulent noise exciting the vocal tract (Stevens and Klatt, 1975). It should be pointed out that these spectra are included merely to illustrate that the short-term spectrum of speech sounds can also change as well as their durations, amplitudes, etc. One should not infer from these figures that the spectra of all sounds change in clear speech, or that when they do, high-frequency emphasis is the result.

DISCUSSION

Acoustical Measurements

The above data indicate that substantial acoustic differences exist between conversational and clear speech. In addition, although the differences are speaker dependent, no speaker employs a radically different strategy than another for speaking clearly. This is partially due to the fact that all three speakers received similar coaching on techniques of speaking clearly. It is not yet known which acoustic phenomena are primarily responsible for the intelligibility differences; however, since the intelligibility of all three speakers increased substantially, some subset of the above phenomena are responsible for the increase, and hence worth studying.

It is useful to review the major acoustical differences between conversational and clear speech. First, when speaking clearly, a speaker speaks much slower than when speaking conversationally. However, this difference is not primarily achieved by inserting pauses (as occurs when a person is merely asked to speak more slowly), but by lengthening individual speech sounds. Different speech sounds seem to lengthen by different amounts depending on their identity and acoustic environment. However, the number of tokens for a particular speech sound in a given environment was too small to carefully describe the

dependence. Finally, short pauses are inserted after most content words in clear speech.

Second, the number and types of phonological phenomena are different in clear and conversational speech. In conversational speech, vowels are modified or reduced, and stop bursts are often not released. In clear speech, vowels are modified to a much lesser extent, and stop bursts are always released, as are essentially all word-final consonants, voiced and unvoiced.

Third, the consonant-vowel ratio for obstruent sounds, particularly stop consonants, is much greater in clear speech than in conversational speech. The increase can be as much as 10 dB. This result can be contrasted with other researchers' findings that indicate when merely asked to speak loudly, a speaker's CV ratio decreases, not increases.

The above factors were those factors most consistently different between conversational and clear speech. Other measurements were also used to contrast conversational and clear speech. These other measurements were not as robust or reliable. For example, though it appears that the durations of different sounds change by different amuunts depending on their identity and acoustic environment, the number of tokens of particular sounds in given environments was too few to adequately describe the differences. Formant frequencies of

vowels were also observed to have moved towards "target" values. However, the change in formant frequencies was not very dramatic for the majority of tense vowels. Short-term spectra of consonants were also observed to have changed. However, only data for /t/ and /s/ were examined, for which large numbers of tokens (50), existed. Other consonants were not adequately represented in number to obtain stable estimates of average short-term spectra.

Therefore, much additional work must be done to adequately characterize the acoustic differences between conversational and clear speech. This additional work has two components: refining the above measurements and examining phenomena not covered in the above set of measurements. The most important measurements to refine are the durational measurements and the measurements of short-term spectra. This can be done by hand-labelling more sentences, or by examining a more controlled set of materials, e.g., as in Chen (1980). Measurements not examined in this study include analysis of formant transition rates between consonants and vowels, analysis of F0 contours, and cues to word juncture, e.g., glottal stops, breathy voicing, etc. All of these phenomena could be significantly involved in making speech "clear" and are worth examining in more detail.

Relations between Acoustics and Intelligibility

The first paper in this series (Picheny, Durlach, and Braida, 1981) demonstrated that substantial increases in intelligibility can occur when a person attempts to speak clearly to a hearing-impaired listener. This paper demonstrated that substantial acoustical differences across many dimensions exist between conversational and clear speech. Attempts to relate acoustical differences to intelligibility differences are difficult for several reasons. First, acoustical differences between clear and conversational speech for all three speakers tended to vary across similar dimensions. This makes it difficult to determine the independent contributions of different acoustic variables to intelligibility. Second, the words in the sentences used to test intelligibility came from an open-response set. Therefore, practically speaking, the listener must be permitted to omit responses, thus making confusions between sounds difficult to determine. Third, acoustical measurements were not made on the same sentences used in intelligibility testing. Therefore, one can not directly compare listener errors on individual words to the acoustic characteristics of these words. Finally, all of the listeners had different degrees and types of hearing impairments, further confounding analyses of listener errors. Nevertheless, there are still certain facets of the intelligibility data that can be discussed in light of the knowledge of the acoustical differences.

One comparison that can be made is between the high intelligibility of MP's conversational speech and the relatively low intelligibility of MS's clear speech. MP's speaking rate (160 wpm), though less than the conversational speaking rates of speakers MM and MS (200 wpm), was much greater than speaker MS's clear speaking rate (100 wpm). In addition, the average probability of a pause following a content word in MP's conversational speech was much lower than in MS's clear speech (Table 3). If the only important variables governing intelligibility differences between conversational speech and clear speech were those associated with speaking rate and pauses, the high intelligibility of MP's conversational speech could not be explained. However, the intensity of plosive and fricative consonants relative to vowels (i.e., the "average" CV ratio) in MP's conversational speech was much higher than in either MM's or MS's conversational speech (Table 6). While this does not conclusively show that MP's conversational speech is very intelligible because of his high "CV ratios", it is interesting to note that the relative intensity of plosives and fricatives to vowels in speaker MS's clear speech is substantially lower than that of either speaker MM or MP, and speaker MS's clear speech is the least intelligible of the three speakers. However, other acoustic variables (such as the short-term spectra of the consonants) also differ across speaker and speaking mode. Since changes in the CV ratio are probably correlated with changes in these variables, it is

not obvious that the intensity difference alone is responsible for intelligibility differences.

Detailed phoneme error analyses were only feasible for two of the five listeners, since the responses of the other three listeners contained too many word omissions. Both of the two listeners on whose data the detailed analyses were performed had flat audiometric configurations. Even for these two listeners, a substantial number of phoneme errors were omissions. Improvements in intelligibility from conversational to clear speech were seen in almost all consonants and for all types of articulatory features. The only group of sounds for which substantial improvements in intelligibility did not occur was for fricatives in MP's clear speech. Acoustic analysis of his fricatives revealed that the spectral maxima in /s/ shifted to an extremely high value (8 KHz), and decreased in intensity, either of which could be responsible for a decrease in intelligibility. Other effects noted were lower scores on fricatives and plosives (relative to MM and MP) on speaker MS's clear speech (consistent with lower intensities of these consonants in his clear speech), and very low scores on speaker MS's conversational fricatives compared to both MM and MP (consistent with the lower CV ratio observed in MS's speech for conversational fricatives).

In clear speech, all three speakers decreased their

speaking rate and increased the number and lengths of pauses. The speaker with the slowest speaking rate for conversational speech (MP) was also the most intelligible in this speaking mode. However, as discussed above, other acoustical differences (e.g., CVR-related factors) may have been responsible for his higher intelligibility. MS suceeded in increasing his intelligibility in clear speech mainly by decreasing his speaking rate and increasing the number of pauses; his CVR's did not change substantially from the values in conversational speech. However, as mentioned above, MS also reduced the amount of phonological modifications in his clear speech. Therefore, it is difficult to attribute the increase in intelligibility to changes in speaking rate and number of pauses introduced.

No simple correlation of acoustic variables with word level intelligibility was observed. For example, durational data in Figure 6 do not seem to be correlated with word-level intelligibility (Figure 13 Picheny, Durlach, and Braida, 1981). Amplitude data in Figure 15 indicate that sentence final words differ in amplitude from sentence medial words by 4 dB. While in type 1 sentences there is some tendency for flat loss listeners to have lower intelligibility scores on the final noun, in type 2 sentences, the sentence medial and the sentence final nouns are less intelligible than the adjective and the verb. However, many other variables were not examined that might account for the intelligibility

differences, e.g., F0 and amplitude contours.

Finally, as mentioned above, plosive sounds showed the largest increases in intelligibility for clear speech. As discussed above, plosive bursts were often omitted in conversational speech in word medial and word final position when followed by other plosives and fricatives. It is logical to wonder whether plosive burst inclusion or deletion accounts for the large intelligibility difference across speaking mode. Intelligibility scores for word-initial and non-word-initial plosives were obtained from the two listeners on whose data detailed phonetic error analysis was performed. Analysis of variance revealed that word initial plosives were more intelligible than non-word initial plosives, but that the intelligibility of both increased in clear speech. As word initial plosive bursts were never deleted in either type of speech, it does not seem that increased stop burst insertion was primarily responsible for increased plosive intelligibility in clear speech.

To summarize, the results of Picheny, Durlach, and Braida (1981) and this paper indicate that a speaker can substantially improve his intelligibility when talking to hearing-impaired individuals, and that significant acoustical differences exist between clear and conversational speech. However, no hard evidence was presented that isolated the acoustical factors most important for the differences in

intelligibility. Before knowledge of clear speech can be applied to other areas, such as design strategies for hearing aids, it is obvious that the relationship between acoustical factors and intelligibility must be determined. One such approach to this problem would be to develop a model for the production of the acoustic speech waveform that allows the manipulation of parameters known to vary between clear and conversational speech, that are thought to contribute towards intelligibility differences, and that can be varied independently from each other while still producing natural speech. Making use of such a model, one could gradually transform conversational speech into clear speech by varying one parameter at a time, and obtain an estimate of the relative importance of different parameters by testing intelligibility at each step along the way. Another approach might be to train an individual speaker to manipulate his own production to achieve a similar variation. To the extent that this is possible, problems associated with modeling or signal processing might be avoided, although independent variation of different production parameters might prove difficult for an individual speaker. In order to implement either of the above techniques, it is first important to identify the acoustical factors most likely responsible for the intelligibility differences. The experiments and the acoustical analysis indicate that these factors can be loosely grouped into two areas: those linked to listener processing time (e.g., speaking rate and pauses) and to the

type and quality of information available to the listener (e.g., informations associated with CV ratio, short-term spectrum, phonological modifications, etc.). It is highly desirable to separate processing time factors from these other factors if some type of hearing aid device based on clear speech were to be developed. If the separation could be made, a more detailed analysis, perhaps based on investigating the relative contributions of prosodic, phonological, and phonetic variables towards intelligibility, could be attempted.

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APPENDIX A

Sentences Forming Acoustic Data Base

1. Their loan may lift up our yells.
2. Their hot protein can pace on our breakdowns.
3. The troop will tremble at his ring.
4. Our friendships should sweep up the crack.
5. The stand assists the drought.
6. His saints coped with our ban.
7. My bare cheer waves at her purse.
8. His bulb backed the neighbor.
9. Our foreign course would spell your wax.
10. His mobile sweater may dare our covers.
11. Their guns bent to my tree.
12. Our inn may convey his candles.
13. Her mail wheels your fork.
14. His drinks glow by a subject.
15. The plays would grumble at his thumb.
16. My net anguish will commute to their plains.
17. His odd badge withdraws from her wheat.
18. Our big gains sink in his role.
19. His lunar pastes can try with her canvas.
20. Your bark revised his thread.
21. Their hut elected my shortstop.
22. His book creeps to your brain.
23. The mounts bore his ladies.
24. A plan shaves her toll.
25. Our shrill curb laughed at your ace.
26. His slow screw may compete for our blames.
27. A stark pea could glance at our blast.
28. The pie could halt at his code.
29. His quick world must pass in a flag.
30. His travels show in our fear.
31. The east stone can face your paste.
32. Her shaky increases will leap on their quarrel.
33. My pea quotes their pig.
34. Her lobby must drill the cook.
35. Her dolls can crack on your turn.
36. A joint faces launches your joint.
37. His straight glands should trade the cloth.
38. Your sad throw can warn the fight.
39. Your slow hardships choose for our fairness.
40. His guests could teach his turnpike.
41. His green chests seek for her discounts.
42. Their shy meal struck at her string.
43. The evil lunch portrayed their sadness.
44. My vain wire piled the trend.
45. Their sleep decided on our outset.
46. A debt can sweep up our lens.
47. Our doll smelled a beach.
48. My damp shoulders must lie for your view.
49. Our blunt wait must solve our abuse.
50. His base would shift with the stages.

APPENDIX B

Phonemic Composition of Key Words in Sentences Forming the Acoustic Data Base (excluding plural and past tense suffixes)

VOWELS		PLOSIVES				FRICATIVES			
i	31	p	29	b	26	f	12	v	11
I	20	t	56	d	28	th	4	dh	1
e	30	k	40	g	11	s	50	z	3
E	19					sh	11	zh	0
u	4								
U	6		NASALS				AFFRICATES		
a	11		m	12			c͡	7	
o	15		n	43			j͡	5	
c	9		ng	3					
ae	21								
ʌ	13		SEMIVOWELS				ASPIRATE		
ɜ˞	10		w	16			h	4	
yu	3		y	1					
aɪ	10		r	49					
oɪ	2		l	51					
aʊ	6								

APPENDIX C

Definitions of Parameters in Computer Generated Display

Wave: Speech waveform.

FF KHz: First three formant frequencies derived from linear predictive analysis of waveform (Markel and Gray, 1976 Algorithm 1).

F0 CHz: Fundamental frequency using SIFT algorithm (Markel and Gray).

E0 dB: RMS energy of waveform measured using a 400 point Kaiser window (effective averaging time at 20 KHz sampling rate is about 10 msec). Energy sampled every millisecond.

LFE dB: RMS energy of waveform filtered by 120 - 440 Hz bandpass filter using Kaiser window with 3 msec averaging time.

MFE dB: RMS energy of waveform filtered by 630 - 2800 Hz bandpass filter using Kaiser window with 3 msec averaging time.

LFE dB: RMS energy of waveform filtered by 3200 - 10000 Hz bandpass filter using Kaiser window with 3 msec averaging

time.

SHP: Measurement of spectral energy concentration computed by differentiating signal, computing RMS energy using a 10 msec averaging, and dividing result by E0.

ZER: Measurement of spectral energy concentration by counting number of zero crossings in 10 msec interval.

Reference

Markel, J. and Gray, A. (1976). "Linear Prediction of Speech," Springer-Verlag, NY.

	CONVERSATIONAL SPEECH	CLEAR SPEECH
MM	205	101
MP	160	91
MS	199	101

TABLE 1

Speaking rates in words/minute for all three speakers.

	CONVERSATIONAL SPEECH		CLEAR SPEECH	
	W/O PAUSES	W PAUSES	W/O PAUSES	W PAUSES
MM	4.2	3.9	2.2	1.9
MP	3.3	3.0	2.0	1.7
MS	4.1	3.8	2.3	1.9

TABLE 2

Articulation rates in syllables/second calculated with and without pauses.

TYPE 1

		NOUN		VERB	
		PROB	LENGTH	PROB	LENGTH
MM	CONV	.14	19.	.13	57.
MM	CLEAR	.71	114.	.91	123.
MP	CONV	.14	134.	.13	92.
MM	CLEAR	1.00	109.	.91	122.
MS	CONV	.14	41.	.13	74.
MS	CLEAR	.93	141.	.91	169.
NO. OF DATA POINTS		14		23	

TYPE 2

		ADJ		NOUN		VERB	
		PROB	LENGTH	PROB	LENGTH	PROB	LENGTH
MM	CONV	.43	56.	.13	69.	.21	47.
MM	CLEAR	.57	127.	.69	188.	.83	137.
MP	CONV	.14	62.	.13	76.	.09	67.
MM	CLEAR	.93	129.	1.00	121.	1.00	127.
MS	CONV	.43	76.	.13	90.	.26	54.
MS	CLEAR	.71	125.	1.00	185.	1.00	208.
NO. OF DATA POINTS		14		16		23	

TABLE 3

Probabilities and average lengths of pauses after content words in Type 1 (without adjectives) and type 2 (with adjectives) sentences.

	r	w	l
MM	.78	.65	.95
MP	.86	.92	.74
MS	.95	1.03	.76
NO. OF DATA POINTS	5	6	4

TABLE 4

Ratio of second formant transition rates at semivowel-vowel boundaries. The standard deviation for these measurements was approximately .22.

Ratio is defined as:

$$\frac{\text{Rate in Conversational Speech}}{\text{Rate in Clear Speech}}$$

	MM				MP				MS			
	CONV		CLEAR		CONV		CLEAR		CONV		CLEAR	
	CON	FUN	CON	FUN	CON	FUN	CON	FUN	CON	FUN	CON	FUN
VR	28	88	18	47	23	83	23	36	35	88	20	33
BE	39	9	8	9	24	7	9	12	41	14	16	10
D	6	1	0	1	5	1	1	1	7	1	2	1
AF	4	5	2	1	3	5	2	1	3	3	2	0
SI	1	0	38	0	1	0	36	2	2	0	21	3
MSD	9	13	2	6	6	19	2	6	13	15	3	4

TABLE 5

Phonological Phenomena Occurences

VR : Vowel Reduction
BE : Burst Elimination
D : Degemination
AF : Alveolar Flapping
SI : Sound Insertion
MSD: Miscellaneous Sound Deletions
CON: Content Words
FUN: Function Words

PREVOCALIC

	MM		MP		MS		N
	CONV	CLEAR	CONV	CLEAR	CONV	CLEAR	
p	-23	- 8	-16	- 4	-21	-16	16
t	-17	- 9	-11	- 4	-16	-12	18
k	-18	- 6	-11	- 5	-18	-14	19
d	-20	-15	-13	-13	-18	-14	16
g	-16	-13	-11	- 8	-15	-14	8
f	-23	-12	-25	-28	-28	-29	9
th	-25	-19	-17	-17	-23	-22	3
s	-10	- 5	- 8	-11	-14	-12	24
sh	-11	- 3	- 5	- 2	- 8	- 6	8
v	-17	-14	-16	-15	-18	-11	2

POSTVOCALIC

p	-25	- 9	-19	- 8	-25	-22	11
t	-24	-11	-17	-12	-23	-21	17
k	-21	- 6	-14	- 8	-23	-21	13
d	-20	-16	-18	-11	-18	-16	10
g	-21	-16	-20	-12	-23	-15	2
f	-26	- 9	-24	-25	-33	-22	3
th	-35	-24	-24	-29	--	-31	1
s	-14	- 7	- 9	-14	-18	-16	25
sh	-10	- 6	- 4	- 4	-16	- 7	3
v	-17	-16	-19	-19	-16	-19	9
dh	-28	-19	-16	-16	-28	-34	1
z	-11	- 9	-11	-13	-19	-16	3

TABLE 6

Intensities of vowels and fricatives (re average vowel level). The standard deviation for these measurements was approximately 4 dB.

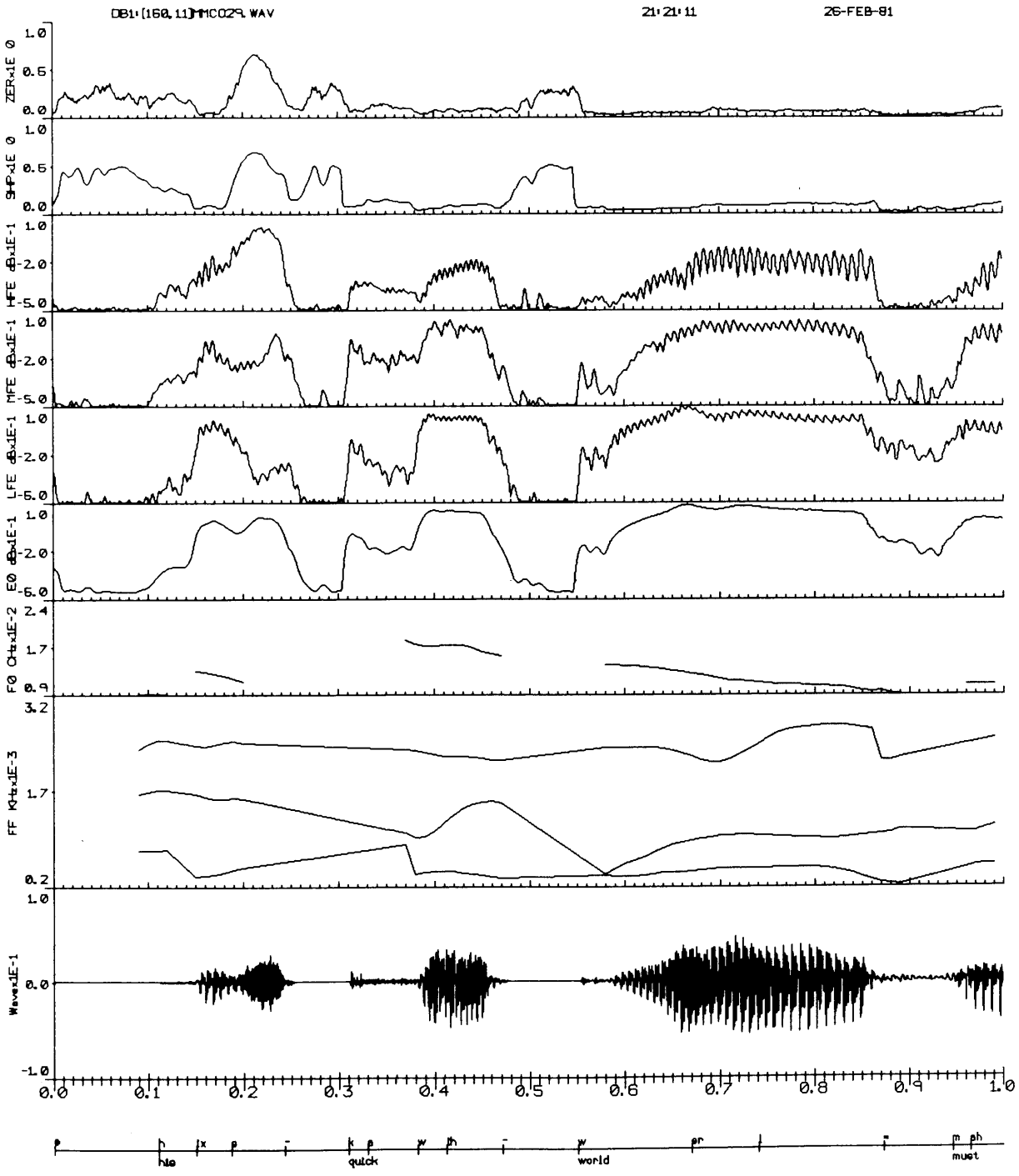

FIGURE 1. PARAMETERS USED AS AIDS IN SENTENCE LABELLING.
THE PARAMETERS ARE DEFINED IN APPENDIX C.

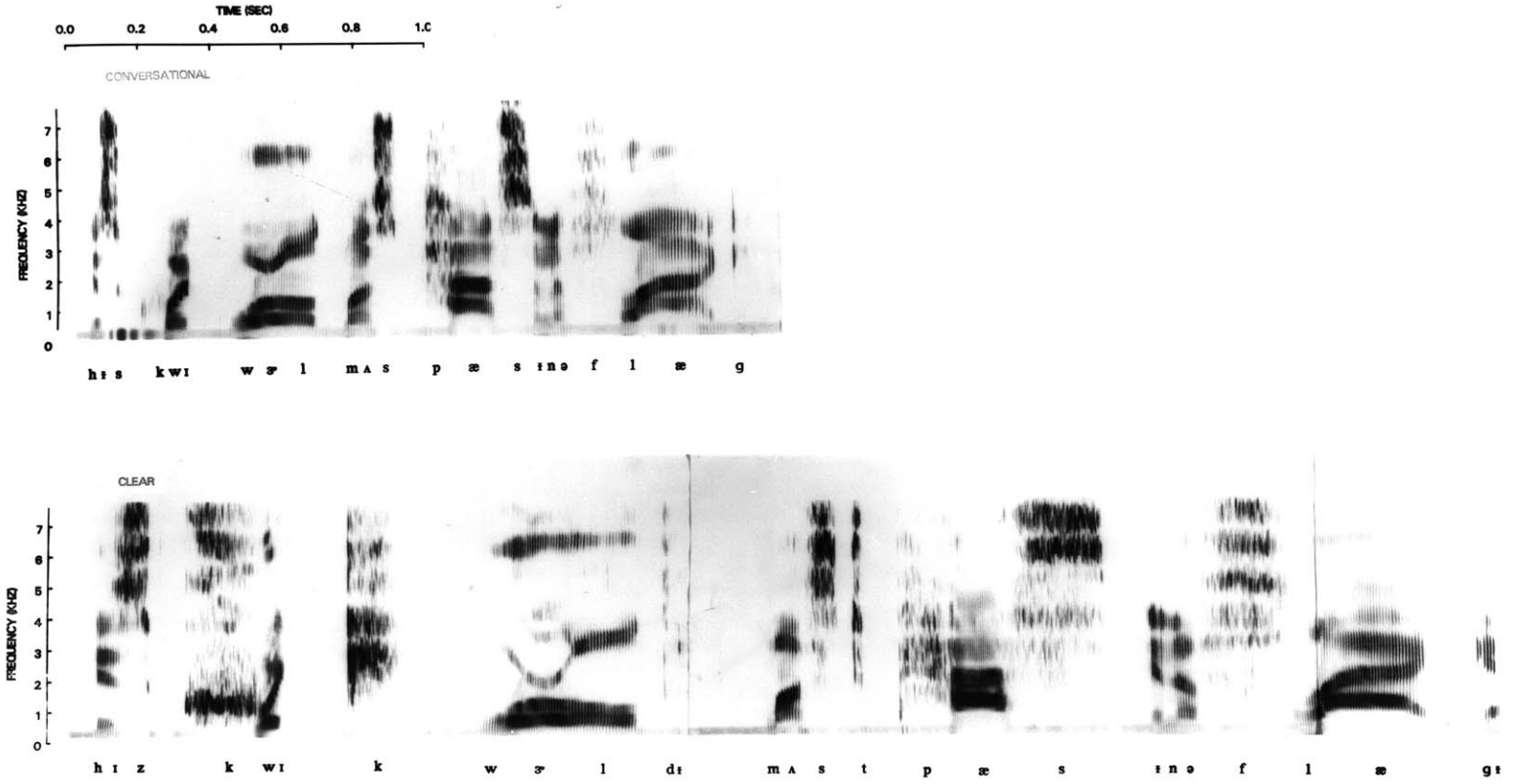

FIGURE 2. SPECTROGRAMS OF "HIS QUICK WORLD MUST PASS IN A FLAG" FOR CLEAR AND CONVERSATIONAL SPEECH.

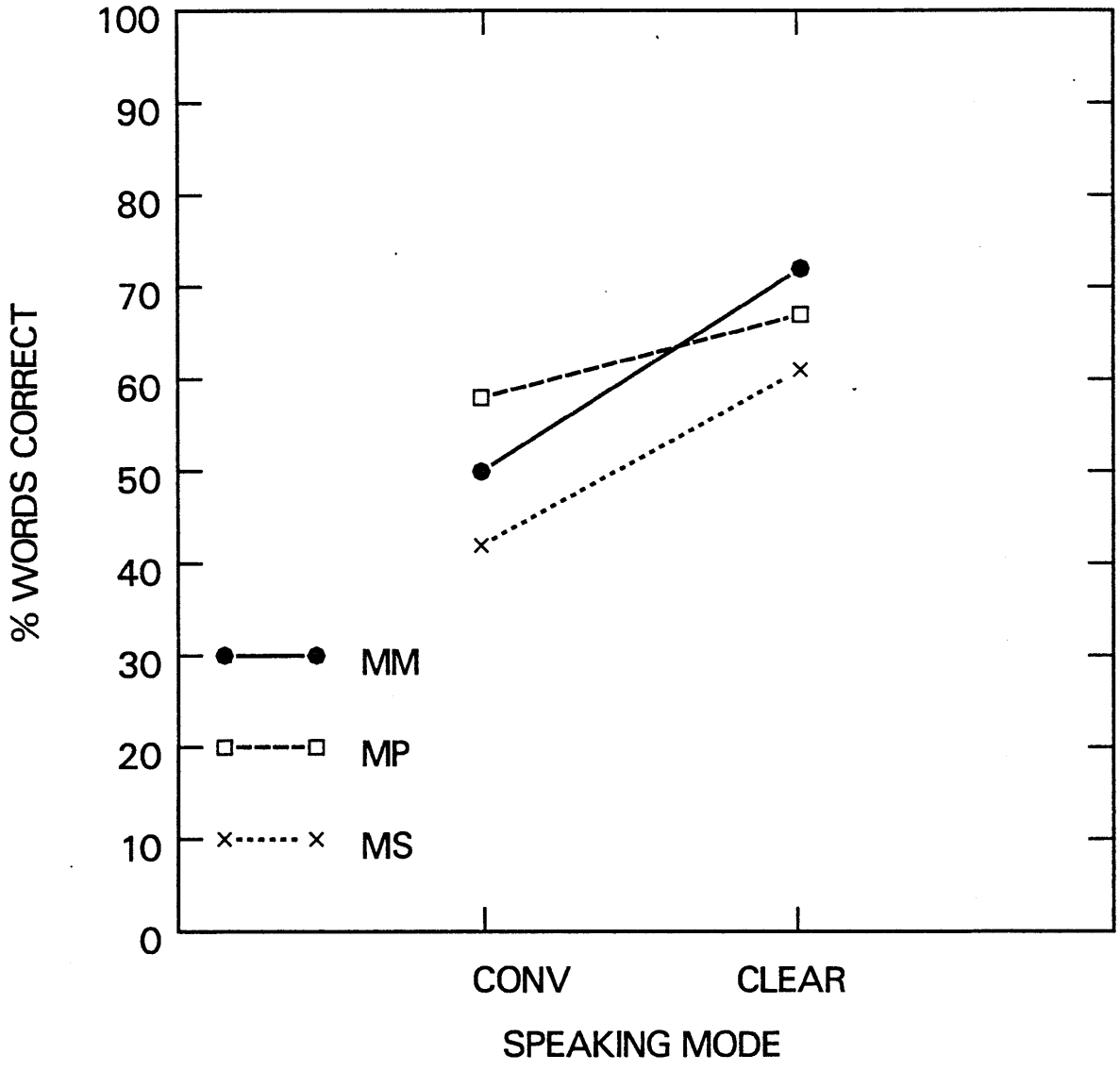

Figure 3. Intelligibility scores as a function of speaking mode for all three speakers.

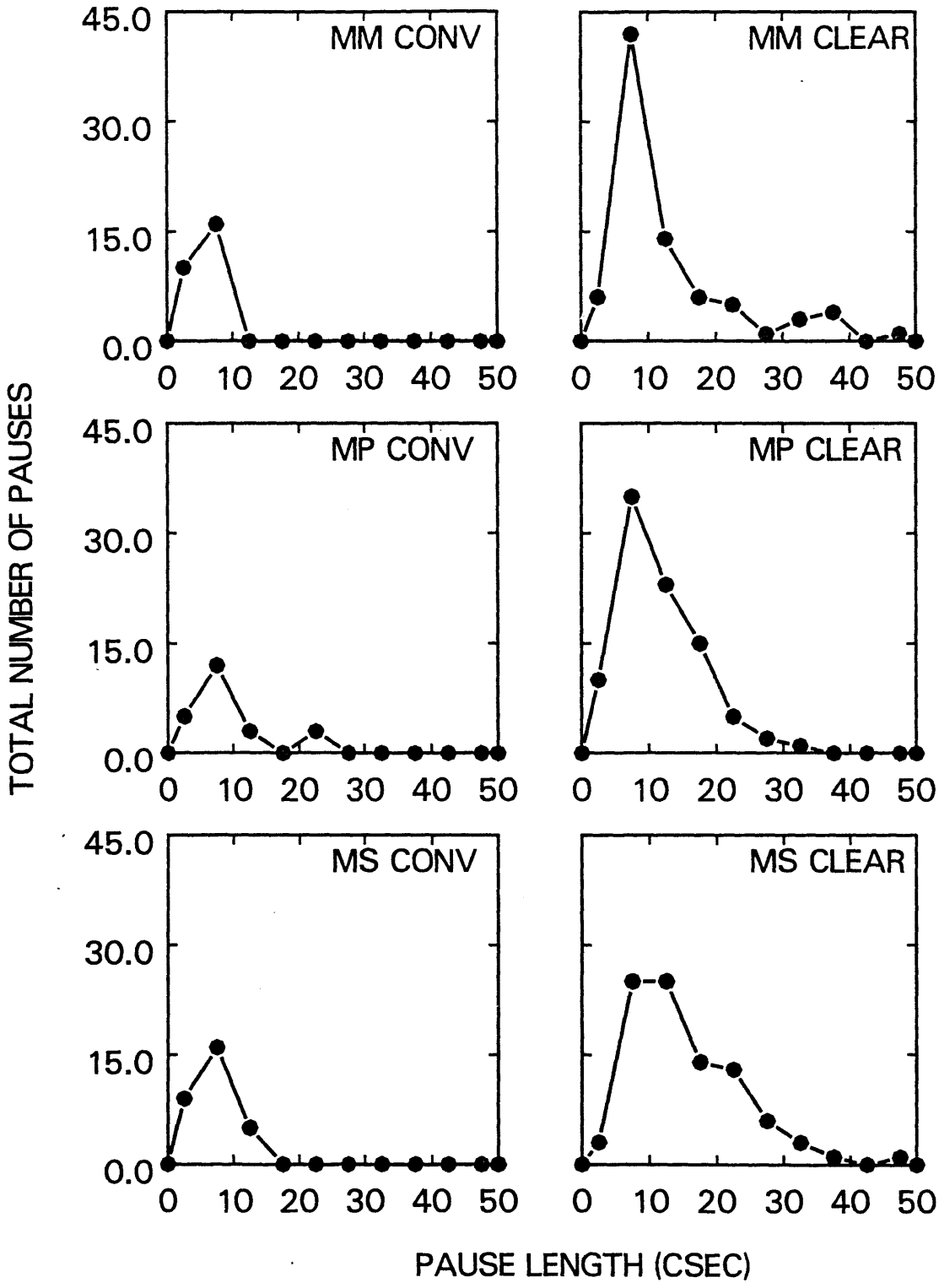

Figure 4. Histograms of pause lengths in clear and conversational speech.

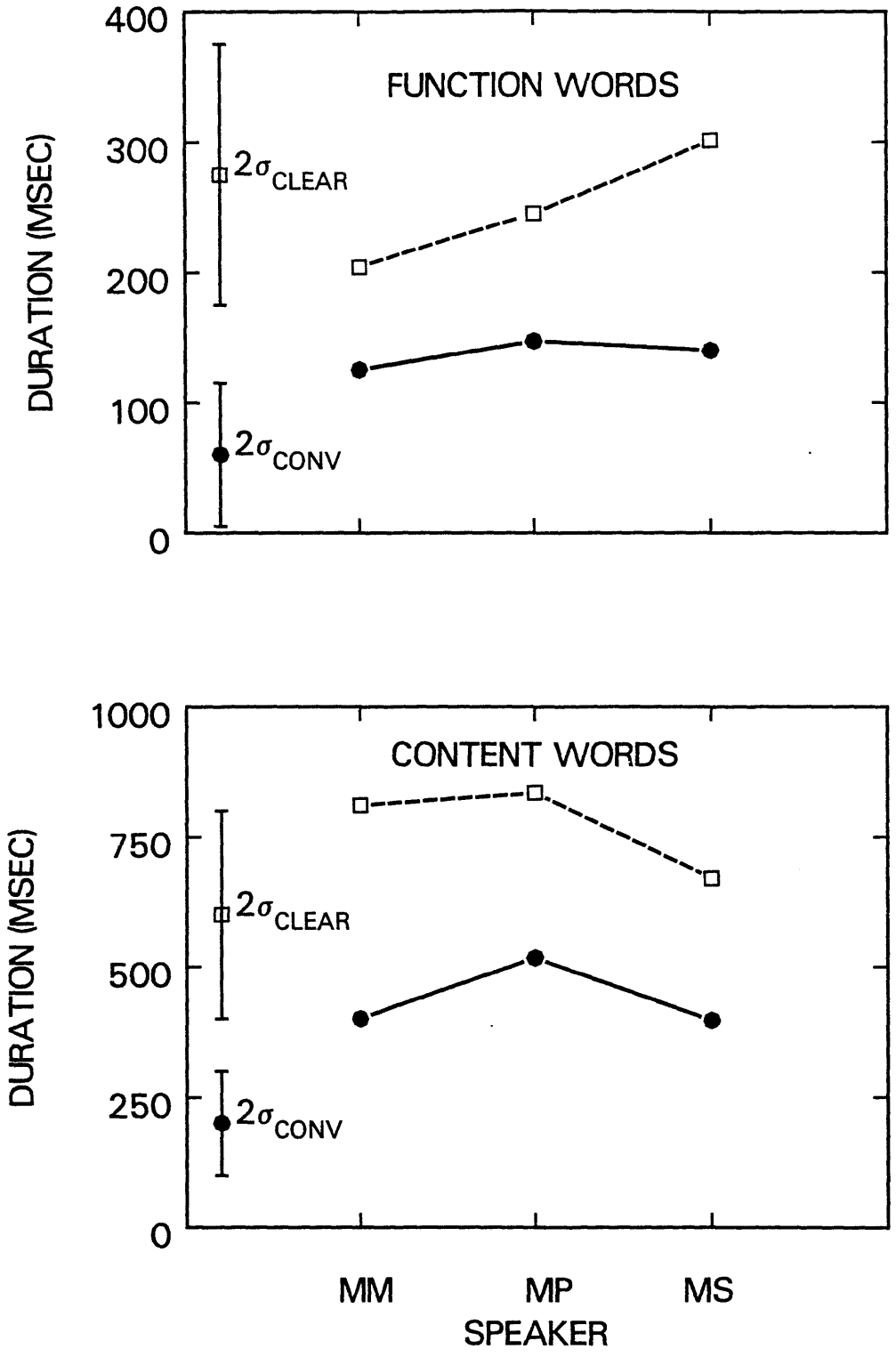

Figure 5. Durations of function (N=150) and content (N=174) words in conversational (●) and clear (□) speech.

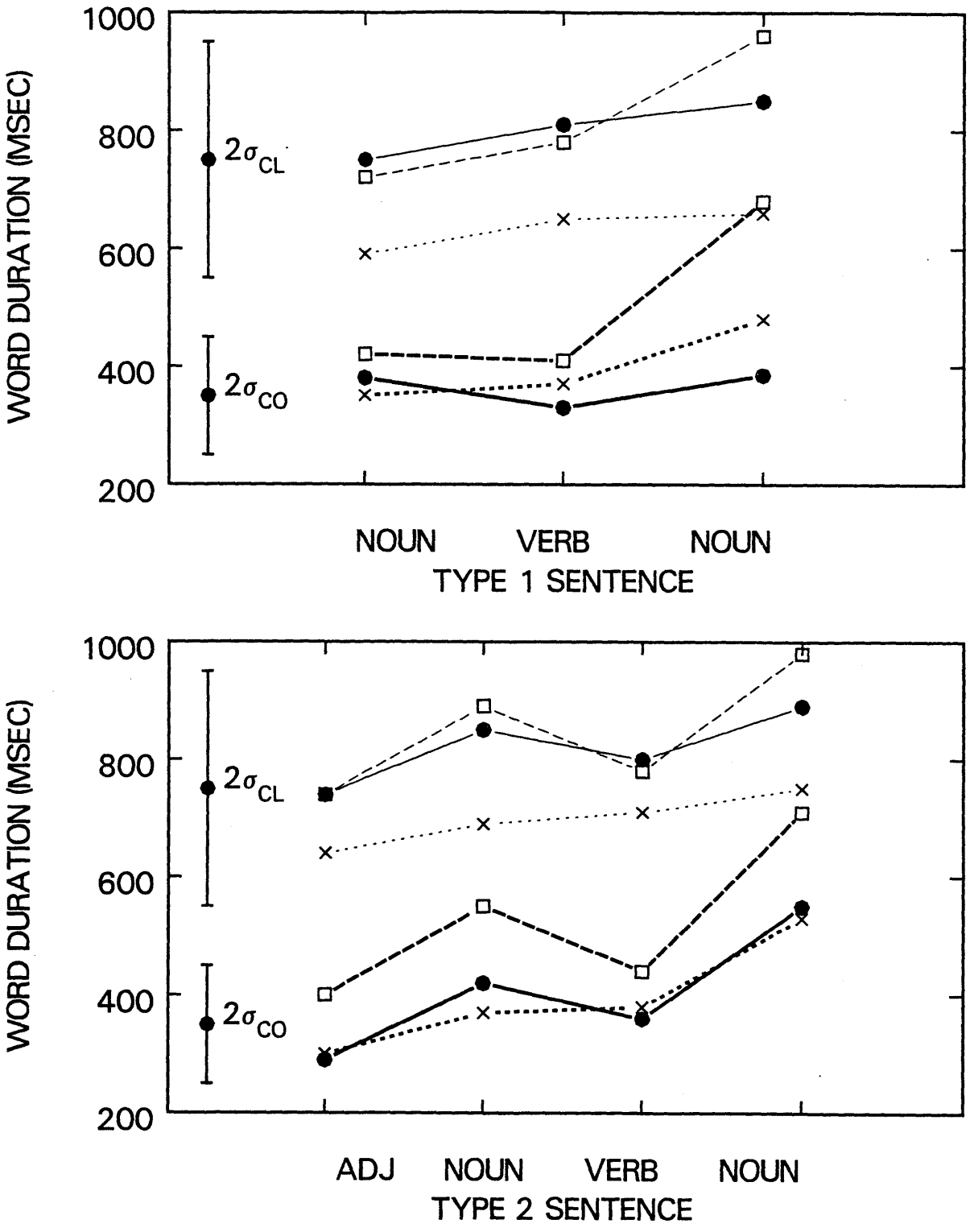

Figure 6. Word duration as a function of word position, speaker (MM(●) MP(□) MS(×)) and speaking mode for type 1 (N=26) and type 2 (N=24) sentences. Data for conversational speech are indicated by the use of thicker lines.

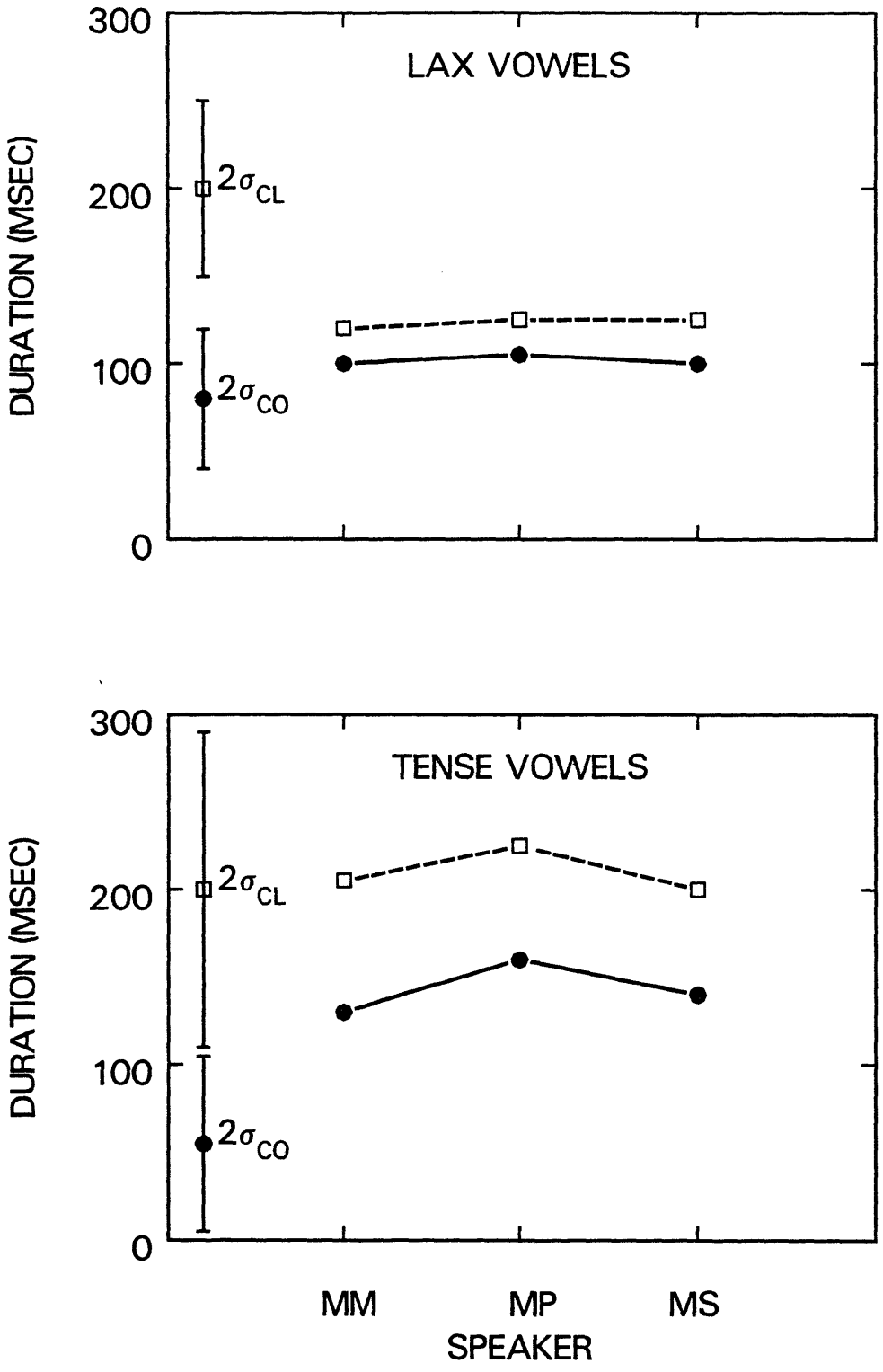

Figure 7a. Durations of tense (N=116) and lax (N=58) vowels in conversational (●) and clear (□) speech.

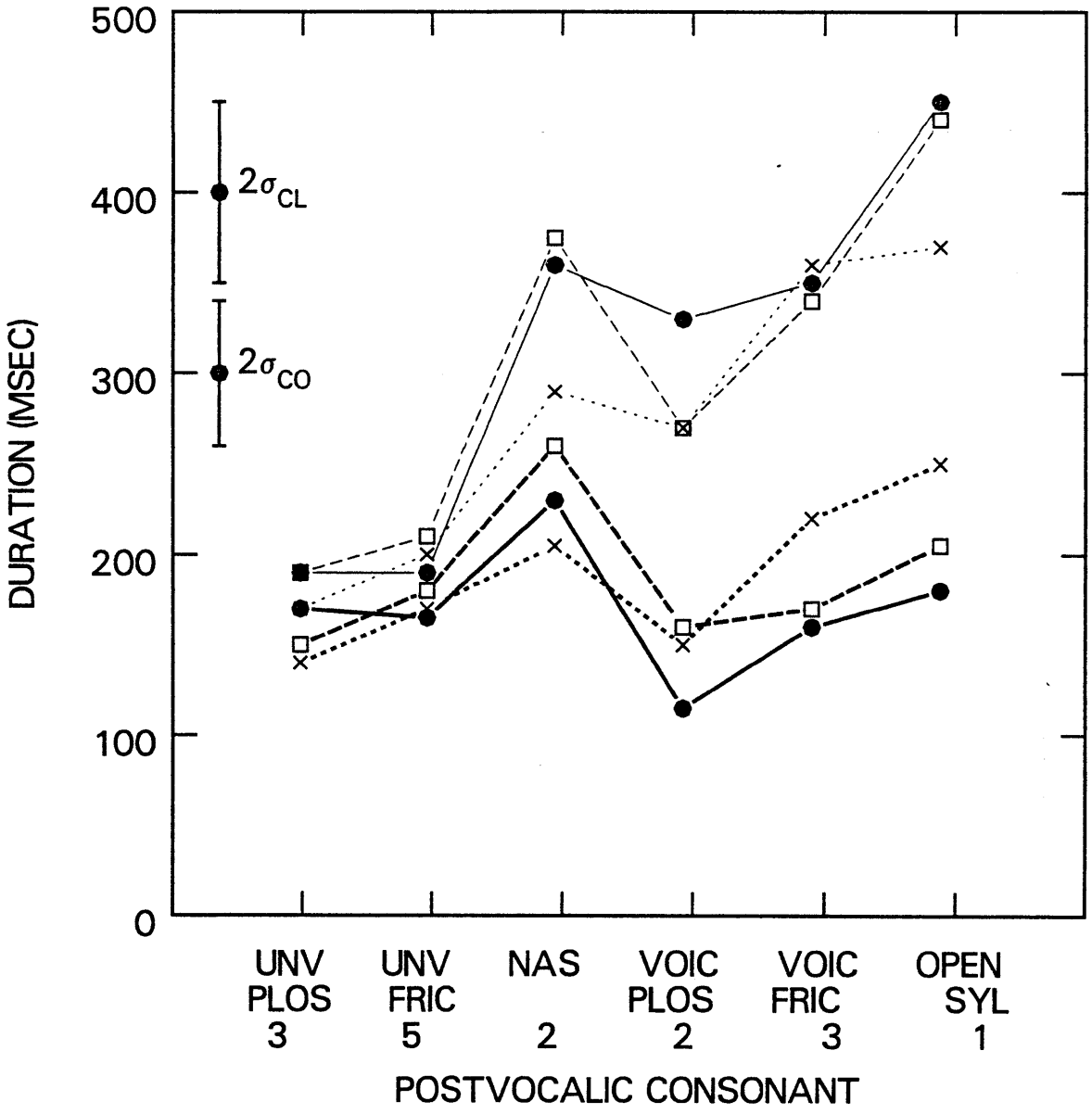

Figure 7b. Duration of vowel /e^{y}/ as a function of postvocalic consonant, speaker (MM(●) MP(□) MS(×)) and speaking mode. Data for conversational speech are indicated by the use of thicker lines. The number of occurences for each postvocalic consonant is given below the associated label.

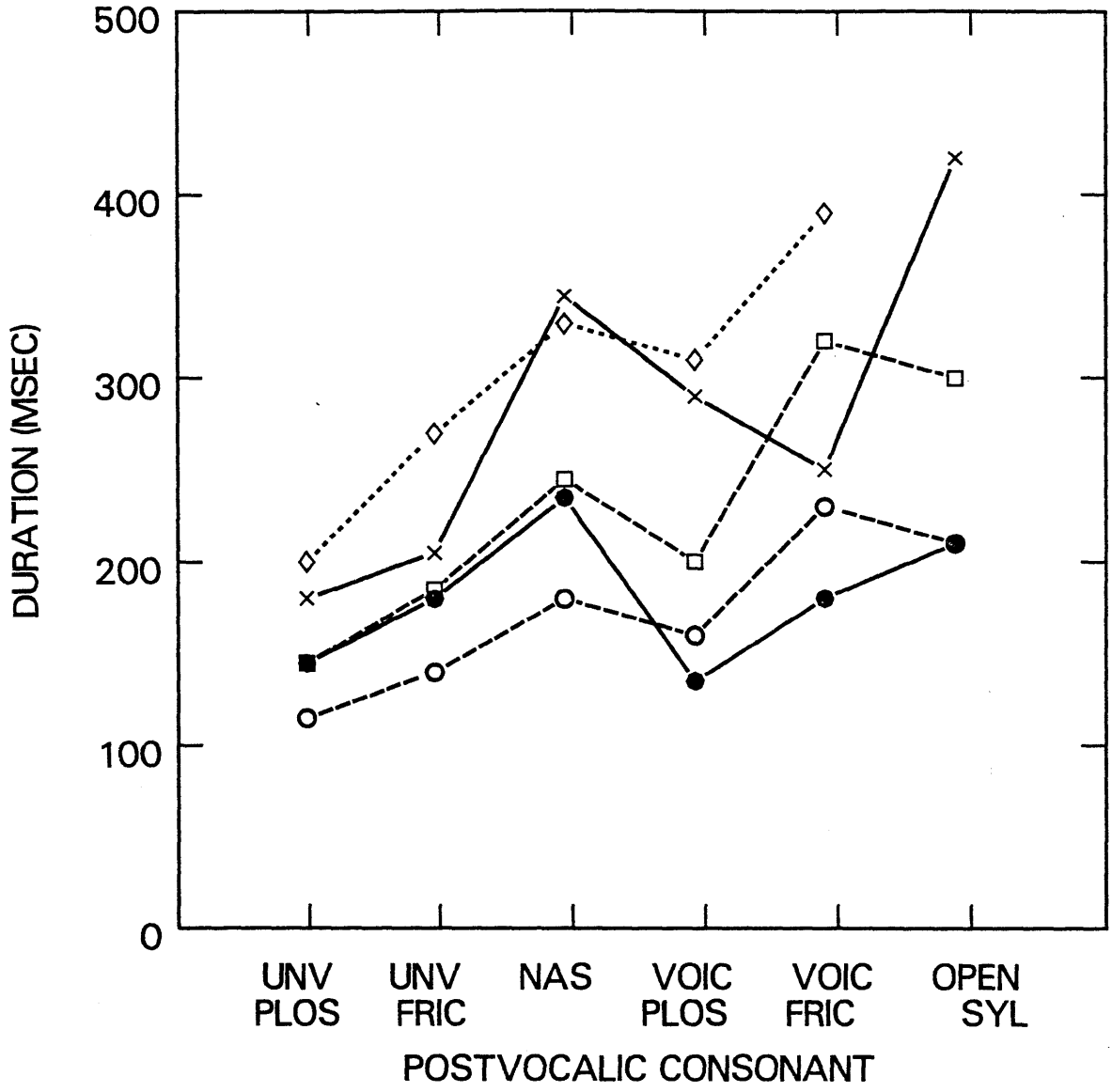

Figure 7c. Average duration of vowel /e^{y}/ as a function of postvocalic consonant and speaking mode (CONV (●) CLEAR (×)). Comparison data obtained from Umeda (1975) for /e^{y}/ in monosyllables (○) and in prepausal position (□), and from Peterson and Lehiste (1961) in isolated words (◇).

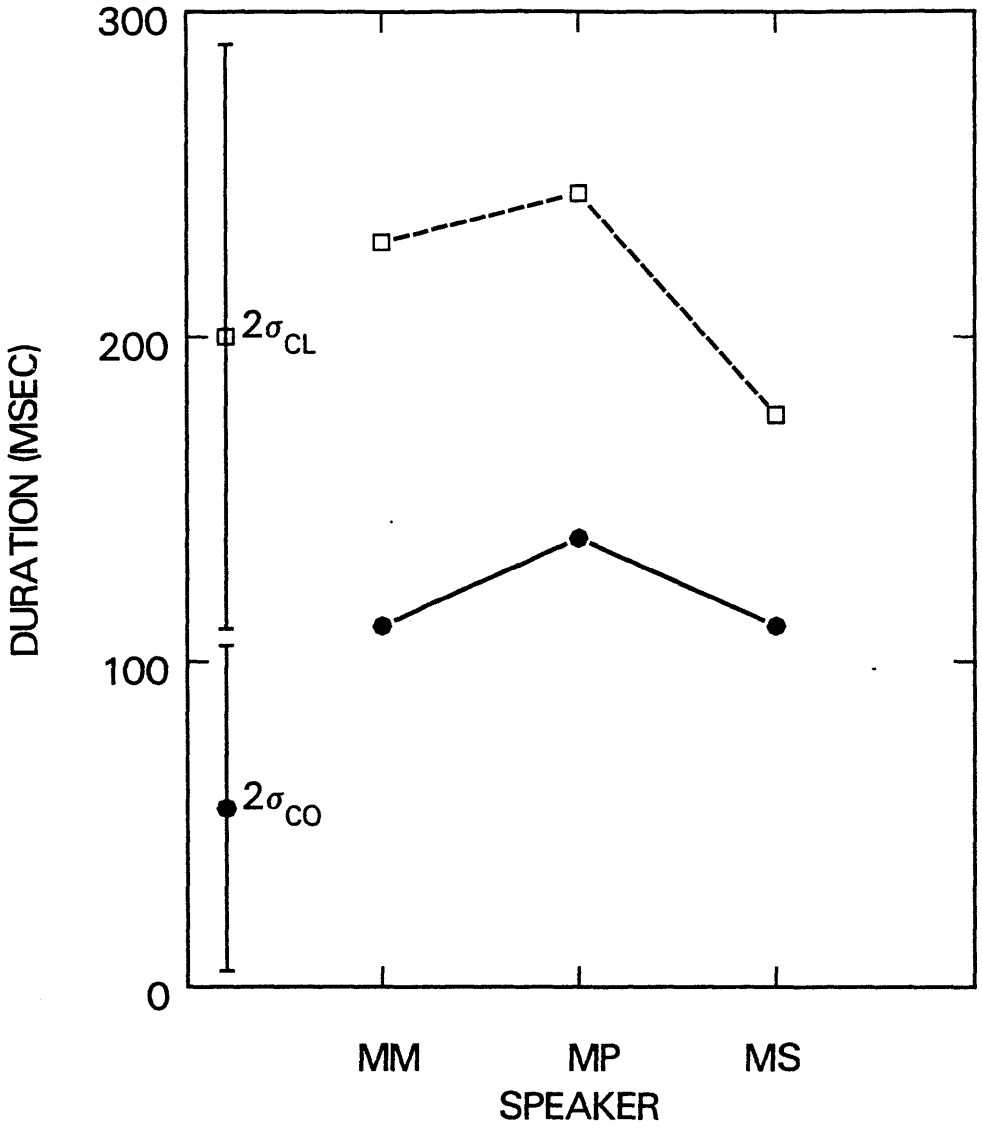

Figure 8a. Overall plosive duration (N=165) (including closure, burst, and aspiration) in conversational (●) and clear (□) speech.

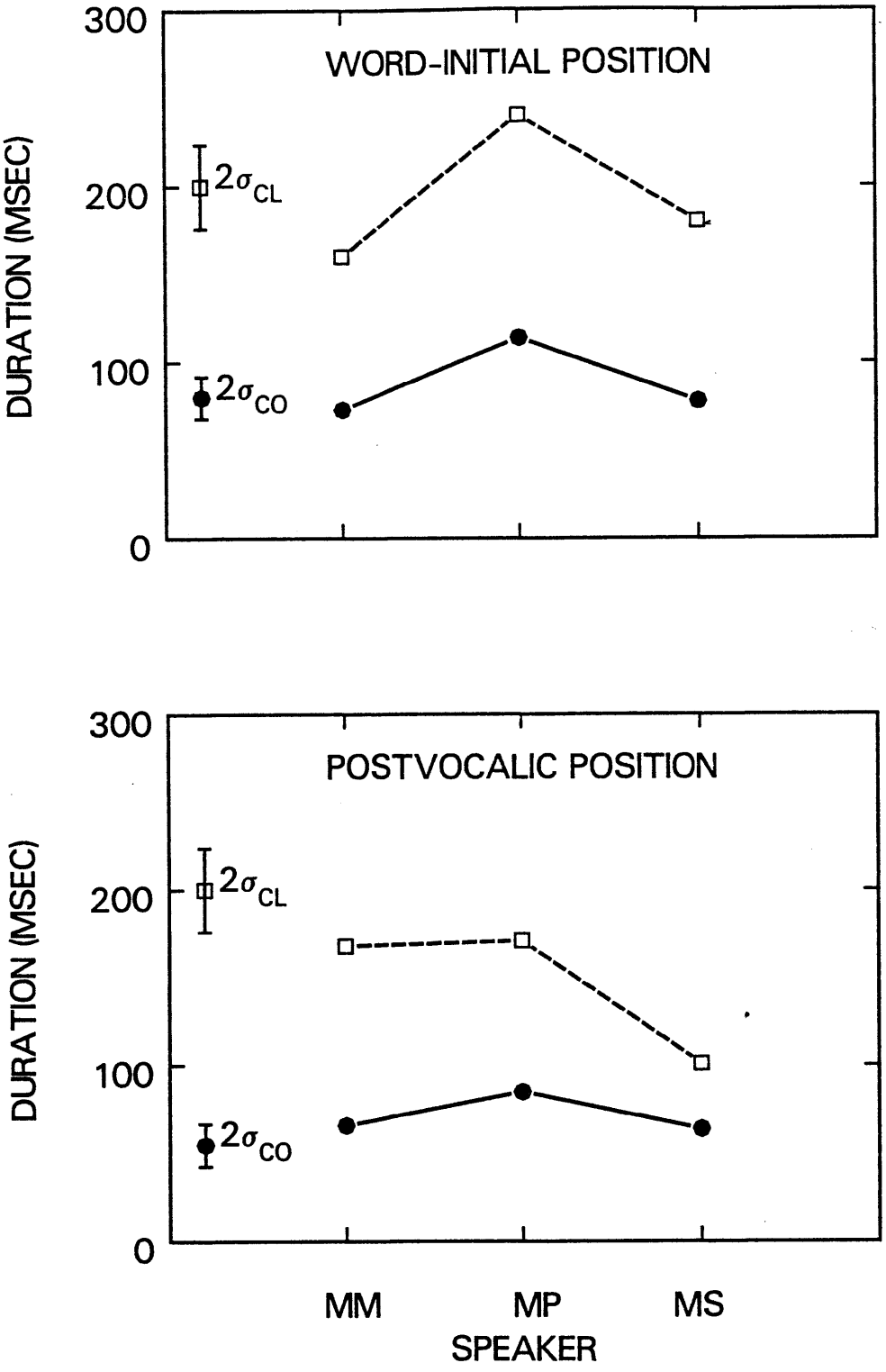

Figure 8b. Duration of closure interval for /p/ in word-initial position (N=11) and postvocalic position (N=7) when it is immediately preceded by a vowel.

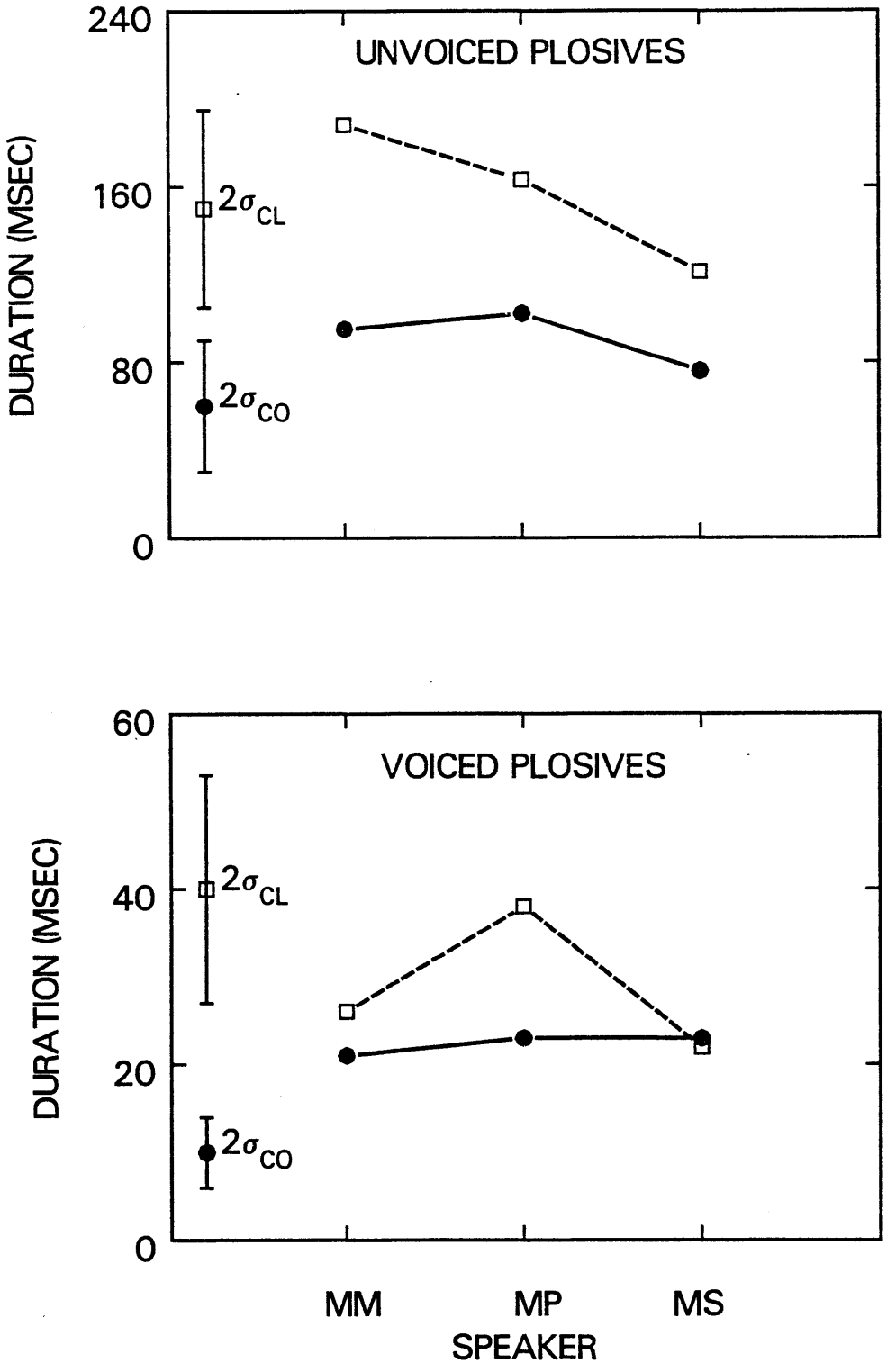

Figure 8c. Voice-onset-time measurements for voiced (N=35) and unvoiced (N=44) plosives in word-initial position for conversational (●) and clear (□) speech. Data have been averaged across place of articulation.

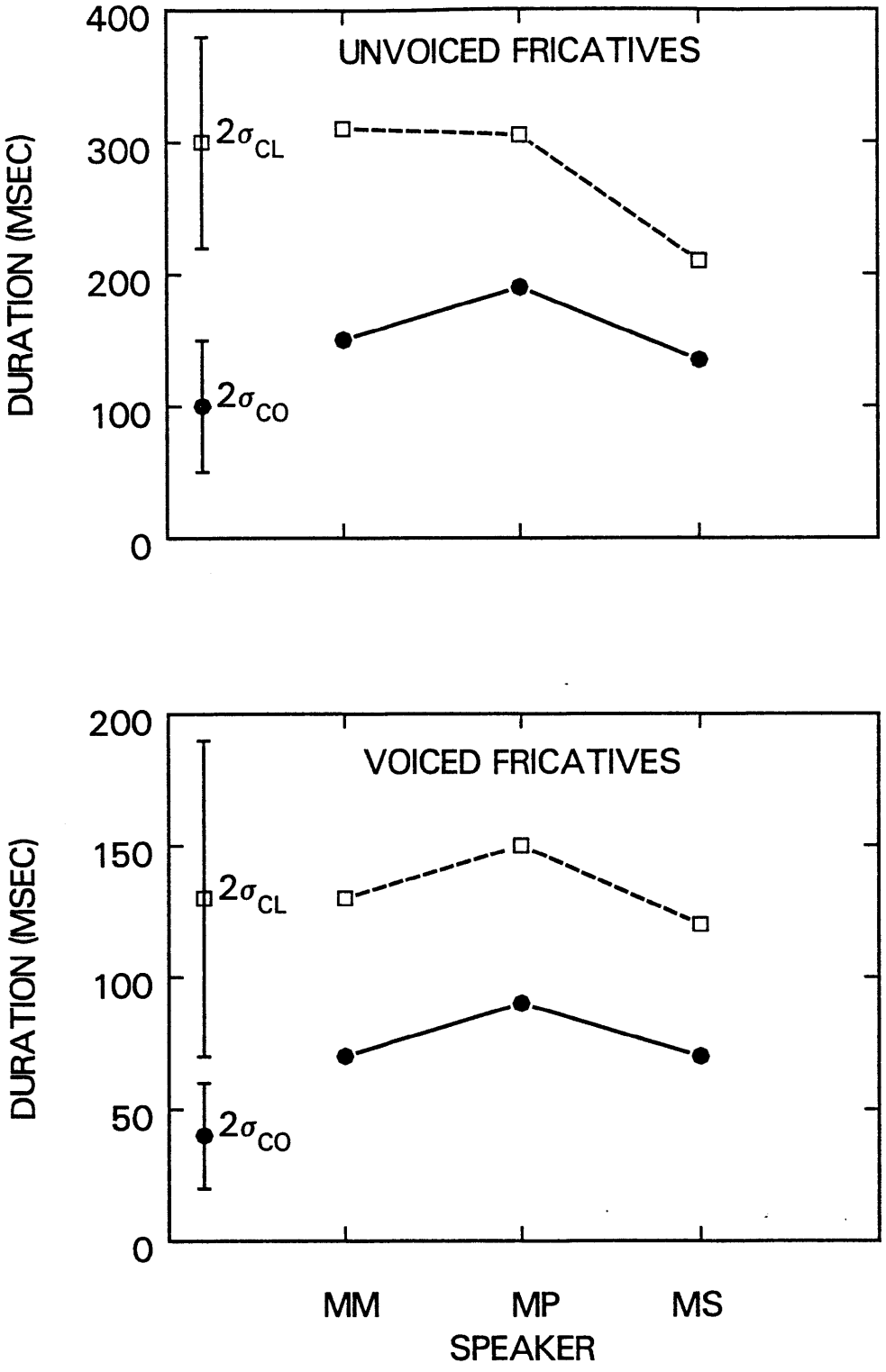

Figure 9a. Durations of unvoiced (N=77) and voiced (N=15) fricatives in conversational (●) and clear (□) speech. Note different durational scales for unvoiced and voiced fricatives.

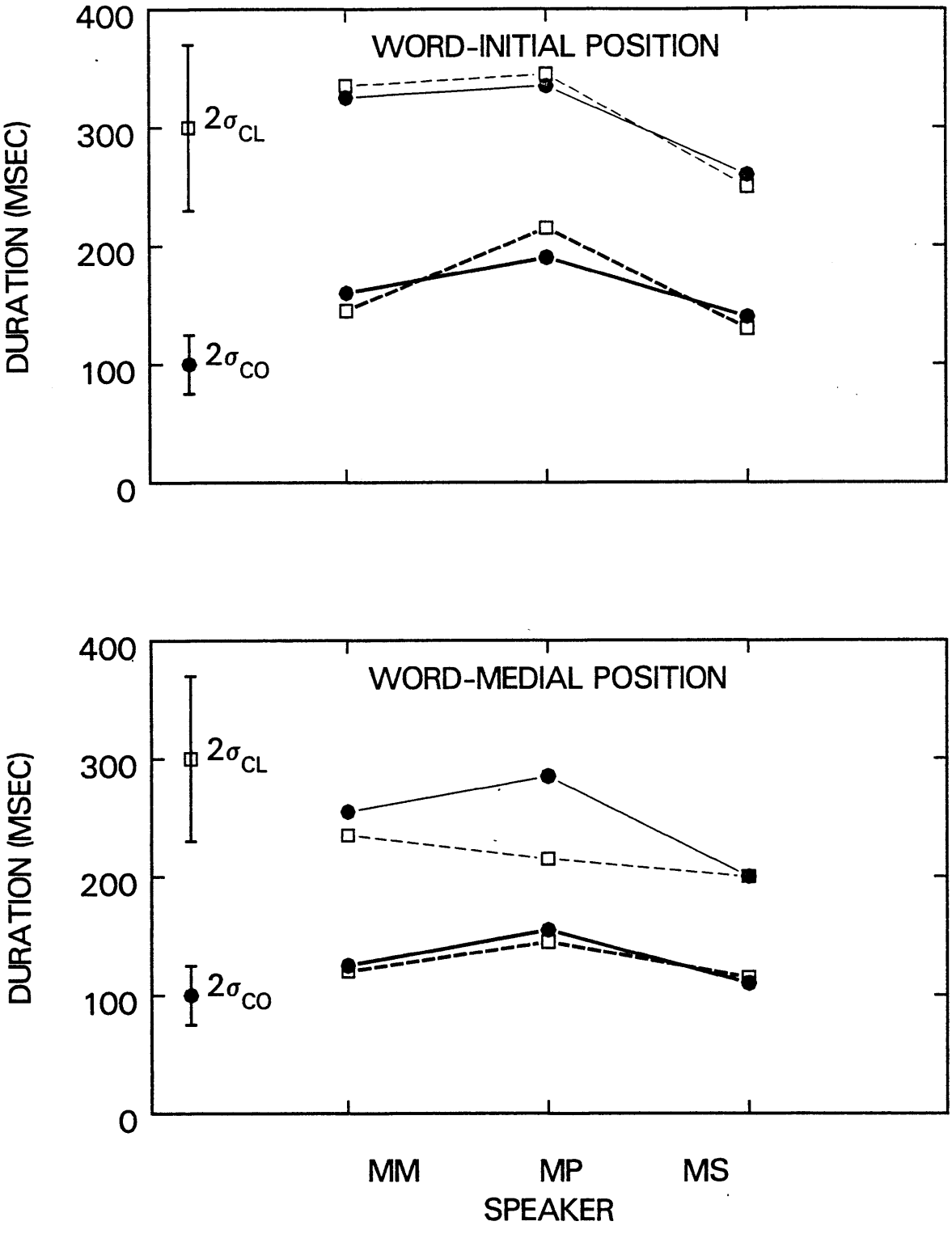

Figure 9b. Durations of /s/ in 1) word-initial position: non-consonant cluster (N=4, ●) and cluster (N=15, □) 2) word-medial position: non-cluster (N=10, ●) and cluster (N=4, □). Data for conversational speech are associated with thicker lines.

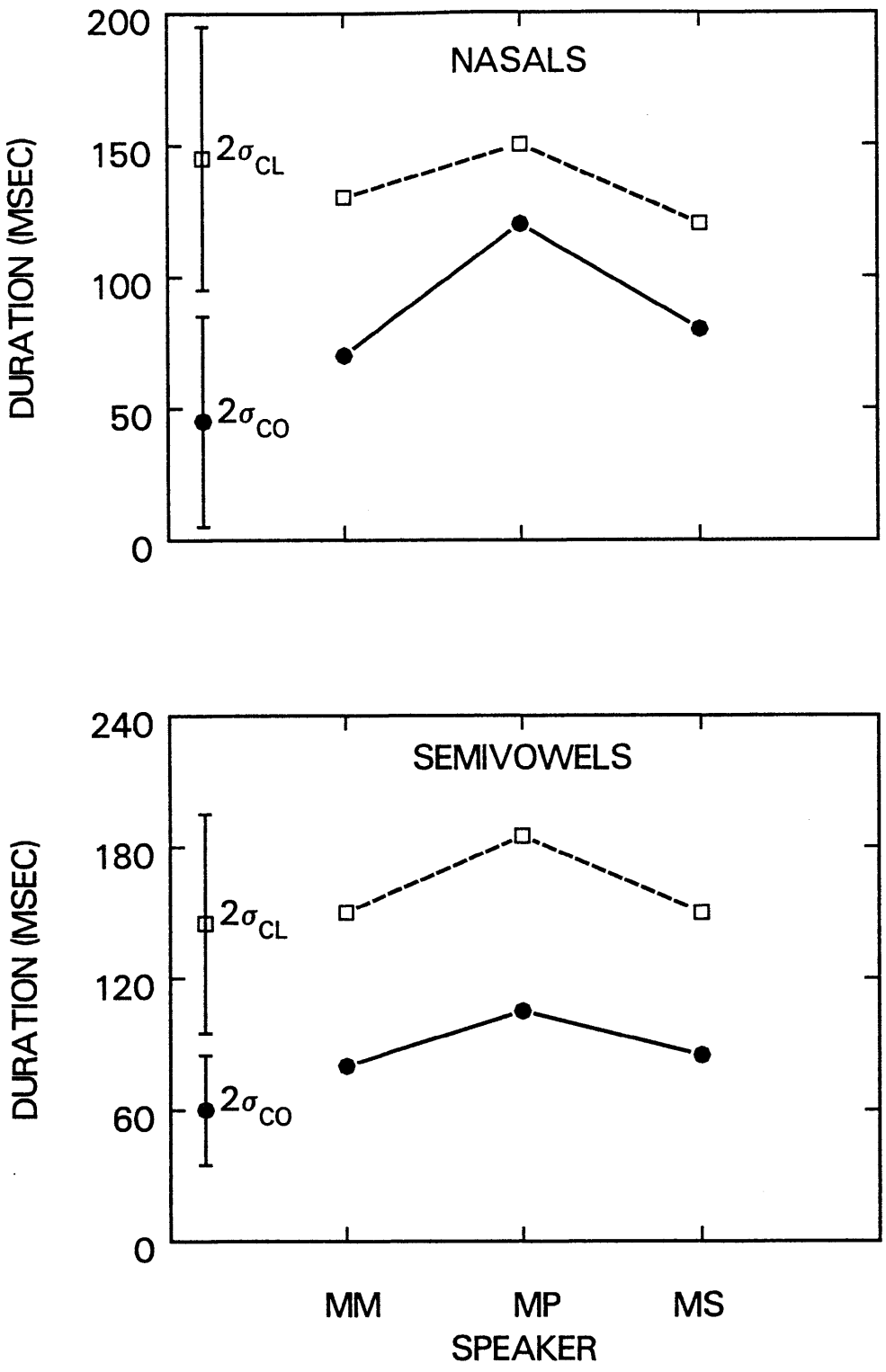

Figure 10 a) average durations of nasals (N=55) b) of semivowels (N=77) in conversational (●) and clear (□) speech.

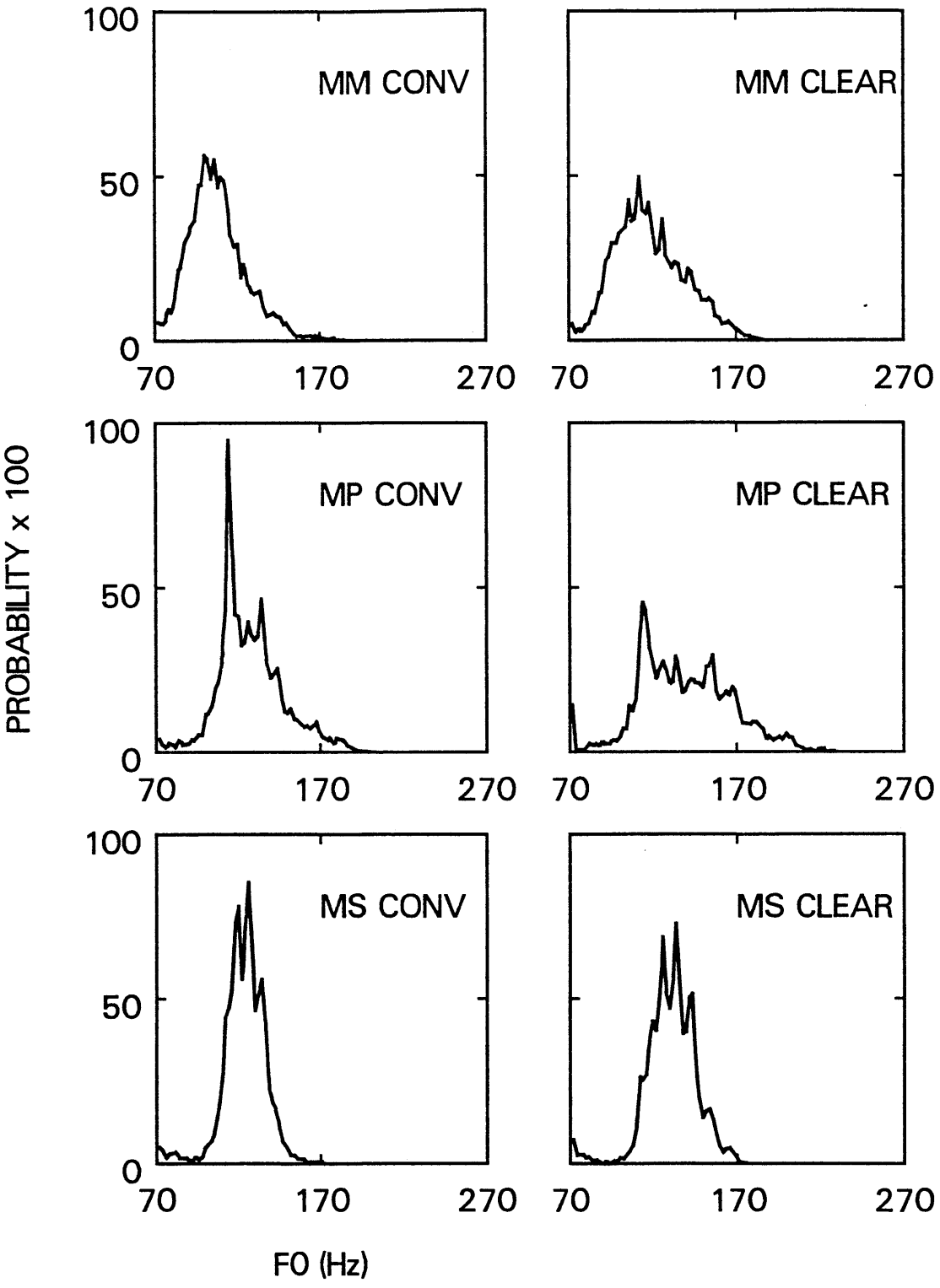

Figure 11. Fundamental frequency histograms for all three speakers and both speaking modes.

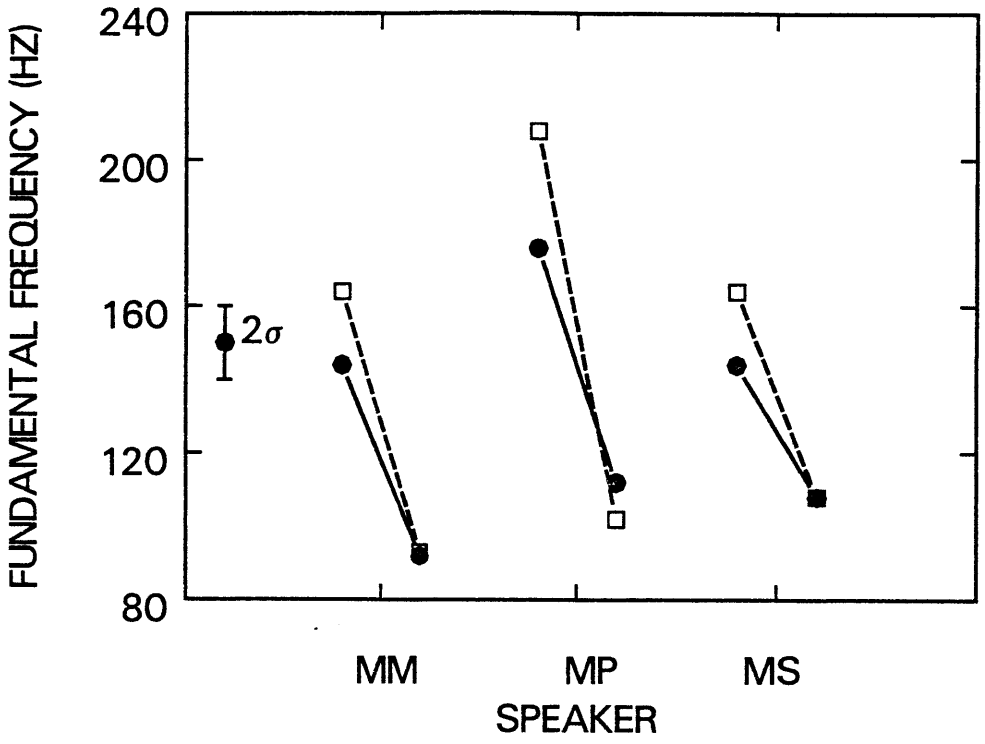

Figure 12. Average maximum value of fundamental frequency in sentence and value achieved 50 msec before the end of the sentence in conversational (●) and clear (□) speech.

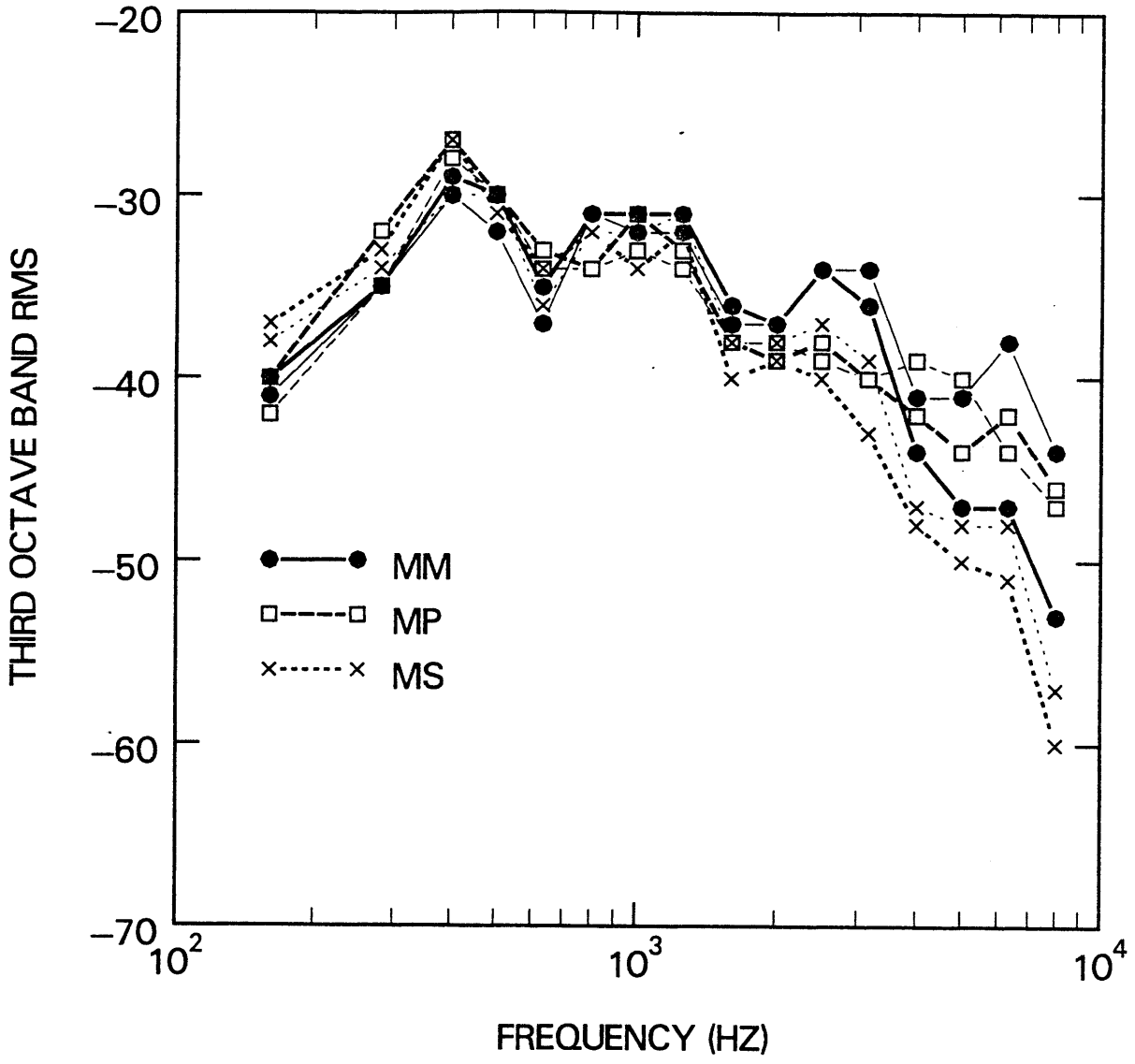

Figure 13. Long-term spectra of speech as a function of speaker (MM(●), MP(□), MS(×)). Conversational speech indicated by thicker lines.

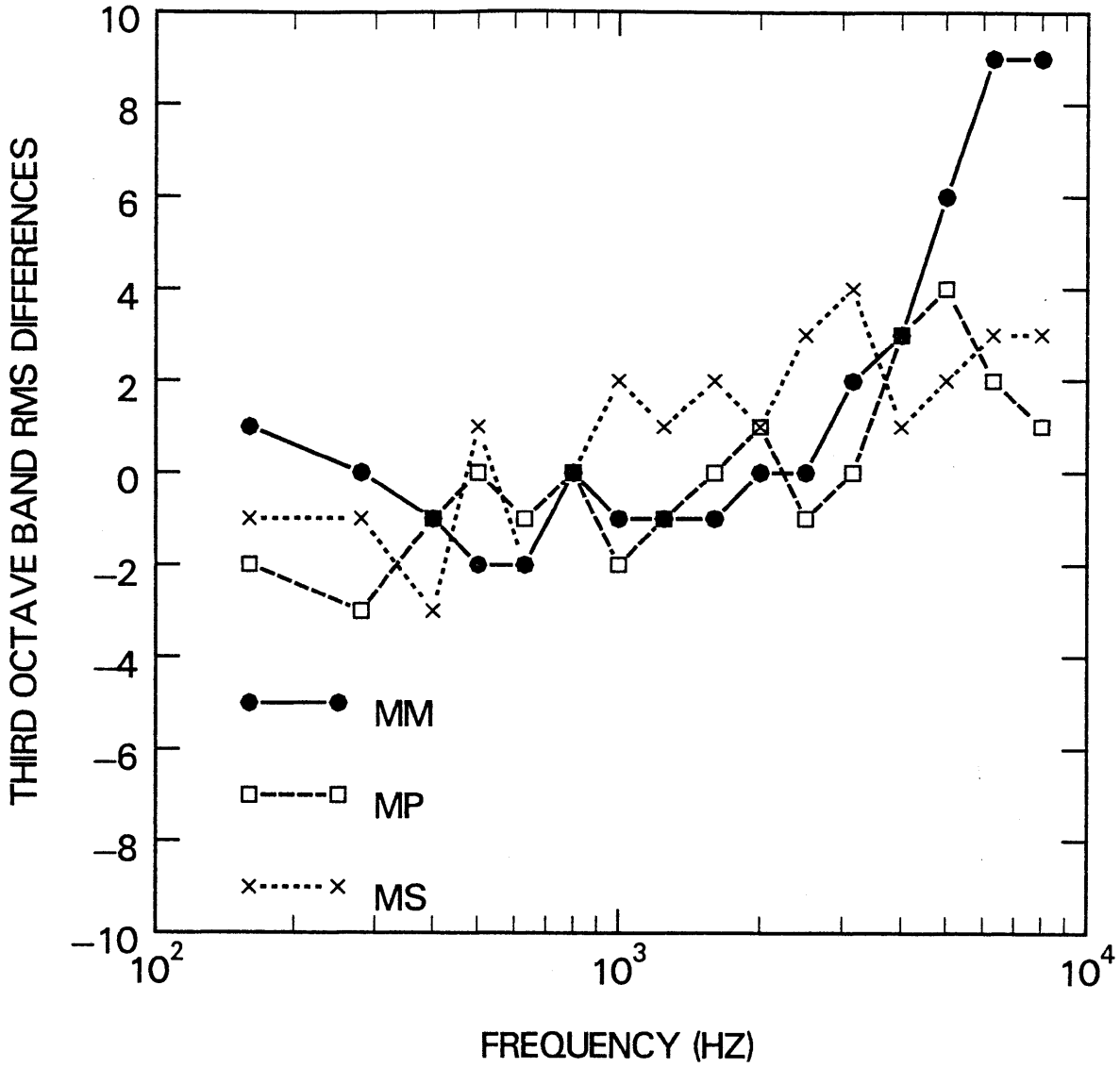

Figure 14. Differences between long-term spectra of clear and conversational speech as a function of speaker (MM(●), MP(□), MS(×)). Actual measurement is (clear - conversational) rms third octave level.

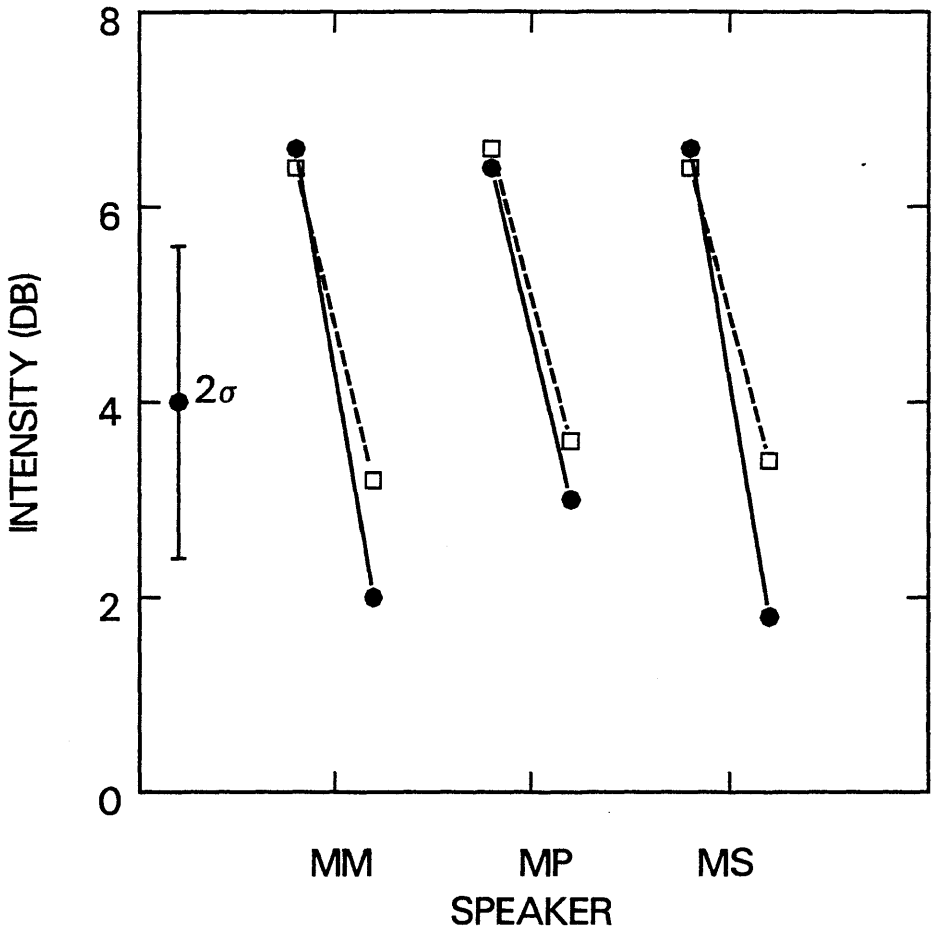

Figure 15. Average maximum intensity in sentence and intensity 50 msec before the end of the sentence for conversational (●) and clear (□) speech. (Average intensity of sentences across speaker and speaking mode has been normalized)

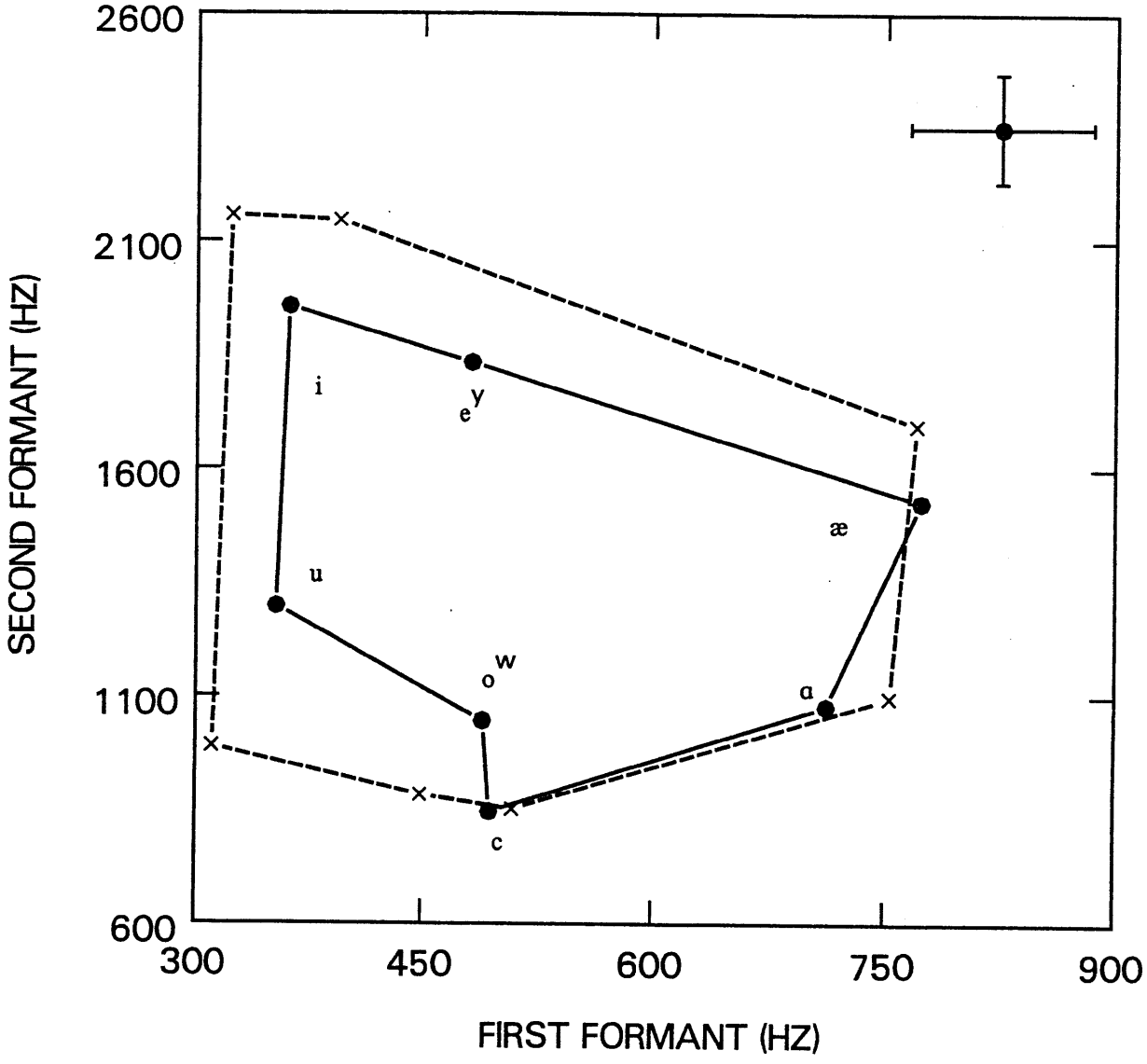

Figure 16a. Formant frequency data for tense vowels for speaker MM in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

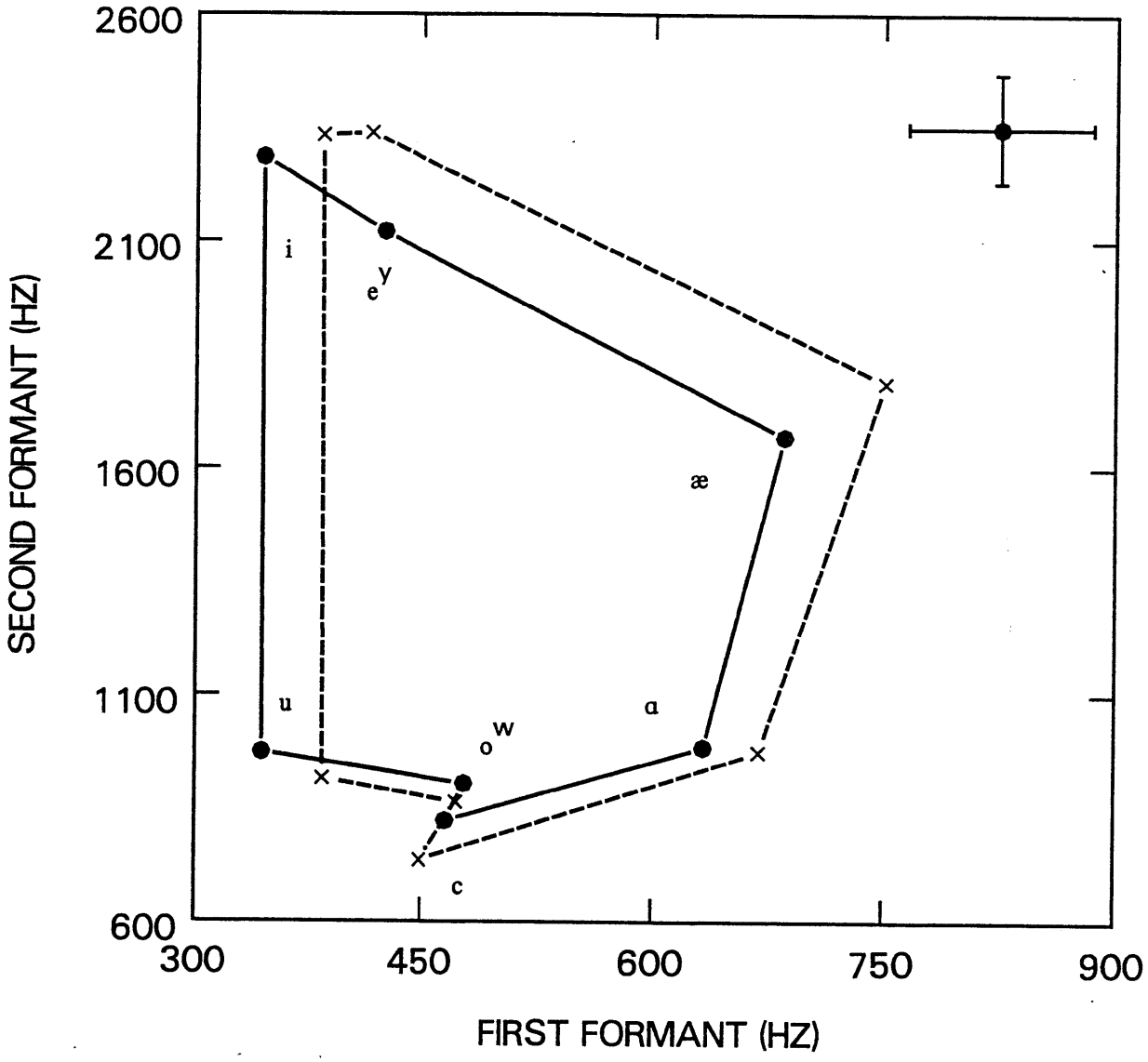

Figure 16b. Formant frequency data for tense vowels for speaker MP in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

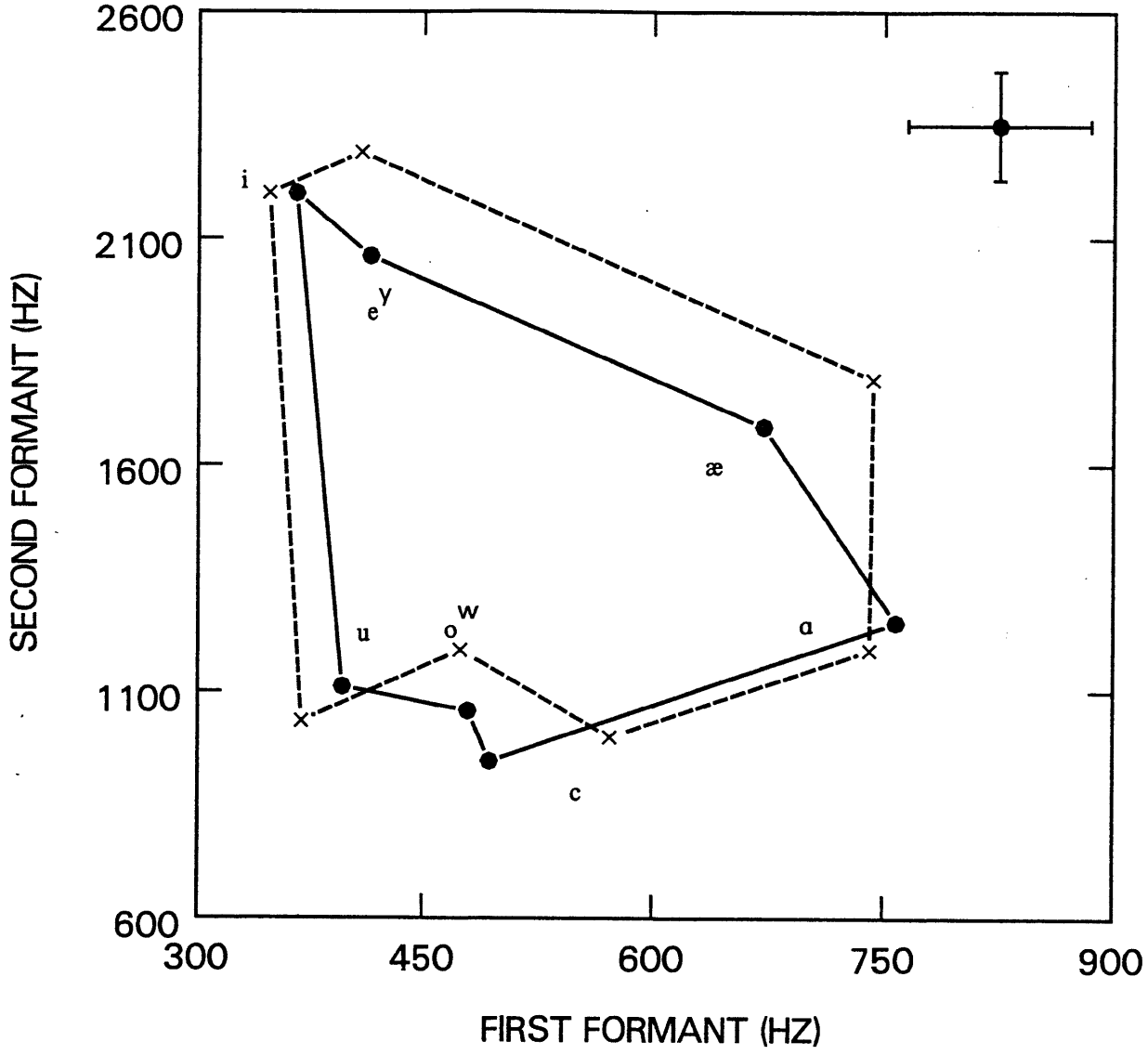

Figure 16c. Formant frequency data for tense vowels for speaker MS in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

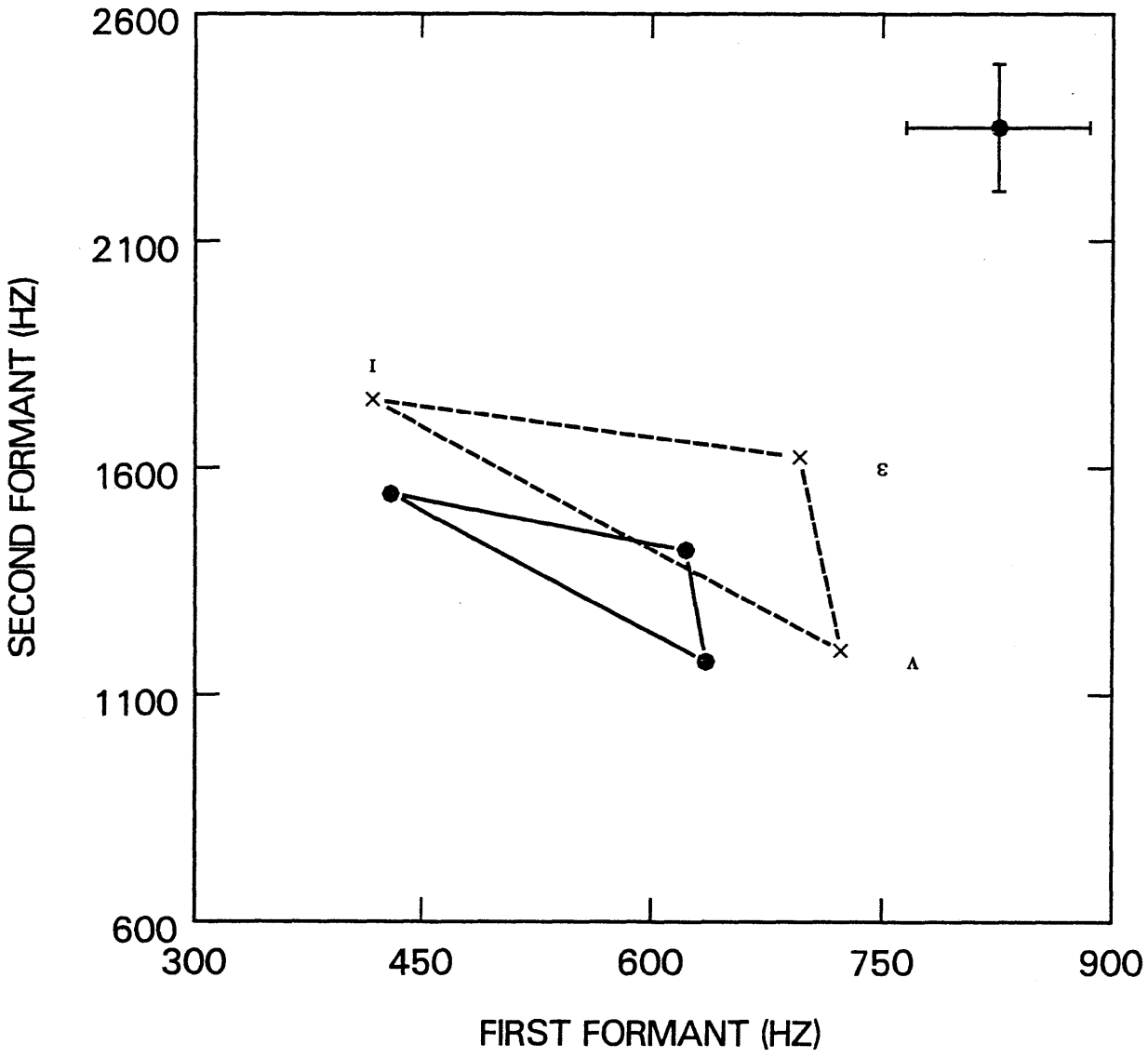

Figure 17a. Formant frequency data for lax vowels for speaker MM in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

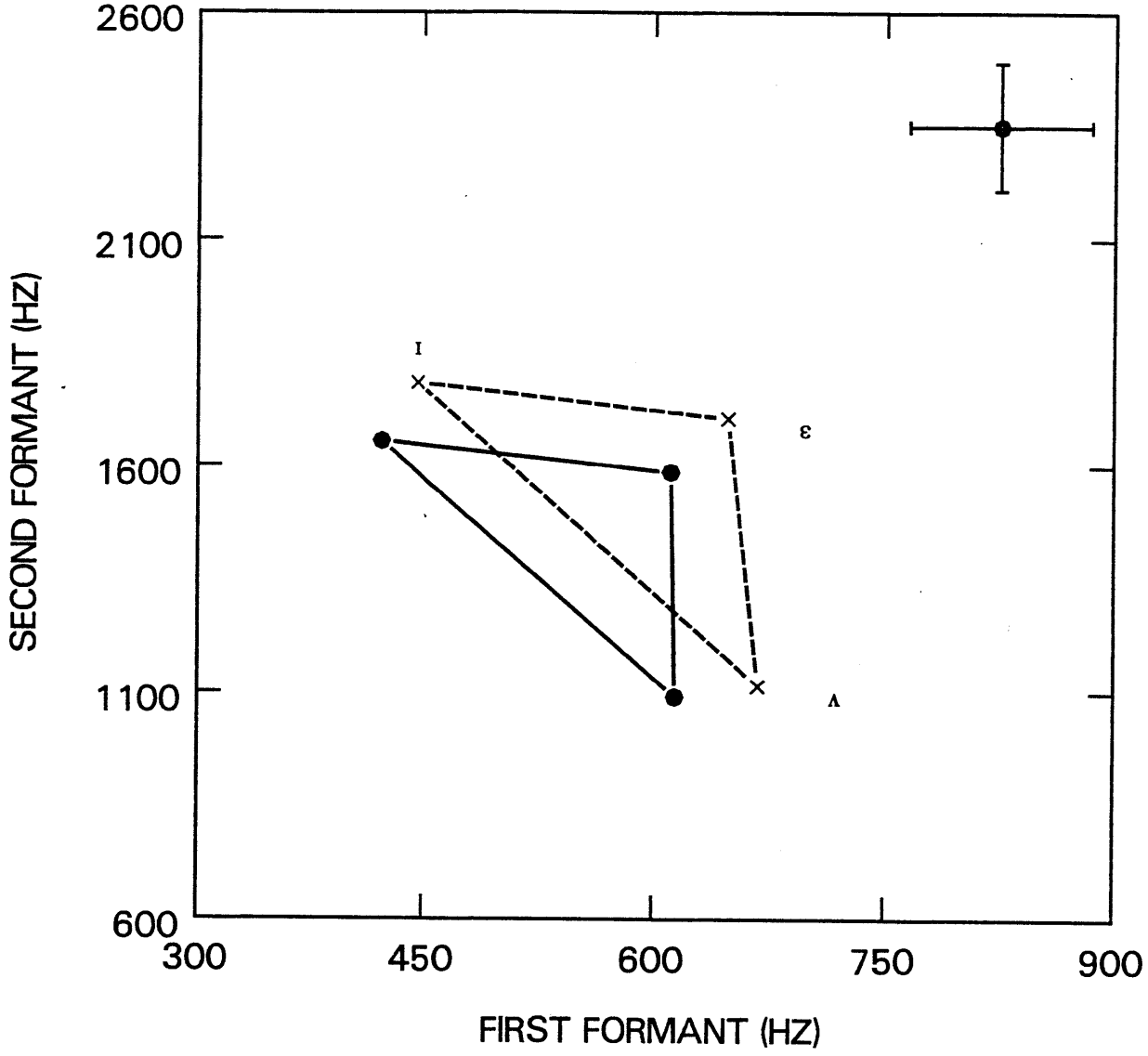

Figure 17b. Formant frequency data for lax vowels for speaker MP in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

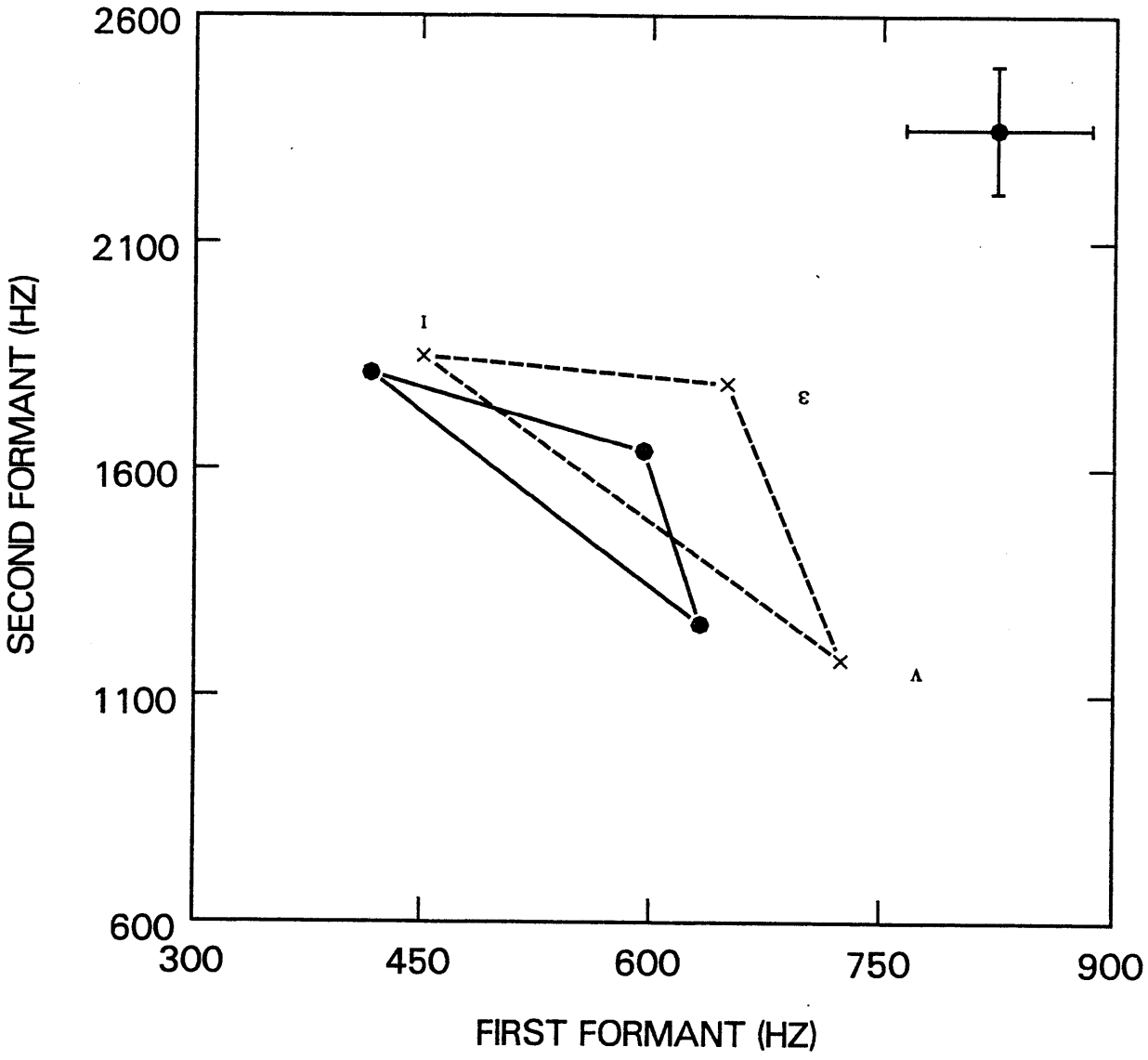

Figure 17c. Formant frequency data for lax vowels for speaker MS in conversational(●) and clear(×) speech. Approximate numbers of occurrence for each vowel are given in Appendix B.

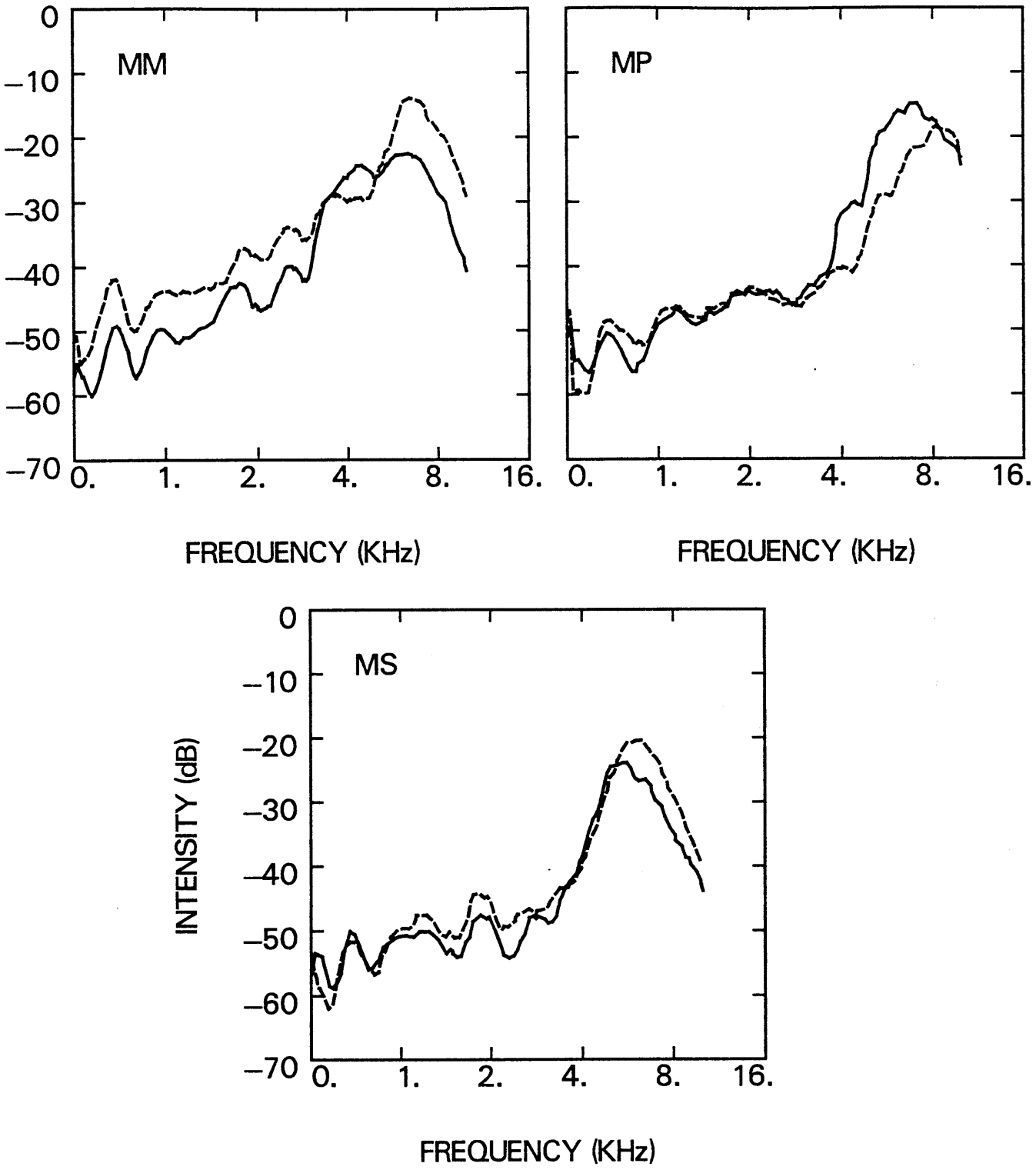

Figure 18. Average long-term spectra of /s/. Spectra for clear speech indicated by dotted line. Conversational speech indicated with solid line. Standard deviation in y direction is approximately 5 dB.

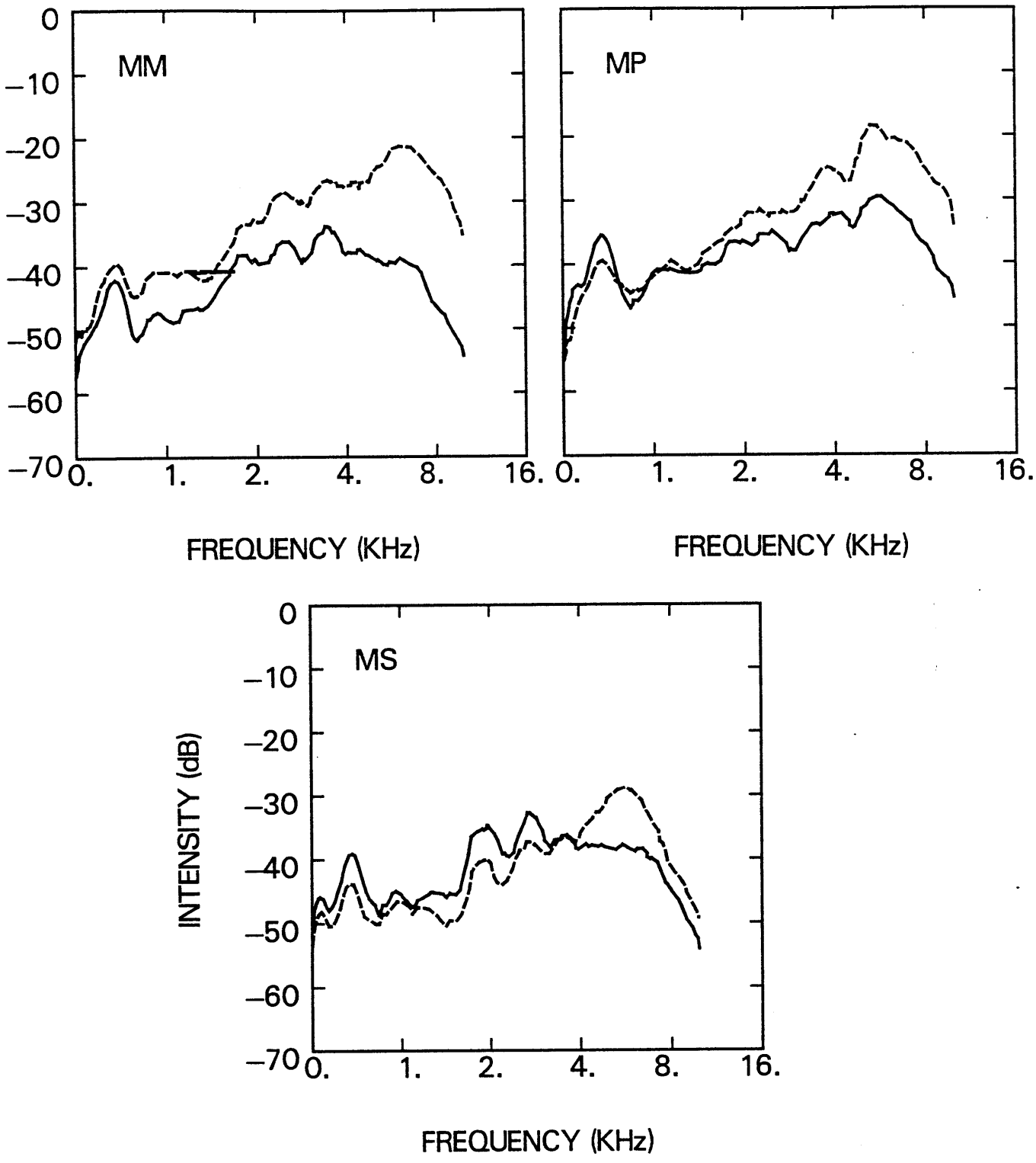

Figure 19. Average long-term spectra of /t/ across speaker and speaking mode. Conversational speech indicated with solid lines. The standard deviation in the y-direction is approximately 5 dB.

SPEAKING CLEARLY FOR THE HARD OF HEARING III: AN ATTEMPT TO DETERMINE THE CONTRIBUTION OF SPEAKING RATE TO DIFFERENCES IN INTELLIGIBILITY BETWEEN CLEAR AND CONVERSATIONAL SPEECH

INTRODUCTION

Conversational speech can be defined as that speech which arises between people in everyday situations. Clear speech can be defined as that speech which arises when people are trying to communicate in difficult situations, e.g., in a noisy environment or when talking with a hearing-impaired individual. Picheny, Durlach, and Braida (1981a) described a set of experiments in which nonsense sentences were spoken clearly and conversationally and presented to hearing-impaired listeners. The average intelligibility of the clear sentences was substantially higher than that of the conversational sentences (an average of 17 percentage points). Acoustical analysis revealed that there were substantial acoustical differences between conversational and clear speech spanning many dimensions. These dimensions included speaking rate, phonological modifications, and consonant-vowel amplitude ratio. It is important to determine to what extent each of the variables is responsible for the difference in intelligibility. In particular, as discussed in Picheny, Durlach, and Braida (1981b), if some

type of hearing aid were to be developed based on knowledge of characteristics of clear speech, the effects of factors associated with listener processing time (e.g. speaking rate, pauses, etc.) must be separated from the effects of factors concerned with the type and quality of information available to the listener (e.g. information associated with CV ratio, short-term spectrum, and phonological modifications).

Three general approaches are suggested for determining the relative contribution of processing time factors towards intelligibility differences. The first approach is to artificially alter a speaker's speaking rate using signal processing techniques. The advantage of this approach is that with a sufficiently accurate signal processing technique, only speaking rate variables could be altered, while leaving other variables (CV ratio, spectra, etc.) unaffected. The disadvantage of this approach is that no such signal processing technique currently exists. The second approach is to control speaking rate by instructions to the speaker. The advantage of this approach is that signal processing distortions are avoided, and all variations occur in a "natural" manner. The main disadvantage of this approach is that many other acoustical variables can vary as well as those associated with speaking rate. Therefore, such a technique would have to be accompanied by substantial amounts of acoustical analyses as a check. The last approach is to manipulate speaking rate using synthetic speech. The

most substantial disadvantage at present of this approach is the relatively low intelligibility of even the best speech synthesis systems. Pisoni (1979) reports intelligibility scores obtained on the Haskins anamolous sentences (similar to the nonsense sentences in our study) of 71% to 85% for a group of 23 normal-hearing listeners. It is obvious that substantial work is required to improve the quality of speech synthesis systems. However, the advantages that would be gained from this approach are substantial. The entire process of making recordings, dubbing tapes, and performing acoustical analyses would be rendered unnecessary. The value of such a flexible system towards the determination of the contributions of other acoustical variables to intelligibility differences is obvious. It is felt that the most productive approach for evaluating the contribution of different variables to intelligibility differences in the long-term will be achieved by synthetic speech manipulation, and it is hoped that work will proceed in that direction. However, since the amount of time required to develop such a system is substantial, it was felt that a simple probe study to investigate the effects of speaking rate on intelligibility might prove worthwhile. This letter reports on an attempt to determine the contribution of speaking rate to intelligibility differences between conversational and clear speech by artificial manipulation of the speaking rate using a recently developed signal processing technique (Malah, 1979).

PRIOR WORK

Previous research on artificial manipulations of speaking rate has generally focused on techniques whose goal is to increase speaking rate without adversely affecting intelligibility. This is desirable in vocoders (to achieve bit-rate reduction) and for reading devices for blind people (as they often comment they could understand at higher speaking rates). The scheme typically used in these studies is one described by Fairbanks et al. (1954). In this scheme, an increase in speaking rate (time compression) is achieved by discarding intervals of speech of approximately 10-30 msec. in duration. A decrease in speaking rate (time expansion) is achieved by repeating 10-30 msec. segments of speech. When listeners are trained on a small (50 word) vocabulary, time compression and expansion factors of 4 do not adversely affect intelligibility. For larger vocabularies (PB words), Fairbanks and Kodman (1957) noted that intelligibility did not substantially decrease for time compression factors less than 4. For factors slightly greater than 4, intelligibility dropped dramatically (30 percentage points), consistent with other researchers' data (Daniloff et al., 1968; Beasley et al., 1972). Intelligibility results obtained using an acoustic feature-dependent pitch-synchronous processing scheme suggest that sentences can be perceived at speaking rates of almost 400

wpm (Toong, 1974). All of these results were obtained using normal-hearing listeners.

Schon (1970) described a study in which the effect of rate manipulated using the Fairbanks scheme was examined for several groups of hard of hearing and aged listeners. The test materials were CID-22 words. The intelligibility scores of all groups evidenced some degradation for both time compression and time expansion. The decrease in scores was small (12 percentage points maximum for compression by a factor of 2), and for no group did scores ever increase under time expansion. Although many other researchers (e.g., Konkle et al., 1977 ; Manning et al., 1977 ; Freeman and Beasley, 1978) have investigated time compression and found not surprisingly that people with communication difficulties have more difficulty understanding compressed speech, only Schon demonstrated that time expansion produced similar difficulties. Thus, the interpretation of these experiments that increased speaking rate places a greater load on the impaired listener and compounds the perceptual distortions is not strictly supported. Schon's study suggests that the processing scheme itself may be confounding the results.

The above studies suggest that while normal hearing listeners can understand speech (artificially) time compressed by a factor of 4, hearing-impaired individuals have difficulty understanding time compressed speech relative

to unprocessed speech. This result might suggest that increased speaking rate is detrimental to intelligibility for hearing-impaired listeners, and hence might be responsible to the intelligibility differences between clear and conversational speech. This conclusion, however, must be tempered by the fact that time expansion also decreased intelligibility. Of course, intuitively it is felt that decreasing one's speaking rate improves intelligibility. However, Picheny, Durlach, and Braida (1981b) demonstrated that the change in speaking rate associated with clear speech is reflected in numerous changes in the speech waveform that cannot be simulated using a simple processing scheme such as Fairbanks'. In addition, previous experiments on time compression have employed words rather than nonsense sentences, producing less of a perceptual load on the listener. For these reasons, the results of previous work on rate manipulation are inconclusive in relation to the intelligibility differences between conversational and clear speech.

METHOD OF STUDY

This study was an initial probe to determine the effect of speaking rate on the intelligibility differences between clear and conversational speech. 100 nonsense sentences spoken conversationally and clearly by a single speaker (MM)

were processed using Malah's algorithm to interchange the speaking rates (defined as the number of words/minute uttered by the speaker) of conversational and clear speech. speech. The materials and recording prodedures were exactly as described in Picheny, Durlach, and Braida (1981a). The speaking rate of MM's conversational speech was 205 wpm, and that of his clear speech was 101 wpm. After processing with Malah's algorithm, the speaking rate of MM's conversational speech was 100 wpm, and that of his clear speech was 200 wpm.

The speaking rate was modified by the following process. A simple description of speech production is that speech is produced when a sound source (pulses or turbulence noise from a continuous stream of air) excites the vocal tract. A simple conceptual model for changing the speaking rate would be a procedure that modified the rate of change of the vocal tract and the rate of change of the excitation. Fairbanks's scheme approximates this by discarding or repeating intervals of speech sufficiently short so that the vocal tract and excitation may be considered as stationary. Malah's algorithm accomplishes this is a more elegant fashion, namely by achieving a decimation or interpolation of the rate of change in the short- term spectrum of speech without altering the fundamental frequency. In addition, though limited to integral factors in changing speaking rate, Malah's algorithm is computationally much more efficient than other similar algorithms proposed to alter speaking rate (Portnoff, 1978;

Seneff, 1980). An basic feature of this algorithm is that all elements of speech in all acoustic environments are slowed down or sped up by exactly the same amount, including events such as formant transitions, burst durations, etc. Data presented in Picheny, Durlach, and Braida (1981b) indicate that rate changes associated with clear speech are not achieved with such a simple strategy. However, an experiment such as this is a useful preliminary to experiments employing more sophisticated strategies for altering speaking rate (e.g., making the rate change phoneme-dependent). The sentences were presented to all five hearing-impaired listeners described in Picheny, Durlach, and Braida (1981a). The listeners were allowed to select the presentation level, and the orthotelephonic frequency-gain characteristic was used. No substantial differences were observed between presentation levels selected in these experiments and in the experiments on the unprocessed speech. The experimental procedure was exactly as described in those experiments.

RESULTS

Although casual listening indicated the processed speech to be of remarkably high quality, listeners' initial reactions to both types of modified speech were unfavorable. For example, a typical comment on the slowed- down conversational speech was, "This guy sounds drunk."

Intelligibility results for all five listeners are shown in Table 1. In addition, scores achieved by each listener on the unprocessed speech for the same speaker (MM) are displayed in Table 1 (from Picheny, Durlach, and Braida, 1981a). As can be seen, all listeners' scores decreased after processing for both clear and conversational speech. As a drop in intelligibility on both types of materials was not expected, the first hypothesis to be investigated was if Malah's algorithm itself was introducing extraneous distortions that degraded performance. To answer this question, the processing to change speaking rate was reapplied to the processed sentences so that the speaking rates of clear and conversational speech were restored to normal (Note this is not equivalent to inverting the processing). Tests were carried out as described above; the results are also shown in Table 1. As can be seen, although the scores do not return to exactly the same level as for the unprocessed speech, they are within an average of 5-10 percentage points of the unprocessed materials. It therefore does not appear that the processing is introducing excessive extraneous distortion.

Figures 1 and 2 show intelligibility scores obtained on different classes of sounds by listeners VF and MF from Picheny, Durlach, and Braida (1981a) and from this series of experiments. The general trend in sped-up clear speech, an overall degradation in performance, is seen in both listeners

VF's and MF's data, though the overall performance level is different for the two listeners. For slowed-down conversational speech, listener VF shows the largest degradation in performance on plosives, and listener MF shows the largest degradation in performance on fricatives and semivowels. Essentially no class of sounds showed any sign of improvement for the decrease in rate.

DISCUSSION

The large drop in scores observed for the sped-up clear speech is not surprising; previous research on the perception of time- compressed speech by hearing-impaired listeners has led to similar results (Schon, 1970). The drop in scores on the slowed-down conversational speech is somewhat more surprising. Even though the algorithm does not slow-down speech in a "natural" fashion, casual listening suggested that the individual sounds were not grossly distorted by the algorithm. In addition, the scores of the restored conversational speech were only 5 percentage points below the scores of the unprocessed speech. This result indicates that there was very little processing "noise" for the processed conversational speech. For the restored sped-up clear speech, however, the scores were 10 percentage points below the unprocessed clear speech. It should be pointed out that the listeners had essentially no training on the processed

speech materials prior to testing. Therefore, it is possible that with more exposure to the output speech of the algorithm (i.e., more training of the listener), scores would have substantially increased. However, it is felt that the general trend of the results would have remained the same.

As mentioned above, a simple stretching of the time axis is only a crude approximation to the strategies speakers use to decrease their speaking rate in clear speech. For example, Picheny, Durlach, and Braida (1981b) found that durations of lax vowels and semivowel-vowel formant transition rates did not increase in clear speech, that the change in duration of a particular sound was environment dependent, and that the pauses were inserted between words. A more sophisticated processing scheme would presumably take some of these factors into account when altering speaking rate.

The results of this study were consistent with Schon's finding that both time compression and expansion are detrimental to intelligibility of speech for hearing-impaired listeners. The large magnitude of the drop in intelligibility relative to his study might be attributable to the greater difficulty of the test materials in this experiment compared to Schon's materials (CID-22 words). However, it is not possible to estimate the relative contribution of speaking rate to intelligibility from this

experiment. As discussed above, other techniques such as carefully instructing a speaker to vary speaking rate, or synthesizing speech with different speaking rates, can also be used rather than artificial speaking rate manipulation. This study suggests that before the effect of speaking rate on intelligibility differences between clear and conversational speech can be understood, more detailed knowledge of how a speaker modifies his speaking rate, and how variables associated with speaking rate interact with other acoustic variables (such as CV ratio, phonological phenomena, etc.) is required.

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	UNPROCESSED		SLOWED	SPED-UP	RESTORED	RESTORED
	CONV	CLEAR	CONV	CLEAR	CONV	CLEAR
MF	30	63	23	27	26	57
VF	71	87	54	60	64	80
GC	43	63	34	34	40	46
HS	56	80	29	36	40	59
LF	64	82	62	69	72	84
AVE	53	75	40	45	48	65

TABLE 1

Results of rate manipulation experiment. First two columns are results on conversational and clear speech for all five listeners from experiments described in Picheny, Durlach and Braida (1981a). Next two columns contain results of processing clear speech to double the speaking rate and processing conversational speech to halve the speaking rate. Last two columns contain results for the speech materials after further processing to restore original speaking rate.

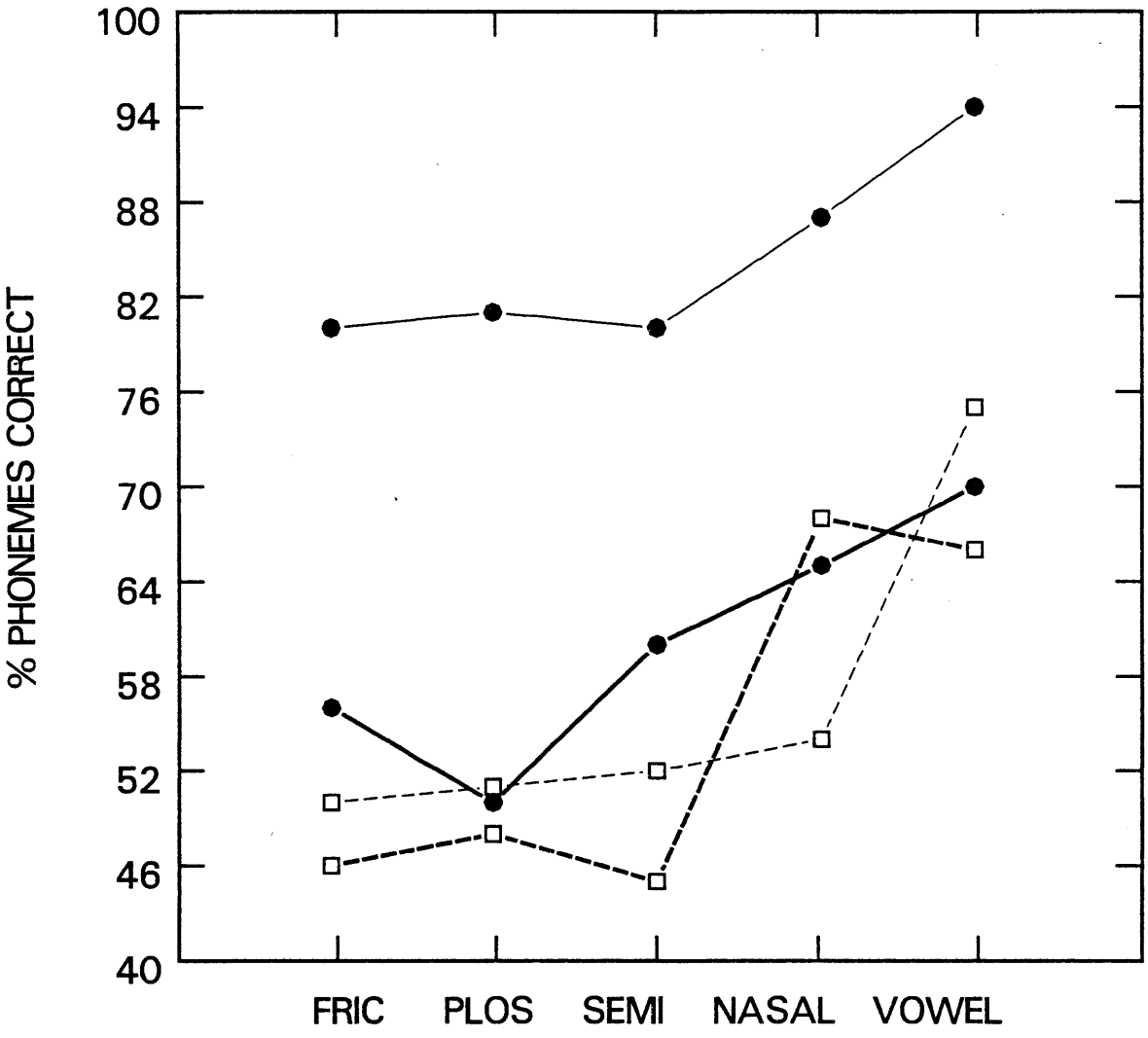

Figure 1. Phoneme errors in rate experiment for listener MF. Unprocessed material (●) (data from Picheny, Durlach and Braida (1981a)), processed material (□). Conversational speech for both conditions indicated by thicker lines.

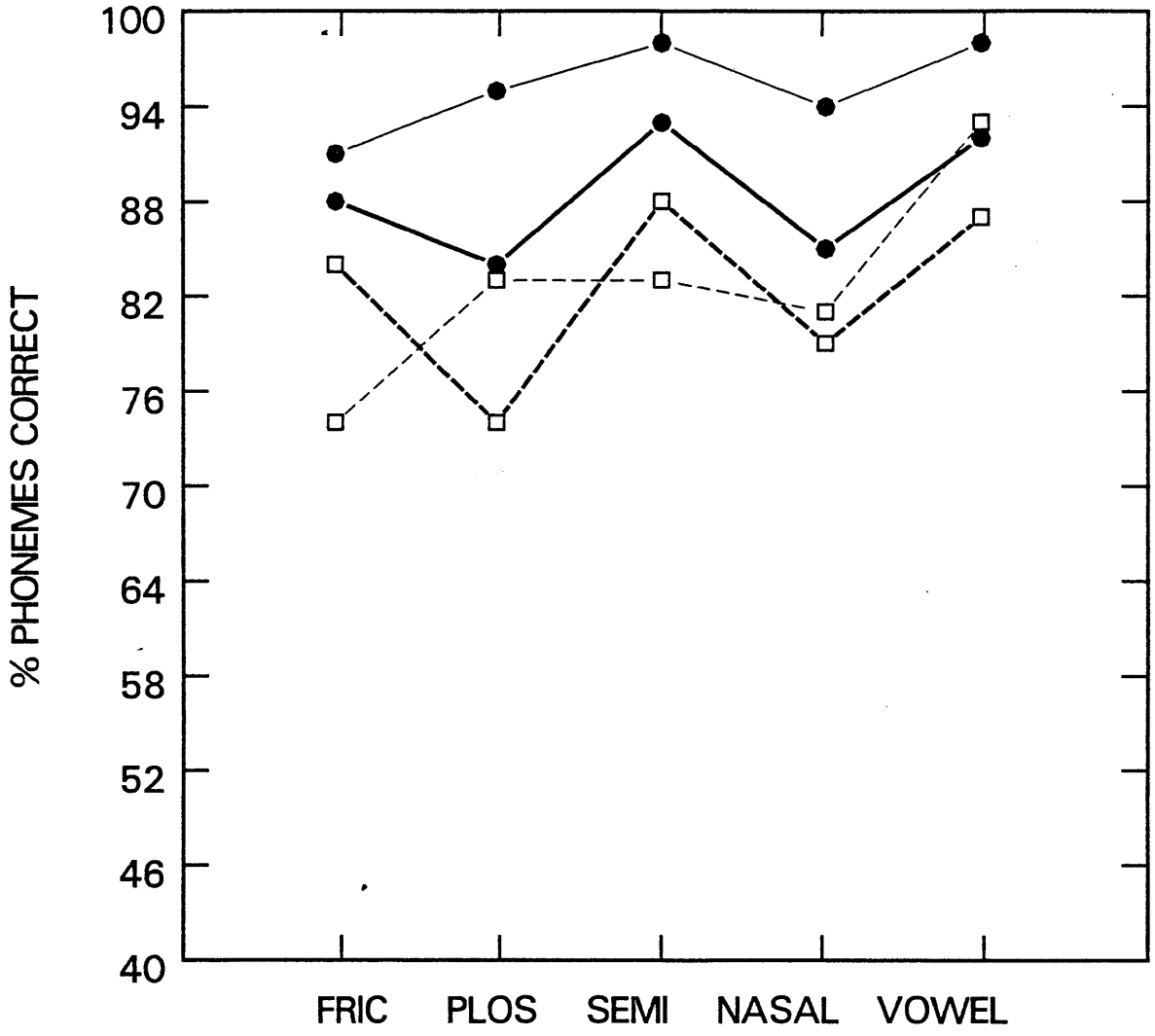

Figure 2. Phoneme errors in rate experiment for listener VF. Unprocessed material (●) (data from Picheny, Durlach and Braida (1981a)), processed material (□). Conversational speech for both conditions indicated by thicker lines.

APPENDIX A

Word Lists for Construction of Nonsense Sentences

The following sections contain the word lists used in the construction of the nonsense sentences. For each word, three pieces of information are displayed: word frequency (in counts per million as obtained from the Brown corpus), word spelling, and a phonetic transcription of the word. The transcription consists of a sequence of two-letter codes:

PP - p as in pot
TT - t " " top
KK - k " " cop
BB - b " " bat
DD - d " " dog
GG - g " " goat
FF - f " " fine
SS - s " " sat
SH - sh " " should
TH - th " " thin
VV - v " " vat
ZZ - z " " zoo
ZH - z " " azure
DH - th " " those
CH - ch " " choose
JH - j " " joint
MM - m " " man
NG - ng " " sing
NN - n " " new
WW - w " " win
YY - y " " young
RR - r " " rat
LL - l " " louse
HH - h " " hard
IY - ee " " beet
IH - i " " bit
EY - ai " " bait
EH - e " " bet
UW - oo " " boot
UU - u " " put
AA - a " " father

AO - oa " " boat
AW - ou " " bought
AE - a " " bat
UH - u " " but
ER - er " " Bert
OY - oi " " join
AY - i " " bite
OW - ou " " house
YU - eau" " beautiful

For nouns, two numbers are reported for word frequency. The first number is the word frequency of the singular noun form, the second, the plural form. Three word frequencies are reported for verbs. The first two are the same as for nouns, while the third is for the past tense of the verb. In addition, the prepositions allowed to follow each verb are given, as well as an indication as to whether the past tense is an irregular form (signified by a leading ||), and an indication that the verb must always be followed with a preposition (signified by a leading %%).

ONE-SYLLABLE ADJECTIVES

15 APT AEPPTT
27 BACK BBAEKK
133 BAD BBAEDD
28 BARE BBEYRR
76 BASE BBEYSS
34 BENT BBEHNNTT
351 BEST BBEHSSTT
324 BIG BBIHGG
9 BLACK BBLLAEKK
11 BLANK BBLLAENGKK
9 BLEAK BBLLIYKK
42 BLIND BBLLAYNNDD
11 BLOND BBLLAANNDD
15 BLUE BBLLUW
6 BLUNT BBLLUHNNTT
20 BOLD BBAOLLDD
18 BRASS BBRRAESS
18 BRAVE BBRREYVV
63 BRIEF BBRRIYFF
77 BRIGHT BBRRAYTT
7 BRISK BBRRIHSSKK
82 BROAD BBRRAWDD
5 BROKE BBRRAOKK
62 BROWN BBRROWNN
6 BURNT BBERNNTT
22 CALM KKAAMM
23 CHEAP CHIYPP
29 CHIEF CHIYFF
5 CHOICE CHOYSS
48 CLEAN KKLLIYNN
196 CLEAR KKLLIYRR
72 CLOSE KKLLAOSS
10 COARSE KKAWRRSS
22 COLD KKAOLLDD
49 COOL KKUWLL
18 CROSS KKRRAWSS
15 CRUDE KKRRUWDD
15 CRUEL KKRRUWLL
5 CUTE KKYUTT
16 DAMP DDAEMMPP
22 DARK DDAARRKK
162 DEAD DDEHDD
11 DEAF DDEHFF
45 DEAR DDIYRR
85 DEEP DDIYPP
9 DENSE DDEHNNSS
5 DIM DDIHMM
5 DRAB DDRRAEBB
20 DRUNK DDRRUHNGKK
52 DRY DDRRAY
99 DUE DDUW
26 DULL DDUHLL

14 DUMB DDUHMM
183 EAST IYSSTT
359 END EHNNDD
25 FAINT FFEYNNTT
63 FAIR FFEYRR
8 FAKE FFEYKK
27 FALSE FFAWLLSS
35 FAR FFAARR
31 FAST FFAESSTT
47 FAT FFAETT
8 FIERCE FFIYRRSS
6 FINE FFAYNN
59 FIRM FFERMM
14 FIT FFIHTT
10 FLAT FFLLAETT
5 FLUSH FFLLUHSH
13 FOND FFAANNDD
8 FRAIL FFRREYLL
18 FRANK FFRRAENNKK
223 FREE FFRRIY
79 FRESH FFRREHSH
142 FRONT FFRRUHNNTT
219 FULL FFUHLL
6 GAUNT GGAWNNTT
26 GAY GGEY
38 GLAD GGLLAEDD
12 GOLD GGAOLLDD
707 GOOD GGUUDD
30 GRAND GGRRAENNDD
19 GRAVE GGRREYVV
5 GRAY GGRREY
595 GREAT GGRREYTT
20 GREEN GGRRIYNN
6 GREY GGRREY
14 GRIM GGRRIHMM
18 GROSS GGRRAOSS
152 HARD HHAARRDD
12 HARSH HHARSH
7 HIGH HHAY
5 HOARSE HHAWRRSS
123 HOT HHAATT
55 HUGE HHYUJH
11 HURT HHERTT
21 ILL IHLL
16 JOINT JHOYNNTT
21 JUST JHUHSSTT
11 KEEN KKIYNN
295 KIND KKAYNNDD
354 LARGE LLAARRJH
8 LAST LLAESSTT
130 LATE LLEYTT
13 LEAN LLIYNN
126 LEFT LLEHFFTT
61 LIGHT LLAYTT

9 LIMP LLIHMMPP
20 LIVE LLIHVV
8 LONE LLAONN
521 LONG LLAWNG
41 LOOSE LLUWSS
173 LOST LLAWSSTT
14 LOUD LLOWDD
143 LOW LLAO
5 LUSH LLUHSH
35 MAD MMAEDD
10 MAIN MMEYNN
13 MALE MMEYLL
29 MEAN MMIYNN
47 MERE MMIYRR
14 MILD MMAYLLDD
5 MOCK MMAAKK
11 MOIST MMOYSSTT
16 NEAR NNIYRR
21 NEAT NNIYTT
13 NET NNEHTT
1057 NEW NNUW
74 NICE NNAYSS
206 NORTH NNAWRRTH
19 NUDE NNUWDD
10 NULL NNUHLL
44 ODD AADD
582 OLD AOLLDD
57 PALE PPEYLL
99 PAST PPAESSTT
8 PET PPEHTT
46 PINK PPIYNNKK
36 PLAIN PPLLEYNN
105 POOR PPUWRR
36 PRIME PPRRAYMM
6 PROMPT PPRRAAMMPPTT
11 PRONE PPRRAONN
50 PROUD PPRROWDD
55 PURE PPYURR
12 QUAINT KKWWEYNNTT
6 QUEER KKWWIYRR
59 QUICK KKWWIHKK
41 RARE RREYRR
43 RAW RRAW
232 REAL RRIYLL
28 REAR RRIYRR
6 RED RREHDD
70 RICH RRIHCH
132 RIGHT RRAYTT
11 RIPE RRAYPP
40 ROUGH RRUHFF
18 ROUND RROWNNDD
6 RUDE RRUWDD
32 SAD SSAEDD
51 SAFE SSEYFF

686 SAME SSEYMM
5 SANE SSEYNN
5 SCANT SSKKAENNTT
6 SCARCE SSKKEYRRSS
71 SHARP SHAARRPP
14 SHEER SHIYRR
190 SHORT SHAWRRTT
8 SHREWD SHRRUWDD
7 SHRILL SHRRIHLL
10 SHY SHAY
50 SICK SSIHKK
6 SIDE SSAYDD
14 SKILLED SSKKIHLLDD
6 SLACK SSLLAEKK
6 SLICK SSLLIHKK
50 SLIGHT SSLLAYTT
10 SLIM SSLLIHMM
48 SLOW SSLLAO
5 SLY SSLLAY
521 SMALL SSMMAWLL
20 SMART SSMMAARRTT
36 SMOOTH SSMMUWDH
7 SMUG SSMMUHGG
59 SOFT SSAWFFTT
15 SOLE SSAOLL
10 SORE SSAWRR
49 SOUND SSOWNNDD
15 SPARE SSPPEYRR
5 SPARSE SSPPARSS
75 SQUARE SSKKWWEYRR
7 STARK SSTTAARRKK
6 STEEP SSTTIYPP
13 STERN SSTTERNN
19 STIFF SSTTIHFF
24 STILL SSTTIHLL
56 STRAIGHT SSTTRREYTT
84 STRANGE SSTTRREYNNJH
7 STRAY SSTTRREY
11 STRICT SSTTRRIHKKTT
197 STRONG SSTTRRAWNG
241 SURE SHUWRR
65 SWEET SSWWIYTT
7 SWELL SSWWEHLL
13 SWIFT SSWWIHFFTT
55 TALL TTAWLL
5 TAME TTEYMM
5 TAN TTAENN
6 TART TTARTT
7 TAUT TTAWTT
10 TENSE TTEHNNSS
63 THICK THIHKK
90 THIN THIHNN
22 TIGHT TTAYTT
25 TORN TTAWRRNN

35 TOUGH TTUHFF
5 TRIM TTRRIHMM
224 TRUE TTRRUW
10 VAIN VVEYNN
61 VAST VVAESSTT
5 VILE VVAYLL
64 WARM WWAARRMM
32 WEAK WWIYKK
9 WEIRD WWIYRRDD
14 WELL WWEHLL
235 WEST WWEHSSTT
47 WET WWEHTT
8 WHITE HWAYTT
50 WHOLE HHAOLL
115 WIDE WWAYDD
51 WILD WWAYLLDD
33 WISE WWAYZZ
34 WORST WWERSSTT
8 WRONG RRAWNG
5 WRY RRAY
363 YOUNG YYUHNG

TWO-SYLLABLE ADJECTIVES

216 ABLE EY''--BBUHLL
18 ABRUPT AE--BBRRUHPPTT
21 ABSENT AEBB''--SSEHNNTT
27 ABSTRACT AEBB''--SSTTRRAEKKTT
17 ABSURD AEBB--SSERDD''
87 ACTIVE AEKK''--TTIHVV
13 ACUTE UH--KKYUTT''
11 ADVERSE AEDD--VVERSS''
56 AFRAID UH--FFRREYDD''
5 AIMLESS EYMM''--LLEHSS
7 AIRY EY''--RRIY
25 ALERT UH--LLERTT''
55 ALIVE UH--LLAYVV'
16 AMPLE AEMM''--PPUHLL
62 ANCIENT EYNN''--CHEHNNTT
44 ANGRY AENG''--RRIY
12 ANTIQUE AENN--TTIYKK
29 ANXIOUS AENG''--SHUHSS
11 ARDENT AR''--DDEHNNTT
5 AUSTERE AW--SSTTIYRR''
11 AWAKE UH--WWEYKK''
84 AWARE UH--WWEYRR''
14 AWFUL AW''--FFUULL
11 AWKWARD AWKK''--WWERDD
5 BACKWARD BBAEKK''--WWERDD
6 BARREN BBAE''--RREHNN
165 BASIC BBEY''--SSIHKK
414 BETTER BBEH''--TTER
53 BITTER BBIH''--TTER
7 BIZARRE BBIH--ZZAR''
8 BLOODY BBLLUH''--DDIY
7 BONY BBAO''--NNIY
5 BREATHLESS BBRREHTH''--LLEHSS
50 BRILLIANT BBRRIHLL''--YYIHNNTT
63 BROKEN BBRRAO''--KKEHNN
7 BRUTAL BBRRUW''--TTIHLL
9 BULKY BBUHLL''--KKYY
55 BUSY BBIH''--ZZIY
7 CALLOUS KKAE''--LLUHSS
10 CAUTIOUS KKAW''--SHUHSS
108 CENTRAL SSEHNN''--TTRRAALL
220 CERTAIN SSER''--TTEHNN
10 CHEERFUL CHIYRR''--FFUULL
11 CHILDISH CHAYLL''--DDIHSH
5 CHILLY CHIH''--LLIY
11 CHRONIC KKRRAA''--NNIHKK
44 CIVIL SSIH''--VVIHLL
31 CLASSIC KKLLAE''--SSIHKK
16 CLEVER KKLLEH''--VVER
6 CLUMSY KKLLUHMM''--ZZIY
7 COMIC KKAA''--MMIHKK
201 COMMON KKAA''--MMUHNN

9 COMPACT KKAAMM''--PPAEKKTT
161 COMPLETE KKAAMM''--PPLLIYTT
59 COMPLEX KKAAMN''--PPLLEHKKSS
20 CONCRETE KKAANN''--KKRRIYTT
46 CONSCIOUS KKAANN''--SHUHSS
59 CONSTANT KKAANN''--SSTTAENNTT
9 CONTENT KKAANN''--TTEHNNTT
6 CORDIAL KKAWRR''--JHUHLL
39 CORRECT KKAW--RREHKKTT''
7 CORRUPT KKAW--RRUHPPTT''
18 COSMIC KKAAZZ''--MMIHKK
16 COSTLY KKAWSSTT''--LLIY
14 COUNTLESS KKAONNTT''--LLEHSS
32 CRAZY KKRREY''--ZZIY
5 CRIMSON KKRRIHMM''--ZZIHNN
7 CROWDED KKRROW''--DDEHDD
29 CRUCIAL KKRRUW''--SHUHLL
5 CURLY KKER''--LLIY
81 CURRENT KKUH''--RREHNNTT
43 DAILY DDEY''--LLIY
6 DAPPER DDAE''--PPER
18 DEADLY DDEHDD''--LLIY
20 DECENT DDIY''--SSEHNNTT
5 DINGY DDIHNN''--JHIY
108 DIRECT DDIH--RREHKKTT''
36 DIRTY DDER''--TTIY
7 DISCRETE DDIHSS--KKRRIYTT''
8 DISMAL DDIHZZ''--MMUHLL
36 DISTANT DDIH''--SSTTIHNNTT
42 DISTINCT DDIH--SSTTIYNGKKTT
13 DIVERSE DDAY--VVERSS''
27 DIVINE DDIH--VVAYNN''
36 DOUBLE DDUH''--BBIHLL
21 DOUBTFUL DDOWTT''--FFUULL
7 DOWNWARD DDOWNN''--WWERDD
11 DRASTIC DDRRAE''--SSTTIHKK
10 DREADFUL DDRREHDD''--FFUULL
6 DREARY DDRRIY''--RRIY
6 DRUNKEN DDRRUHNG''--KKIHNN
16 DUSTY DDUH''--SSTTIY
34 DYING DDAY''--IYNG
27 EAGER IY''--GGER
242 EARLY ER''--LLIY
15 EARNEST ER''--NNEHSSTT
6 EARTHLY ERTH''--LLIY
10 EARTHY ER''--THIY
11 EASTERN IYSS''--TTERNN
111 EASY IY''--ZZIY
64 EMPTY EHMMPP''--TTIY
20 ENDLESS EHNNDD''--LLEHSS
148 ENTIRE EHNN''--TTAYRR
82 EQUAL IY''--KKWWAALL
8 ERECT IY--RREHKKTT''
13 ETHNIC EHTH''--NNIHKK

25 EVEN IY''--VVEHNN
39 EVIL IY''--VVIHLL
27 EXACT EHGG--ZZAEKKTT''
19 EXCESS EHKK''--SSEHSS
11 EXPERT EHKK''--SSPPERTT
5 EXPRESS EHKK''--SSPPRREHSS
48 EXTRA EHKK''--SSTTRRAA
53 EXTREME EHKK''--SSTTRRIYMM
10 FAITHFUL FFEYTH''--FFUULL
34 FALLEN FFAW''--LLEHNN
89 FAMOUS FFEY''--MMUHSS
6 FANCY FFAENN''--SSIY
32 FARTHER FFAARR''--DHER
19 FATAL FFEY''--TTUHLL
7 FATTY FFAE''--TTIY
8 FAULTY FFAWLL''--TTIY
13 FEARFUL FFIYRR''--FFUHLL
6 FEARLESS FFIYRR''--LLIHSS
8 FEEBLE FFIY''--BBUHLL
20 FEMALE FFIY''--MMEYLL
5 FERTILE FFER''--TTIHLL
5 FERVENT FFER''--VVIHNNTT
6 FEUDAL FFYU''--DDUHLL
7 FIERY FFAY''--RRIY
7 FILTHY FFIHLL''--THIY
142 FINAL FFAY''--NNUHLL
10 FINITE FFAY''--NNAYTT
16 FOOLISH FFUW''--LLIHSH
139 FOREIGN FFAA''--RRIHNN
47 FORMAL FFAWRR''--MMUHLL
131 FORMER FFAWRR''--MMER
6 FORTHRIGHT FFAWTH''--RRAYTT
18 FORWARD FFAWRR''--WWERDD
10 FRAGILE FFRRAE''--JHIHLL
11 FRANTIC FFRRAENN''--TTIHKK
32 FREQUENT FFRRIY''--KKWWEHNNTT
59 FRIENDLY FFRREHNN''--DDLLIY
6 FRIGHTFUL FFRRAYTT''--FFUHLL
5 FRIGID FFRRIH''--JHIHDD
27 FROZEN FFRRAO''--ZZEHNN
7 FRUITFUL FFRRUWTT''--FFUHLL
5 FRUITLESS FFRRUWTT''--LLEHSS
39 FUNNY FFUH''--NNIY
74 FURTHER FFER''--DHER
6 FUTILE FFYU''--TTIHLL
109 FUTURE FFYU''--CHER
7 FUZZY FFUH''--ZZIY
5 GALLANT GGAE''--LLIHNNTT
7 GAUDY GGAW''--DDIY
26 GENTLE JHEHNN''--TTIHLL
6 GHASTLY GGAE''--SSTTLLIY
13 GIFTED GGIHFF''--TTEHDD
5 GIRLISH GGER''--LLIHSH
7 GLARING GGLLEH''--RRIYNG

24 GOLDEN GGAOLL''--DDIHNN
7 GORGEOUS GGAWRR''--JHUHSS
10 GRACEFUL GGRREYSS''--FFUHLL
9 GRACIOUS GGRREY''--SHUHSS
5 GRAPHIC GGRRAE''--FFIHKK
8 GREASY GGRRIY''--SSIY
5 GREEDY GGRRIY''--DDIY
29 GUILTY GGIHLL''--TTIY
5 HAIRY HHEY''--RRIY
40 HANDSOME HHAENNDD''--SSUHMM
13 HANDY HHAENN''--DDIY
91 HAPPY HHAE''--PPIY
6 HARDY HHAR''--DDIY
5 HARMLESS HHARMM''--LLIHSS
5 HASTY HHEY''--SSTTIY
5 HAZY HHEY''--ZZIY
33 HEALTHY HHEHLL''--THIY
108 HEAVY HHEH''--VVIY
28 HELPFUL HHEHLLPP''--FFUULL
21 HELPLESS HHEHLLPP''--LLIHSS
20 HIDDEN HHIH''--DDEHNN
8 HOLLOW HHAA''--LLAO
19 HOLY HHAO''--LLIY
47 HONEST AA''--NNEHSSTT
19 HOSTILE HHAA''--SSTTIHLL
261 HUMAN HHYU''--MMIN
5 HUMANE HHYU''--MMEYNN
17 HUMBLE HHUHMM''--BBIHLL
23 HUNGRY HHUHNG''--GGRRIY
12 ICY AY''--SSIY
45 IDEAL AY--DDIYLL''
11 IDLE AY''--DDIHLL
14 IMMENSE IH--MMEHNNSS''
53 INNER IH''--NNER
13 INSANE IHNN--SSEYNN''
7 INSIDE IHNN--SSAYDD''
5 INSTANT IHNN''--SSTTAENNTT
14 INTACT IHNN--TTAEKKTT''
40 INTENSE IHNN--TTEHNNSS''
6 JUICY JHYU''--SSIY
20 JUNIOR JHYUNN''--YYAWRR
5 KINDLY KKAYNNDD''--LLIY
9 LAZY LLEY''--ZZIY
71 LEGAL LLIY''--GGUHLL
11 LENGTHY LLEHNN''--THIY
8 LESSER LLEH''--SSER
5 LETHAL LLIY''--THUHLL
15 LEVEL LLEH''--VVUHLL
19 LIQUID LLIH''--KKWNIHDD
285 LITTLE LLIH''--TTIHLL
275 LOCAL LLAO''--KKUHLL
5 LOFTY LLAWFF''--TTIY
11 LOUSY LLOW''--ZZIY
9 LOWER LLAO''--WWER

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20 LUCKY LLUH''--KKIY
10 LUNAR LLUW''--NNER
5 LYRIC LLIH''--RRIHKK
21 MAGIC MMAE''--JHIHKK
220 MAJOR MMEY''--JHER
7 MAPLE MMEY''--PPUHLL
21 MARBLE MMAARR''--BBUHLL
33 MASSIVE MMAE''--SSIHVV
24 MATURE MMAE--CHUWRR''
6 MEAGER MMIY''--GGER
6 MERRY MMEH''--RRIY
47 MIDDLE MMIH''--DDUHLL
14 MIGHTY MMAY''--TTIY
5 MINDFUL MMAYNNDD''--FFUULL
44 MINOR MMAY''--NNER
11 MINUTE MMAY--NNYUTT''
26 MOBILE MMAO''--BBUHLL
191 MODERN MMAA''--DDERNN
27 MODEST MMAA''--DDEHSSTT
13 MONSTROUS MMAANN''--SSTTRRUHSS
17 MONTHLY MMUHNNTH''--LLIY
135 MORAL MMAO''--RRUHLL
10 MORTAL MMAWRR''--TTUHLL
114 MOVING MMUW''--VVIYNG
10 MUDDY MMUH''--DDIY
5 MURKY MMER''--KKIY
61 NARROW NNAE''--RRAO
5 NASTY NNAE''--SSTTIY
36 NATIVE NNEY''--TTIHVV
10 NEEDLESS NNIYDD''--LLIHSS
5 NEEDY NNIY''--DDIY
24 NERVOUS NNER''--VVUHSS
32 NEUTRAL NNUW''--TTRRUHLL
6 NEWBORN NNUW''--BBAWRRNN
12 NIGHTTIME NNAY''--TTAYMM
23 NOBLE NNAO''--BBUHLL
6 NOISY NNOY''--ZZIY
133 NORMAL NNAWRR''--MMUHLL
24 NORTHERN NNAW''--DHERNN
11 NOVEL NNAA''--VVUHLL
11 OBSCURE AABB--SSKKYURR''
10 OILY OY''--LLIY
238 OPEN AO''--PPEHNN
8 ORANGE AA''--RRAENNJH
1702 OTHER UH''--DHER
6 OUTBOARD OWTT''--BBAWRRDD
19 OUTDOOR OWTT--DDAWRR''
28 OUTER OW''--TTER
5 OUTRIGHT OW''--TTRRAYTT
40 OUTSIDE OWTT--SSAYDD
5 OVAL AO''--VVUHLL
11 OVERT AO--VVERTT''
25 PAINFUL PPEYNN''--FFUHLL
37 PAINTING PPEYNN''--TTIYNG
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11 PARTIAL PPAR''--SHUHLL
11 PASSIVE PPAE''--SSIHVV
11 PATIENT PPEY''--SHIHNNTT
58 PERFECT PPER''--FFEHKKTT
5 PERVERSE PPER--VVERSS''
6 PETTY PPEH''--TTIY
11 PHONY FFAO''--NNIY
7 PLASTIC PPLLAE''--SSTTIHKK
33 PLEASANT PPLLEH''--ZZEHNNTT
7 POLAR PPAO''--LLER
7 POLITE PPAO--LLAYTT''
12 POROUS PPAW''--RRUHSS
9 POTENT PPAO''--TTIHNNTT
22 PRECIOUS PPRREH''--SHUHSS
32 PRECISE PPRRIY--SSAYSS''
8 PREGNANT PPRREHGG''--NNIHNNTT
225 PRESENT PPRREH''--ZZEHNNTT
39 PRETTY PPRRIH''--TTIY
5 PRICELESS PPRRAYSS''--LLEHSS
183 PRIVATE PPRRAY''--VVIHTT
27 PROFOUND PPRRAO--FFOWNNDD''
95 PROPER PPRRAA''--PPER
272 PUBLIC PPUH''--BBLLIHKK
6 PUNY PPYU''--NNIY
8 PURPLE PPER''--PPUHLL
9 PUZZLING PPUH''--ZZLLIYNG
25 RACIAL RREY''--SHUHLL
5 RAINY RREY''--NNIY
31 RANDOM RRAENN''--DDUHMM
42 RAPID RRAE''--PPIHDD
7 RAUCOUS RRAW''--KKUHSS
140 READY RREH''--DDIY
178 RECENT RRIY''--SSIHNNTT
9 RECKLESS RREHKK''--LLIHSS
32 REMOTE RRIY--MMAOTT''
12 RESTLESS RREHSSTT''--LLEHSS
11 RHYTHMIC RRIHDH''--MMIHKK
5 RIGHTEOUS RRAY''--CHUHSS
24 RIGID RRIH''--JHIHDD
5 RIVAL RRAY''--VVUHLL
9 ROCKY RRAA''--KKIY
7 ROSY RRAO''--ZZIY
17 ROUTINE RRUW--TTIYNN''
46 RURAL RRUW''--RRUHLL
7 RUSTY RRUH''--SSTTIY
7 RUTHLESS RRUWTH''--LLIHSS
6 SANDY SSAENN''--DDIY
19 SAVAGE SSAE''--VVIHJH
8 SCENIC SSIY''--NNIHKK
5 SCORNFUL SSKKAWRRNN''--FFUULL
373 SECOND SSEH''--KKUHNNDD
46 SECRET SSIY''--KKRREHTT
14 SECURE SSIH--KKYURR''
5 SELECT SSEH--LLEHKKTT''

8 SELFISH SSEHLL''--FFIHSH
26 SENIOR SSIYNN''--YYER
9 SERENE SSEH--RRIYNN''
38 SEVERE SSEH--VVIYRR''
5 SHABBY SHAE''--BBIY
5 SHAKY SHEY''--KKIY
14 SHALLOW SHAE''--LLAO
49 SILENT SSAY''--LLEHNNTT
15 SILLY SSIH''--LLIY
6 SILVER SSIHLL''--VVER
158 SIMPLE SSIHMM''--PPIHLL
10 SIMPLEST SSIHMM''--PPLLEHSSTT
15 SINCERE SSIHNN--SSIYRR''
20 SIXTEEN SSIHKK''--SSTTIYNN
9 SKILLFUL SSKKIHLL''--FFUULL
8 SKINNY SSKKIH''--NNIY
6 SLEEPY SSLLIY''--PPIY
19 SLENDER SSLLEHNN''--DDER
5 SMOKY SSMMAO''--KKIY
16 SOBER SSAO''--BBER
361 SOCIAL SSAO''--SHUHLL
11 SOLEMN SSAA''--LLEHMM
69 SOLID SSAA''--LLIHDD
46 SORRY SSAA''--RRIY
30 SOUTHERN SSUH''--DHERNN
9 SPACIOUS SSPPEY''--SHUHSS
230 SPECIAL SSPPEH''--SHUHLL
6 SPECTRAL SSPPEHKK''--TTRRUHLL
5 SPEEDY SSPPIY''--DDIY
20 SPLENDID SSPPLLEHNN''--DDIHDD
16 STABLE SSTTEY''--BBUHLL
5 STAGNANT SSTTAEGG''--NNIHNNTT
66 STANDARD SSTTAENN''--DDERDD
12 STATIC SSTTAE''--TTIHKK
37 STEADY SSTTEH''--DDIY
9 STERILE SSTTEH''--RRIHLL
9 STICKY SSTTIH''--KKIY
5 STONY SSTTAO''--NNIY
12 STUBBORN SSTTUH''--BBERNN
24 STUPID SSTTUW''--PPIHDD
16 STURDY SSTTER''--DDIY
25 SUBTLE SSUH''--TTIHLL
37 SUDDEN SSUH''--DDIHNN
9 SULLEN SSUH''--LLEHNN
5 SUNDRY SSUHNN''--DDRRIY
12 SUNNY SSUH''--NNIY
14 SUPERB SSUW--PPERBB''
5 SUPER SSUW''--PPER
18 SUPREME SSUW--PPRRIYMM''
7 SURFACE SSER''--FFIHSS
5 SWEATY SSWWEH''--TTIY
8 SWOLLEN SSWWAO''--LLIHNN
11 TENDER TTEHNN''--DDER
6 THANKFUL THAENGKK''--FFUHLL

21 THOROUGH THUH''--RRAO
11 THOUGHTFUL THAWTT''--FFUULL
5 TIMID TTIH''--MMIHDD
49 TINY TTAY''--NNIY
72 TOTAL TTAO''--TTUHLL
33 TRAGIC TTRRAE''--JHIHKK
21 UGLY UHGG''--LLIY
9 UNCHANGED UHNN--CHEYNNJHDD''
13 UNFAIR UHNN--FFEYRR''
42 UNKNOWN UH--NNAONN''
7 UNPAID UHNN--PPEYDD''
6 UNREAL UHNN--RRIYLL''
5 UNSEEN UHNN--SSIYNN''
9 UNTOUCHED UHNN--TTUHCHDD''
57 UPPER UH''--PPER
40 URBAN ER''--BBIHNN
21 URGENT ER''--JHEHNNTT
17 USELESS YUSS''--LLEHSS
6 UTMOST UHTT''--MMAOSSTT
11 VACANT VVEY''--KKAENNTT
22 VALID VVAE''--LLIHDD
6 VIBRANT VVAY''--BBRRIHNNTT
17 VICIOUS VVIH''--SHUHSS
56 VITAL VVAY''--TTUHLL
25 VIVID VVIH''--VVIHDD
14 VOCAL VVAO''--KKUHLL
7 VULGAR VVUHLL''--GGER
106 WAITING WWEY''--TTIYNG
54 WALKING WWAW''--KKIYNG
5 WARLIKE WWAR''--LLAYKK
7 WARY WWEY''--RRIY
12 WEALTHY WWEHLL''--THIY
15 WEARY WWIY''--RRIY
14 WEEKLY WWIY''--KKLIY
18 WELCOME WWEHLL''--KKUHMM
34 WESTERN WWEH''--SSTTERNN
5 WHISTLING HWIHSS''--LLIYNG
9 WINDING WWAYNN''--DDIYNG
8 WIRY WWAY''--RRIY
9 WISHFUL WWIHSH''--FFUHLL
10 WITTY WWIH''--TTIY
50 WOODEN WWUH''--DDEHNN
149 WORKING WWER''--KKIYNG
9 WORLDLY WWERLLDD''--LLIY
8 WORTHWHILE WWERTH''--HWAYLL
25 WORTHY WWER''--DHIY
9 WOVEN WWAO''--VVEHNN
5 YEARLY YYIYRR''--LLIY
48 YELLOW YYEH''--LLAO
12 YOUTHFUL YUTH''--FFUULL

ONE-SYLLABLE NOUNS

14-3 ACE EYSS
92-26 ACT AEKKTT
10-10 AD AEDD
214-38 AGE EYJH
101-20 AID EYDD
27-13 AIM EYMM
216-3 AIR EYRR
6-7 ANT AENNTT
40-8 ARC ARKK
10-5 ARCH ARCH
92-113 ARM AARRMM
179-43 ART ARTT
8-6 ASH AESH
8-4 AUNT AENNTT
5-7 AX AEKKSS
177-12 BACK BBAEKK
5-1 BADGE BBAEJH
41-10 BAG BBAEGG
103-17 BALL BBAWLL
6-0 BAN BBAENN
44-11 BAND BBAENNDD
54-19 BANK BBAENNKK
68-35 BAR BBAR
5-3 BARGE BBARJH
13-0 BARK BBAARRKK
29-4 BARN BBAARRNN
76-19 BASE BBEYSS
13-5 BAT BBAETT
5-0 BATCH BBAECH
25-4 BATH BBAETH
19-2 BAY BBEY
33-14 BEACH BBIYCH
19-13 BEAM BBIYMM
10-0 BEAR BBEYRR
25-5 BEARD BBIYRRDD
7-2 BEAST BBIYSSTT
23-1 BEAT BBIYTT
127-12 BED BBEHDD
9-15 BEE BBIY
26-0 BEEF BBIYFF
35-1 BEER BBIYRR
14-6 BELL BBEHLL
27-7 BELT BBEHLLTT
27-8 BENCH BBEHNNCH
8-1 BEND BBEHNNDD
6-3 BET BBEHTT
12-5 BID BBIHDD
78-45 BILL BBIHLL
9-2 BIN BBIHNN
25-48 BIRD BBERDD
47-4 BIRTH BBERTH
93-12 BIT BBIHTT

14-12 BLADE BBLLEYDD
1E BBLLEYMM
11-4 BLAST BBLLAESSTT
5-2 BLEND BBLLEHNNDD
47-3 BLIND BBLLAYNNDD
61-37 BLOCK BBLLAAKK
6-1 BLONDE BBLLAANNDD
119-1 BLOOD BBLLUHDD
5-3 BLOT BBLLAATT
7-4 BLUFF BBLLUHFF
166-43 BOARD BBAORRDD
69-48 BOAT BBAOTT
5-1 BOIL BBOYLL
8-1 BOLT BBAOLLTT
33-35 BOMB BBAAMM
42-46 BOND BBAANNDD
33-20 BONE BBAONN
175-94 BOOK BBUHKK
9-19 BOOT BBUWTT
7-3 BOOTH BBUWTH
18-5 BOSS BBAWSS
42-10 BOUND BBOWNNDD
11-2 BOW BBOW
20-3 BOWL BBAOLL
64-14 BOX BBAAKKSS
236-136 BOY BBOY
9-4 BRACE BBRREYSS
44-18 BRAIN BBRREYNN
28-33 BRANCH BBRRAENNCH
16-4 BRAND BBRRAENNDD
18-0 BRASS BBRRAESS
6-0 BREACH BBRRIYCH
40-0 BREAD BBRREHDD
22-3 BREAK BBRREYKK
51-1 BREATH BBRREHTH
13-1 BREED BBRRIYDD
14-2 BREEZE BBRRIYZZ
18-6 BRICK BBRRIHKK
32-2 BRIDE BBRRAYDD
79-21 BRIDGE BBRRIHJH
8-1 BRIEF BBRRIYFF
8-0 BRONZE BBRRAANNZZ
29-7 BRUSH BBRRUHSH
7-3 BULB BBUHLLBB
13-0 BULK BBUHLLKK
14-2 BULL BBUULL
5-2 BUM BBUHMM
5-1 BUMP BBUHMMPP
17-0 BUNCH BBUHNNCH
8-8 BUN BBUHNN
18-17 BUNK BBUHNNKK
5-13 BURN BBERNN
10-1 BURST BBERSSTT
34-7 BUS BBUHSS

10-10 BUSH BBUUSH
5-3 BUST BBUHSSTT
12-1 CAB KKAEBB
9-2 CAGE KKEYJH
13-3 CAKE KKEYKK
8-0 CALF KKAEFF
49-22 CALL KKAWLL
65-18 CAMP KKAEMMPP
22-5 CAN KKAENN
12-0 CANE KKEYNN
17-5 CAP KKAEPP
20-4 CAPE KKEYPP
270-112 CAR KKAARR
26-32 CARD KKAARRDD
86-1 CARE KKEYRR
5-5 CART KKAARRTT
349-146 CASE KKEYSS
23-3 CAST KKAESSTT
20-17 CAT KKAETT
78-28 CAUSE KKAWZZ
9-5 CAVE KKEYVV
65-81 CELL SSEHLL
155-26 CENT SSEHNNTT
46-9 CHAIN CHEYNN
64-23 CHAIR CHEYRR
127-24 CHANCE CHAENNSS
104-43 CHARGE CHARJH
23-2 CHARM CHAARRMM
16-9 CHART CHAARRTT
36-15 CHECK CHEHKK
20-13 CHEEK CHIYKK
6-4 CHEER CHIYRR
9-0 CHEESE CHIYZZ
53-4 CHEST CHEHSSTT
29-3 CHIEF CHIYFF
13-2 CHILL CHIHLL
23-2 CHIN CHIHNN
16-2 CHIP CHIHPP
104-11 CHOICE CHOYSS
7-6 CHORD KKAWRRDD
7-16 CHORE CHAWRR
222-83 CHURCH CHERCH
69-46 CLAIM KKLLEYMM
5-2 CLASH KKLLAESH
164-76 CLASS KKLLAESS
9-4 CLAUSE KKLLAWZZ
85-1 CLAY KKLLEY
33-6 CLERK KKLLERKK
8-2 CLIFF KKLLIHFF
6-2 CLIP KKLLIHPP
19-8 CLOCK KKLLAAKK
42-0 CLOTH KKLLAWTH
25-33 CLOUD KKLLOWDD
69-19 CLUB KKLLUHBB

15-10 CLUE KKLLUW
18-5 COACH KKAOCH
27-8 COAL KKAOLL
32-6 COAST KKAOSSTT
42-10 COAT KKAOTT
22-17 CODE KKAODD
6-2 COIL KKOYLL
9-9 COIN KKOYNN
22-2 COLD KKAOLLDD
13-6 COLT KKAOLLTT
6-0 COMB KKAOMM
13-2 CONE KKAONN
12-8 COOK KKUHKK
14-17 COP KKAAPP
6-2 CORD KKAWRRDD
41-3 CORE KKAORR
9-1 CORK KKAWRRKK
32-2 CORN KKAWRRNN
7-5 CORPSE KKAWRRPPSS
177-156 COST KKAWSSTT
12-1 COUCH KKOWCH
18-8 COUNT KKOWNNTT
464-60 COURSE KKAWRRSS
114-44 COURT KKAORRTT
28-16 COW KKOW
11-6 CRACK KKRRAEKK
22-3 CRAFT KKRRAEFFTT
14-1 CRASH KKRRAESH
17-1 CREAM KKRRIYMM
6-1 CREED KKRRIYDD
8-1 CREEK KKRRIYKK
12-3 CREST KKRREHSSTT
5-3 CRIB KKRRIHBB
32-13 CRIME KKRRAYMM
20-17 CROP KKRRAAPP
18-1 CROSS KKRRAWSS
50-12 CROWD KKRROWDD
16-1 CROWN KKRROWNN
30-5 CRY KKRRAY
11-4 CULT KKUHLLTT
43-14 CUP KKUHPP
12-3 CURB KKERBB
16-3 CURE KKYURR
7-3 CURSE KKERSS
45-19 CURVE KKERVV
18-16 CUT KKUHTT
5-3 DAM DDAEMM
66-19 DANCE DDAENNSS
10-1 DASH DDAESH
97-22 DATE DDEYTT
25-0 DAWN DDAWNN
629-376 DAY DDEY
90-1 DEAL DDIYLL
8-0 DEAR DDIYRR

264-8 DEATH DDEHTH
13-11 DEBT DDEHTT
21-6 DECK DDEHKK
7-7 DEED DDIYDD
52-19 DEPTH DDEHPPTH
65-4 DESK DDEHSSKK
43-0 DIRT DDERTT
15-19 DISH DDIHSH
25-4 DISK DDIHSSKK
9-2 DITCH DDIHCH
6-1 DOCK DDAAKK
71-68 DOG DDAWGG
10-12 DOLL DDAALL
17-7 DOME DDAOMM
312-35 DOOR DDAWRR
11-13 DOSE DDAOSS
11-11 DOT DDAATT
97-16 DOUBT DDOWTT
15-3 DRAFT DDRRAEFFTT
5-0 DRAG DDRRAEGG
11-4 DRAIN DDRREYNN
8-0 DREAD DDRREHDD
48-26 DREAM DDRRIYMM
53-10 DRESS DDRREHSS
15-4 DRIFT DDRRIHFFTT
17-4 DRILL DDRRIHLL
56-18 DRINK DDRRIYNNKK
48-1 DRIVE DDRRAYVV
24-10 DROP DDRRAAPP
5-2 DROUGHT DDRROWTT
20-27 DRUG DDRRUHGG
10-15 DRUM DDRRUHMM
10-3 DRUNK DDRRUHNNKK
29-37 EAR IYRR
76-37 EDGE EHJH
12-35 EGG EHGG
359-54 END EHNNDD
5-0 EVE IYVV
119-394 EYE AY
320-58 FACE FFEYSS
446-85 FACT FFAEKKTT
102-3 FAITH FFEYTH
71-4 FALL FFAWLL
17-1 FAME FFEYMM
14-19 FAN FFAENN
7-3 FARE FFEYRR
110-16 FARM FFAARRMM
29-3 FATE FFEYTT
22-7 FAULT FFAWLLTT
96-43 FEAR FFIYRR
6-3 FEAT FFIYTT
16-28 FEE FFIY
30-16 FENCE FFEHNNSS
242-69 FIELD FFIYLLDD

54-3 FIGHT FFAYTT
44-12 FILE FFAYLL
92-31 FILM FFIHLLMM
6-2 FINE FFAYNN
159-16 FIRE FFAYRR
59-55 FIRM FFERMM
30-1 FISH FFIHSH
25-14 FIST FFIHSSTT
14-3 FIT FFIHTT
15-3 FLAG FFLLAEGG
13-12 FLAME FFLLEYMM
14-9 FLASH FFLLAESH
5-0 FLASK FFLLAESSKK
11-1 FLEET FFLLIYTT
43-14 FLIGHT FFLLAYTT
6-1 FLOCK FFLLAAKK
15-6 FLOOD FFLLUHDD
157-12 FLOOR FFLLAORR
17-54 FLOWER FFLLOWRR
15-8 FLY FFLLAY
8-6 FOE FFAO
17-0 FOIL FFOYLL
5-3 FOLD FFAOLLDD
33-17 FOLK FFAOLLKK
137-41 FOOD FFUWDD
30-5 FOOL FFUWLL
173-141 FORCE FFAORRSS
13-2 FORK FFAWRRKK
300-122 FORM FFAWRRMM
7-4 FORT FFAWRRTT
9-0 FOX FFAAKKSS
69-26 FRAME FFRREYMM
7-4 FRAUD FFRRAWDD
126-146 FRIEND FFRREHNNDD
16-0 FRINGE FFRRIHNNJH
33-14 FRUIT FFRRUWTT
17-0 FUEL FFYULL
41-91 FUND FFUHNNDD
48-15 GAIN GGEYNN
121-52 GAME GGEYMM
20-6 GANG GGAENG
11-2 GAP GGAEPP
96-7 GAS GGAESS
33-13 GATE GGEYTT
7-0 GAZE GGEYZZ
25-2 GEAR GGIYRR
9-5 GHOST GGAOSSTT
32-11 GIFT GGIHFFTT
211-138 GIRL GGERLL
30-5 GLANCE GGLLAENNSS
9-6 GLAND GGLLAENNDD
6-0 GLARE GGLLEYRR
96-29 GLASS GGLLAESS
9-3 GLAZE GGLLEYZZ

14-4 GLIMPSE GGLLIHMMPPSS
12-1 GLOBE GGLLAOBB
9-6 GLOVE GGLLUHVV
13-0 GLOW GGLLAO
60-38 GOAL GGAOLL
6-0 GOAT GGAOTT
36-0 GOLD GGAOLLDD
60-57 GOOD GGUUDD
16-2 GOWN GGOWNN
31-4 GRACE GGRREYSS
35-23 GRADE GGRREYDD
26-20 GRAIN GGRREYNN
9-18 GRAM GGRRAEMM
22-20 GRANT GGRRAENNTT
17-1 GRAPH GGRRAEFF
7-0 GRASP GGRRAESSPP
53-1 GRASS GGRRAESS
14-6 GRAVE GGRREYVV
9-3 GREASE GGRRIYSS
20-4 GREEN GGRRIYNN
10-0 GRIEF GGRRIYFF
10-0 GRILL GGRRIHLL
12-2 GRIN GGRRIHNN
19-8 GRIP GGRRIHPP
7-0 GROSS GGRRAOSS
168-54 GROUND GGRROWNNDD
378-124 GROUP GGRRUWPP
7-4 GROVE GGRRAOVV
150-1 GROWTH GGRRAOTH
7-3 GRUDGE GGRRUHJH
27-18 GUARD GGAARRDD
56-3 GUESS GGEHSS
35-61 GUEST GGEHSSTT
17-5 GUIDE GGAYDD
33-0 GUILT GGIHLLTT
6-1 GUISE GGAYZZ
5-0 GULF GGUHLLFF
14-4 GUM GGUHMM
99-40 GUN GGUHNN
42-20 GUY GGAY
14-0 HALF HHAAFF
106-3 HALL HHAWLL
14-1 HAM HHAEMM
413-285 HAND HHAENNDD
24-0 HARM HHARMM
54-14 HAT HHAETT
9-1 HATE HHEYTT
7-0 HAWK HHAWKK
19-0 HAY HHEY
7-0 HAZE HHEYZZ
403-41 HEAD HHEHDD
14-1 HEAP HHIYPP
171-21 HEART HHARTT
89-0 HEAT HHIYTT

9-22 HEEL HHIYLL
35-12 HEIGHT HHAYTT
7-2 HEIR EYRR
80-1 HELL HHEHLL
93-2 HELP HHEHLLPP
21-4 HEN HHEHNN
19-6 HERD HHERDD
37-36 HILL HHIHLL
8-8 HINT HHIHNNTT
9-8 HIP HHIHPP
10-14 HIT HHIHTT
25-2 HOLD HHAOLLDD
53-38 HOLE HHAOLL
219-62 HOME HHAOMM
5-2 HOOK HHUUKK
99-30 HOPE HHAOPP
14-8 HORN HHAWRRNN
111-68 HORSE HHAWRRSS
8-2 HOSE HHAOZZ
36-4 HOST HHAOSSTT
145-174 HOUR OWRR
388-80 HOUSE HHOWSS
10-0 HULL HHUHLL
6-1 HUNCH HHUHNNCH
11-1 HURT HHERTT
13-6 HUT HHUHTT
7-6 HYMN HHIHMM
45-0 ICE AYSS
39-80 INCH IHNNCH
6-1 INK IYNNKK
5-1 INN IHNN
16-3 JAIL JHEYLL
6-2 JAM JHAEMM
16-2 JAR JHAARR
16-10 JAW JHAW
19-4 JET JHEHTT
233-64 JOB JHAABB
16-12 JOINT JHOYNNTT
19-8 JOKE JHAOKK
40-7 JOY JHOY
22-18 JUDGE JHUHJH
6-0 JUG JHUHGG
11-2 JUICE JHYUSS
9-1 JUMP JHUHMMPP
7-0 JUNK JHUHNNKK
5-0 KEEL KKIYLL
50-16 KEY KKIY
10-2 KICK KKIHKK
54-31 KID KKIHDD
295-36 KIND KKAYNNDD
25-2 KING KKIYNG
8-3 KISS KKIHSS
33-38 KNEE NNIY
72-0 KNIFE NNAYFF

7-4 KNIGHT NNAYTT
7-1 KNOT NNAATT
7-1 LACE LLEYSS
96-0 LACK LLAEKK
6-1 LAD LLAEDD
11-6 LAKE LLEYKK
6-5 LAMB LLAEMM
18-6 LAMP LLAEMMPP
192-23 LAND LLAENNDD
11-4 LANE LLEYNN
17-1 LAP LLAEPP
19-3 LAUGH LLAEFF
279-88 LAW LLAW
14-5 LAWN LLAWNN
5-1 LAY LLEY
47-2 LEAD LLIYDD
12-0 LEAF LLIYFF
23-8 LEAGUE LLIYGG
6-3 LEAP LLIYPP
7-2 LEASE LLIYSS
6-1 LEDGE LLEHJH
54-67 LEG LLEHGG
114-23 LENGTH LLEHNNTH
12-5 LENS LLEHNNZZ
19-4 LID LLIHDD
9-3 LIE LLAY
678-0 LIFE LLAYFF
5-1 LIFT LLIHFFTT
253-46 LIGHT LLAYTT
13-0 LIME LLAYMM
281-196 LINE LLAYNN
12-7 LINK LLIYNNKK
18-69 LIP LLIHPP
125-27 LIST LLIHSSTT
42-10 LOAD LLAODD
5-0 LOAF LLAOFF
41-28 LOAN LLAONN
5-5 LOBE LLAOBB
21-7 LOCK LLAAKK
9-2 LODGE LLAAJH
11-8 LOG LLAAGG
96-9 LOOK LLUUKK
15-0 LOOP LLUWPP
7-1 LORD LLAWRRDD
84-46 LOSS LLAWSS
124-41 LOT LLAATT
5-1 LOUNGE LLOWNNJH
165-2 LOVE LLUHVV
47-1 LUCK LLUHKK
7-3 LUMP LLUHMMPP
32-0 LUNCH LLUHNNCH
16-20 LUNG LLUHNG
27-12 MAID MMEYDD
37-7 MAIL MMEYLL

24-19 MALE MMEYLL
11-13 MAP MMAEPP
14-1 MARCH MMARCH
12-1 MARE MMEYRR
36-14 MARK MMAARRKK
8-3 MASK MMAESSKK
81-21 MASS MMAESS
6-2 MAST MMAESSTT
5-2 MAT MMAETT
15-9 MATCH MMAECH
17-10 MATE MMEYTT
6-0 MAZE MMEYZZ
30-26 MEAL MMIYLL
12-115 MEAN MMIYNN
43-11 MEAT MMIYTT
7-2 MEET MMIYTT
20-1 MESS MMEHSS
42-169 MILE MMAYLL
48-0 MILK MMIHLLKK
9-11 MILL MMIHLL
287-56 MIND MMAYNNDD
19-28 MINE MMAYNN
5-0 MINK MMIYNNKK
7-0 MINT MMIHNNTT
11-2 MIST MMIHSSTT
10-4 MOB MMAABB
20-8 MODE MMAODD
43-7 MOLD MMAOLLDD
13-10 MONK MMUHNNKK
130-189 MONTH MMUHNNTH
35-7 MOOD MMUWDD
46-3 MOON MMUWNN
8-1 MOUND MMOWNNDD
6-5 MOUNT MMOWNNTT
103-8 MOUTH MMOWTH
36-9 MOVE MMUWVV
34-6 MYTH MMIHTH
5-14 NAIL NNEYLL
256-87 NAME NNEYMM
76-2 NECK NNEHKK
155-90 NEED NNIYDD
11-22 NERVE NNERVV
18-3 NEST NNEHSSTT
21-3 NET NNEHTT
8-1 NIECE NNIYSS
400-31 NIGHT NNAYTTSS
7-1 NOD NNAADD
35-6 NOISE NNOYZZ
59-6 NOSE NNAOZZ
6-6 NOTCH NNAACH
72-50 NOTE NNAOTT
16-4 NURSE NNERSS
15-19 NUT NNUHTT
7-1 OAK AOKK

6-3 OATH AOTH
87-15 OIL OYLL
37-7 PACE PPEYSS
14-2 PACK PPAEKK
6-5 PAD PPAEDD
60-31 PAGE PPEYJH
4-4 PAIL PPEYLL
87-14 PAIN PPEYNN
18-6 PAINT PPEYNNTT
50-14 PAIR PPEYRR
18-8 PALM PPAAMM
12-3 PAN PPAENN
9-3 PAR PPAR
48-14 PARK PPAARRKK
471-109 PART PPAARRTT
23-11 PASS PPAESS
99-0 PAST PPAESSTT
9-1 PASTE PPEYSSTT
13-10 PATCH PPAECH
44-14 PATH PPAETH
16-1 PAUSE PPAWZZ
3-3 PAW PPAW
24-24 PEA PPIY
134-0 PEACE PPIYSS
16-8 PEAK PPIYKK
6-2 PEAR PPEYRR
9-2 PEARL PPERLL
6-7 PEER PPIYRR
15-2 PEN PPEHNN
8-5 PET PPEHTT
64-24 PHASE FFEYZZ
47-5 PHONE FFAONN
33-18 PHRASE FFRREYZZ
13-5 PIE PPAY
127-92 PIECE PPIYSS
8-6 PIG PPIHGG
18-1 PILE PPAYLL
15-6 PILL PPIHLL
14-5 PIN PPIHNN
14-2 PINE PPAYNN
13-0 PINT PPAYNNTT
20-7 PIPE PPAYPP
13-4 PIT PPIHTT
21-6 PITCH PPIHCH
474-91 PLACE PPLLEYSS
7-4 PLAIN PPLLEYNN
164-98 PLAN PPLLAENN
112-26 PLANE PPLLEYNN
6-5 PLANK PPLLAENNKK
164-98 PLAN PPLLAENN
116-58 PLANT PPLLAENNTT
20-22 PLATE PPLLEYTT
88-32 PLAY PPLLEY
9-1 PLEA PPLLIY

7-0 PLIGHT PPLLAYTT
32-7 PLOT PPLLAATT
8-3 PLOW PPLLOW
21-2 PLUG PPLLUHGG
349-124 POINT PPOYNNTT
13-8 POLE PPAOLL
9-10 POLL PPAOLL
23-7 POND PPAANNDD
105-14 POOL PPUWLL
42-2 PORCH PPAWRRCH
11-4 PORT PPAWRRTT
55-22 POST PPAOSSTT
27-5 POT PPAATT
26-43 POUND PPOWNNDD
13-0 PRAISE PPRREYZZ
24-13 PRAYER PPRREYRR
80-7 PRESS PPRREHSS
7-0 PREY PPRREY
101-61 PRICE PPRRAYSS
39-0 PRIDE PPRRAYDD
16-16 PRIEST PPRRIYSSTT
33-2 PRINCE PPRRIHNNSS
14-10 PRINT PPRRIHNNTT
17-6 PRIZE PPRRAYZZ
33-0 PROOF PPRRUWFF
13-0 PROSE PPRRAOZZ
5-0 PULP PPUHLLPP
8-0 PULSE PPUHLLSS
8-5 PUMP PPUHMMPP
5-1 PUNCH PPUHNNCH
12-1 PURSE PPERSS
7-1 PUSH PPUUSH
9-9 QUACK KKWWAEKK
20-7 QUEEN KKWWIYNN
15-0 QUEST KKWWEHSSTT
9-0 QUILL KKWWIHLL
94-20 RACE RREYSS
7-1 RACK RRAEKK
7-7 RAG RRAEGG
16-1 RAGE RREYJH
9-5 RAID RREYDD
16-9 RAIL RREYLL
66-4 RAIN RREYNN
52-3 RAISE RREYZZ
8-0 RAKE RREYKK
6-1 RAMP RRAENMPP
26-1 RANCH RRAENNCH
141-7 RANGE RREYNNJH
22-19 RANK RRAENNKK
6-3 RAT RRAETT
205-97 RATE RREYTT
9-7 RAY RREY
14-4 REACH RRIYCH
19-2 REALM RREHLLMM

20-0 REAR RRIYRR
11-1 REEF RRIYFF
6-0 REIGN RREYNN
8-3 RENT RREHNNTT
135-2 REST RREHSSTT
14-6 RIDE RRAYDD
12-4 RIDGE RRIHJH
132-69 RIGHT RRAYTT
34-5 RING RRIYNG
5-0 RINSE RRIHNNSS
53-2 RISE RRAYZZ
42-4 RISK RRIHSSKK
179-53 ROAD RRAODD
12-0 ROAR RRAWRR
7-1 ROAST RRAOSSTT
6-4 ROBE RRAOBB
52-22 ROCK RRAAKK
5-4 ROD RRAADD
104-34 ROLE RRAOLL
15-8 ROLL RRAOLL
58-5 ROOF RRUWFF
364-54 ROOM RRUWMM
26-21 ROOT RRUWTT
15-4 ROPE RRAOPP
9-7 ROSE RRAOZZ
18-13 ROUND RROWNNDD
29-6 ROUTE RRUWTT
31-16 ROW RRAO
13-4 RUG RRUHGG
58-72 RULE RRUWLL
52-39 RUN RRUHNN
16-1 RUSH RRUHSH
7-0 RUST RRUHSSTT
6-1 SACK SSAEKK
7-0 SAFE SSEYFF
10-4 SAINT SSEYNNTT
44-127 SALE SSEYLL
44-6 SALT SSAWLLTT
28-7 SAND SSAENNDD
17-5 SAUCE SSAWSS
52-4 SCALE SSKKEYLL
10-10 SCAR SSKKAR
102-29 SCENE SSIYNN
6-0 SCENT SSEHNNTT
33-6 SCHEME SSKKIYMM
414-189 SCHOOL SSKKUWLL
26-1 SCOPE SSKKAOPP
50-15 SCORE SSKKAWRR
5-2 SCOUT SSKKOWTT
8-3 SCRAP SSKKRRAEPP
6-6 SCRATCH SSKKRRAECH
6-2 SCREAM SSKKRRIYMM
42-9 SCREEN SSKKRRIYNN
19-10 SCREW SSKKRRUW

1PT SSKKRRIHPPTT
78-9 SEA SSIY
14-3 SEAL SSIYLL
7-7 SEAM SSIYMM
58-1 SEARCH SSERCH
53-14 SEAT SSIYTT
39-42 SEED SSIYDD
34-0 SELF SSEHLLFF
300-12 SENSE SSEHNNSS
86-47 SET SSEHTT
84-11 SEX SSEHKKSS
25-11 SHADE SHEYDD
11-2 SHAFT SHAEFFTT
20-1 SHAME SHEYMM
77-25 SHAPE SHEYPP
56-41 SHARE SHEYRR
38-0 SHEAR SHIYRR
11-1 SHED SHEHDD
45-26 SHEET SHIYTT
12-0 SHELF SHEHLLFF
21-15 SHELL SHEHLL
6-2 SHIELD SHIYLLDD
25-15 SHIFT SHIHFFTT
76-43 SHIP SHIHPP
26-2 SHIRT SHERTT
28-4 SHOCK SHAAKK
14-44 SHOE SHUW
49-16 SHOP SHAAPP
41-9 SHORE SHAWRR
60-29 SHOT SHAATT
72-21 SHOW SHAO
13-2 SHOWER SHOWRR
5-4 SHRINE SHRRAYNN
363-98 SIDE SSAYDD
5-0 SIEGE SSIYJH
10-1 SIGH SSAY
82-15 SIGHT SSAYTT
73-66 SIGN SSAYNN
1 SSIHLLKK
50-16 SIN SSIHNN
12-0 SINK SSIYNNKK
63-16 SITE SSAYTT
133-12 SIZE SSAYZZ
15-17 SKETCH SSKKEHCH
41-37 SKILL SSKKIHLL
47-6 SKIN SSKKIHNN
19-3 SKIRT SSKKERTT
56-9 SKY SSKKAY
9-0 SLAB SSLLAEBB
5-0 SLATE SSLLEYTT
30-44 SLAVE SSLLEYVV
34-0 SLEEP SSLLIYPP
11-7 SLEEVE SSLLIYVV
10-2 SLICE SSLLAYSS

12-5 SLIDE SSLLAYDD
12-7 SLIP SSLLIHPP
19-7 SLOPE SSLLAOPP
6-4 SLOT SSLLAATT
8-4 SLUG SSLLUHGG
8-7 SLUM SSLLUHMM
5-0 SLUMP SSLLUHMMPP
25-2 SMELL SSMMEHLL
48-8 SMILE SSMMAYLL
32-0 SMOKE SSMMAOKK
6-2 SNACK SSNNAEKK
42-26 SNAKE SSNNEYKK
52-2 SNOW SSNNAO
21-3 SOAP SSAOPP
51-15 SOIL SSOYLL
141-18 SON SSUHNN
56-58 SONG SSAWNG
157-12 SORT SSAWRRTT
47-21 SOUL SSAOLL
126-35 SOUND SSOWNNDD
16-0 SOUP SSUWPP
90-80 SOURCE SSAORRSS
173-11 SPACE SSPPEYSS
11-2 SPAN SSPPAENN
8-3 SPARK SSPPAARRKK
5-0 SPEAR SSPPIYRR
6-2 SPECK SSPPEHKK
61-21 SPEECH SSPPIYCH
74-12 SPEED SSPPIYDD
14-0 SPELL SSPPEHLL
22-3 SPHERE SSFFIYRR
6-0 SPINE SSPPAYNN
5-3 SPIRE SSPPAYRR
8-1 SPLIT SSPPLLIHTT
6-0 SPOON SSPPUWNN
17-43 SPORT SSPPAWRRTT
53-30 SPOT SSPPAATT
13-1 SPRAY SSPPRREY
16-1 SPREAD SSPPRREHDD
102-7 SPRING SSPPRRIYNG
10-3 SPUR SSPPER
8-1 SPY SSPPAY
16-2 SQUAD SSKKWWAADD
7-1 SQUALL SSKKWWAWLL
75-13 SQUARE SSKKWWEYRR
7-1 STACK SSTTAEKK
100-8 STAFF SSTTAEFF
169-51 STAGE SSTTEYJH
6-9 STAIN SSTTEYNN
18-3 STAKE SSTTEYKK
17-3 STALL SSTTAWLL
6-1 STANCE SSTTAENNSS
39-16 STAND SSTTAENNDD
16-26 STAR SSTTAR

5-1 STARE SSTTEYRR
50-10 START SSTTAARRTT
528-140 STATE SSTTEYTT
14-2 STAY SSTTEY
8-4 STEAK SSTTEYKK
5-0 STEALTH SSTTEHLLTH
16-0 STEAM SSTTIYMM
36-3 STEEL SSTTIYLL
6-0 STEEP SSTTIYPP
6-1 STEER SSTTIYRR
25-18 STEM SSTTEHMM
109-114 STEP SSTTEHPP
8-1 STERN SSTTERNN
5-1 STEW SSTTUW
23-19 STICK SSTTIHKK
139-16 STOCK SSTTAAKK
47-12 STONE SSTTAONN
8-0 STOOL SSTTUWLL
26-5 STOP SSTTAAPP
65-34 STORE SSTTAWRR
24-6 STORM SSTTAWRRMM
15-2 STOVE SSTTAOVV
30-8 STRAIN SSTTRREYNN
15-3 STRAW SSTTRRAW
10-6 STREAK SSTTRRIYKK
49-11 STREAM SSTTRRIYMM
147-57 STREET SSTTRRIYTT
132-4 STRENGTH SSTTRREHNNTH
96-15 STRESS SSTTRREHSS
18-5 STRETCH SSTTRREHCH
12-7 STRIDE SSTTRRAYDD
6-0 STRIFE SSTTRRAYFF
25-12 STRIKE SSTTRRAYKK
18-12 STRING SSTTRRIYNG
24-14 STRIP SSTTRRIHPP
18-12 STROKE SSTTRRAOKK
6-3 STUD SSTTUHDD
98-18 STYLE SSTTAYLL
40-24 SUIT SSUWTT
19-4 SUITE SSWWIYTT
43-15 SUM SSUHMM
101-1 SUN SSUHNN
8-0 SURGE SSERJH
5-2 SWAMP SSWWAAMMPP
22-0 SWEAT SSWWEHTT
8-0 SWEEP SSWWIYPP
8-3 SWING SSWWIYNG
37-23 SWITCH SSWWIHCH
6-4 SWORD SSAWRRDD
6-0 TACT TTAEKKTT
5-1 TAG TTAEGG
24-7 TAIL TTEYLL
21-19 TALE TTEYLL
40-15 TALK TTAWKK

12-18 TANK TTAENNKK
8-1 TAP TTAEPP
31-4 TAPE TTEYPP
58-29 TASK TTAESSKK
53-5 TASTE TTEYSSTT
181-43 TAX TTAEKKSS
28-1 TEA TTIY
81-21 TEAM TTIYMM
5-1 TENSE TTEHNNSS
20-10 TENT TTEHNNTT
75-159 TERM TTERMM
94-57 TEST TTEHSSTT
59-4 TEXT TTEHKKSSTT
10-0 THEFT THEHFFTT
55-8 THEME THIYMM
8-0 THIEF THIYFF
9-7 THIGH THAY
326-362 THING THIYNG
103-51 THOUGHT THAWTT
13-7 THREAD THRREHDD
40-14 THREAT THRREHTT
610-3 THREE THRRIY
40-6 THROAT THRRAOTT
5-1 THRONE THRRAONN
6-0 THROW THRRAO
7-4 THRUST THRRUHSSTT
10-3 THUMB THUHMM
8-4 TIDE TTAYDD
14-13 TIE TTAY
16-5 TILE TTAYLL
1567-260 TIME TTAYMM
20-12 TIP TTIHPP
20-11 TIRE TTAYRR
13-0 TOAST TTAOSSTT
7-19 TOE TTAO
13-2 TOLL TTAOLL
11-2 TOMB TTUWMM
13-28 TON TTUHNN
77-15 TONE TTAONN
38-33 TOOL TTUWLL
19-0 TOOTH TTUWTH
129-8 TOP TTAAPP
54-9 TOUCH TTUHCH
38-9 TOUR TTUWRR
198-50 TOWN TTOWNN
11-9 TOY TTOY
13-8 TRACE TTRREYSS
34-12 TRACK TTRRAEKK
15-5 TRACT TTRRAEKKTT
121-8 TRADE TTRREYDD
27-15 TRAIL TTRREYLL
67-15 TRAIN TTRREYNN
19-7 TRAP TTRRAEPP
18-3 TRAY TTRREY

56-95 TREE TTRRIY
45-20 TREND TTRREHNNDD
117-34 TRIAL TTRRAYLL
15-7 TRICK TTRRIHKK
78-29 TRIP TTRRIHPP
9-52 TROOP TTRRUWPP
5-0 TRUCE TTRRUWSS
55-21 TRUCK TTRRUHKK
8-5 TRUNK TTRRUHNNKK
25-4 TRUST TTRRUHSSTT
123-4 TRUTH TTRRUWTH
13-5 TUB TTUHBB
30-24 TUBE TTUWBB
7-7 TUNE TTUWNN
88-8 TURN TTERNN
5-0 TWEED TTWWIYDD
6-7 TWIN TTWWIHNN
12-5 TWIST TTWWIHSSTT
191-113 TYPE TTAYPP
8-2 URGE ERJH
352-25 USE YUSS
8-3 VEIL VVEYLL
25-6 VEIN VVEYNN
8-4 VENT VVEHNNTT
28-9 VERSE VVERSS
18-5 VICE VVAYSS
166-47 VIEW VVYU
220-37 VOICE VVOYSS
8-0 VOID VVOYDD
48-17 VOTE VVAOTT
53-42 WAGE WWEYJH
7-0 WAIT WWEYTT
7-0 WAKE WWEYKK
33-6 WALK WWAWKK
139-70 WALL WWAWLL
9-8 WANT WWAANNTT
301-25 WAR WWAWRR
22-2 WARD WWARDD
28-0 WARMTH WWAWRRMMTH
11-5 WART WWARTT
21-5 WASH WWAASH
25-6 WASTE WWEYSSTT
27-3 WATCH WWAACH
43-51 WAVE WWEYVV
13-0 WAX WWAEKKSS
882-126 WAY WWEY
6-0 WEB WWEHBB
257-140 WEEK WWIYKK
91-10 WEIGHT WWEYTT
17-4 WELL WWEHLL
9-0 WHEAT HWIYTT
52-21 WHEEL HWIYLL
14-1 WHIP HWIHPP
50-2 WHOLE HHAOLL

14-5 WIDTH WWIHDDTH
227-0 WIFE WWAYFF
100-1 WILL WWIHLL
54-16 WIND WWIHNNDD
71-24 WINE WWAYNN
16-23 WING WWIYNG
41-13 WIRE WWAYRR
23-11 WISH WWIHSH
20-5 WIT WWIHTT
5-8 WITCH WWIHCH
5-0 WOE WWAO
51-24 WOOD WWUUDD
10-0 WOOL WWUULL
263-270 WORD WWERDD
578-89 WORK WWERKK
686-5 WORLD WWERLLDD
20-0 WORTH WWERTH
16-8 WOUND WWUWNNDD
8-0 WRATH RRAETH
8-3 WREATH RRIYTH
6-0 WRECK RREHKK
9-6 WRIST RRIHSSTT
8-5 WRONG RRAWNG
33-63 YARD YYAARRDD
12-6 YARN YYARNN
641-946 YEAR YYIYRR
6-0 YELL YYEHLL
76-10 YOUTH YYUWTH
7-0 ZEAL ZZIYLL
5-0 ZEST ZZEHSSTT
6-0 ZINC ZZIYNNKK

TWO-SYLLABLE NOUNS

53-3 ABSENCE AEBB''--SSEHNNSS
13-7 ABUSE UH--BBYUSS''
9-5 ACCENT AEKK''--SSEHNNTT
23-1 ACCESS AEKK''--SSEHSS
7-0 ACCORD UH--KKAWRRDD''
86-28 ACCOUNT UH--KKOWNNTT
10-7 ACID AE''--SSIHDD
289-68 ACTION AEKK''--SHUHNN
24-15 ACTOR AEKK''--TTER
5-3 ACTRESS AEKK''--TTRREHSS
68-16 ADDRESS AE--DDRREHSS''
24-23 ADULT AE''--DDUHLLTT
41-17 ADVANCE AEDD--VVAENNSS''
5-0 ADVENT AEDD''--VVEHNNTT
50-0 ADVICE AEDD--VVAYSS''
33-62 AFFAIR UH--FFEYRR''
44-39 AGENT EY''--JHEHNNTT
59-0 AIRCRAFT EYRR''--KKRRAEFFTT
5-6 AIRFIELD EYRR''--FFIYLLDD
11-10 AIRPLANE EYRR''--PPLLEYNN
11-4 AIRPORT EYRR''--PPAWRRTT
14-1 ALARM UH--LLAARRMM
6-2 ALBUM AELL''--BBUHMM
8-1 ALLEY AE''--LLIY
9-23 ALLY AE''--LLAY
5-1 AMBUSH AEMM''--BBUUSH
141-24 AMOUNT UH--MMOWNNTT
15-2 ANCHOR AENN''--KKAWRR
9-10 ANGEL EYNN''--JHEHLL
48-0 ANGER AENN''--GGER
50-0 ANGLE AENN''--GGUHLL
8-0 ANGUISH AENN''--GGWWIHSH
8-0 ANKLE AENN''--KKUHLL
106-36 ANSWER AENN''--SSER
48-13 APPEAL UH--PPIYLL''
14-0 APPLAUSE UH--PPLLAWZZ''
8-6 APPLE AE''--PPUHLL
104-17 APPROACH UH--PPRRAOCH''
7-1 APRON EY''--PPRRAANN
56-14 ARMY AR''--MMIY
13-3 ARREST UH--RREHSSTT''
13-6 ARROW AE''--RRAO
54-46 ARTIST AR''--TTIHSSTT
47-61 ASPECT AE''--SSPPEHKKTT
14-3 ASSAULT AE--SSAWLLTT''
5-13 ASSET AE''--SSEHTT
8-5 ATHLETE AETH''--LLIYTT
37-39 ATOM AE''--TTUHMM
78-17 ATTACK UH--TTAEKK
71-30 ATTEMPT UH--TTEHMMPPTT''
14-0 ATTIC AE''--TTIHKK
6-0 ATTIRE UH--TTAYRR''

44-23 AUTHOR AW''--THAORR
21-4 AUTO AW''--TTAO
22-0 AUTUMN AW''--TTUHMM
35-16 AWARD UH--WWAWRRDD''
5-0 AXLE AEKK''--SSIHLL
57-12 BABY BBEY''--BBIY
65-7 BACKGROUND BBAEKK''--GGRROWNNDD
5-0 BACKLOG BBAE''--KKLLAAGG
80-1 BALANCE BBAE''--LLAENNSS
7-7 BALLAD BBAE''--LLAEDD
9-3 BALLOON BBAE--LLUWNN''
12-2 BALLOT BBAE''--LLUHTT
7-0 BALLROOM BBAWLL''--RRUWMM
5-0 BANDSTAND BBAENNDD''--SSTTAENNDD
6-2 BANNER BBAE--NNER
6-3 BANQUET BBAENN''--KKWWEHTT
5-0 BANTER BBAENN''--TTER
5-0 BARBELL BBAR''--BBEHLL
7-2 BARGAIN BBAR''--GGEHNN
23-8 BARREL BBAE''--RREHLL
5-0 BASIN BBEY''--SSIHNN
15-2 BASKET BBAE''--SSKKEHTT
18-1 BATHROOM BBAE--THRRUWMM
5-0 BATON BBAE--TTAANN''
75-0 BATTLE BBAE''--TTUHLL
5-1 BAZAAR BBAE--ZZAARR''
5-0 BEACON BBIY''--KKUHNN
68-5 BEAUTY BBYU''--TTIY
52-4 BEDROOM BBEH''--DDRRUWMM
5-0 BEDSIDE BBEHDD''--SSAYDD
64-23 BELIEF BBIY--LLIYFF''
23-2 BELLY BBEH''--LLIY
5-3 BEQUEST BBIY--KKWWEHSSTT''
18-0 BIRTHDAY BBERTH''--DDEY
6-0 BIRTHPLACE BBERTH''--PPLLEYSS
5-5 BISCUIT BBIHSS''--KKIHTT
5-5 BISHOP BBIH''--SHUHPP
5-0 BLACKNESS BBLLAEKK''--NNEHNNEHSS
29-10 BLANKET BBLLAENN''--KKEHTT
12-0 BLINDNESS BBLLAYNNDD''--NNEHSS
7-1 BLIZZARD BBLLIH''--ZZARDD
13-0 BLOCKADE BBLLAA--KKEYDD''
271-63 BODY BBAA''--DDIY
8-22 BOMBER BBAA''--MMER
14-9 BORDER BBAORR''--DDER
76-14 BOTTLE BBAA''--TTUHLL
77-8 BOTTOM BBAA''--TTUHMM
6-3 BOULDER BBAOLL''--DDER
6-2 BOXCAR BBAAKKSS''--KKAR
5-0 BOYHOOD BBOY''--HHUUDD
7-0 BRANDY BBRRAENN''--DDIY
13-3 BREAKDOWN BBRREYKK''--DDOWNN
53-2 BREAKFAST BBRREHKK''--FFAESSTT
18-0 BRIGHTNESS BBRRAYTT''--NNEHSS

11-7 BROADCAST BBRRAWDD''--KKAESSTT
71-37 BROTHER BBRRUH''--DHER
12-0 BUBBLE BBUH''--BBUHLL
7-4 BUCKET BBUH''--KKEHTT
5-2 BUCKLE BBUH''--KKUHLL
11-5 BUDDY BBUH''--DDIY
53-5 BUDGET BBUH''--JHEHTT
16-0 BUFFER BBUH''--FFER
6-1 BUGGY BBUH''--GGIY
26-25 BUILDER BBIHLL''--DDER
87-75 BUILDING BBIHLL''--DDIYNG
26-21 BULLET BBUU''--LLEHTT
18-0 BUNDLE BBUHNN''--DDUHLL
42-7 BURDEN BBER''--DDEHNN
17-2 BUREAU BBYU''--RRAO
392-19 BUSINESS BBIHZZ''--NNEHSS
27-0 BUTTER BBUH''--TTER
10-10 BUTTON BBUH''--TTUHNN
21-7 CABIN KKAE''--BBIHNN
75-17 CAMPAIGN KKAEMM--PPEYNN''
29-1 CAMPUS KKAEMM''--PPUUSS
20-1 CANCER KKAENN''--SSER
16-0 CANDLE KKAENN''--DDUHLL
15-2 CANDY KKAENN''--DDIY
5-2 CANOE KKAE''--NNUW
19-8 CANVAS KKAENN''--VVUHSS
6-2 CANYON KKAENN''--YYUHNN
5-3 CAPSULE KKAEPP''--SSUHLL
45-1 CAPTAIN KKAEPP''--TTIHNN
17-1 CAPTURE KKAEPP''--CHOORR
6-2 CARBINE KKAR''--BBIHNN
28-2 CARBON KKAR''--BBUHNN
6-1 CARCASS KKAR''--KKIHSS
5-0 CARDBOARD KKARDD''--BBAORRDD
67-14 CAREER KKAE--RRIYRR''
6-0 CARGO KKAR''--GGAO
13-4 CARPET KKAARR''--PPEHTT
11-5 CARRIAGE KKAE''--RRIHJH
6-5 CARTRIDGE KKAARR''--TTRRIHJH
6-3 CASTLE KKAE''--SSUHLL
16-1 CATCHER KKAE''--CHER
13-0 CAUTION KKAW''--SHUHNN
31-1 CEILING SSIY''--LLIYNG
26-1 CELLAR SSEH''--LLER
9-0 CEMENT SSEH--NMEHNNTT
8-3 CENSUS SSEHNN''--SSUHSS
176-44 CENTER SSEHNN''--TTER
48-0 CHAIRMAN CHEYRR''--MMIHNN
21-1 CHALLENGE CHAE''--LLIHNNJH
31-8 CHAMBER CHEYMM''--BBER
13-0 CHAMPAGNE SHAEMM--PPEYNN''
9-23 CHANNEL CHAE''--NNEHLL
10-2 CHAPEL CHAE''--PPEHLL
38-12 CHAPTER CHAEPP''--TTER

14-0 CHARCOAL CHAR''--KKAOLL
20-3 CHARTER CHAR''--TTER
5-0 CHECKBOOK CHEHKK''--BBUUKK
33-13 CHICKEN CHIH''--KKEHNN
5-3 CHIMNEY CHIHNM''--NNIY
17-2 CHORUS KKAW''--RRUHSS
6-0 CHURCHYARD CHERCH''--YYARDD
10-2 CIGAR SSIH--GGAARR
55-0 CIRCLE SSER''--KKUHLL
19-4 CIRCUIT SSER''--KKIHTT
6-0 CIRCUS SSER''--KKUHSS
262-107 CITY SSIH''--TTIY
8-5 CLAIMANT KKLLEY''--MMIHNNTT
5-9 CLASSIC KKLLAE''--SSIHKK
18-5 CLASSROOM KKLLAESS''--RRUWMM
10-0 CLERGY KKLLER''--JHIY
26-1 CLIMATE KKLLAY''--MMIHTT
13-1 CLIMAX KKLLAY''--MMAEKKSS
16-2 CLOSET KKLLAA''--ZZEHTT
16-0 CLOVER KKLLAO''--VVER
8-5 CLUSTER KKLLUH''--SSTTER
29-12 COATING KKAO''--TTIYNG
16-1 COCKPIT KKAAKK''--PPIHTT
23-2 COCKTAIL KKAAKK''--TTEYLL
76-0 COFFEE KKAW''--FFIY
6-0 COFFIN KKAW''--FFIHNN
13-1 COLLAR KKAA''--LLER
164-39 COLLEGE KKAA''--LLEHJH
131-47 COLOR KKUH''--LLER
59-31 COLUMN KKAA''--LLUHMM
22-0 COMBAT KKAAMM''--BBAETT
41-5 COMFORT KKUHMM''--FFAORRTT
48-12 COMMAND KKAA--MMAENNDD''
35-27 COMMENT KKAA''--MMEHNNTT
7-0 COMMON KKAA''--MMIHNN
12-0 COMPASS KKAAMM''--PPAESS
14-8 COMPLAINT KKAAMM--PPLLEYNNTT''
31-6 COMPLEX KKAAMN''--PPLLEHKKSS
83-27 CONCEPT KKAANN''--SSEHPPTT
84-29 CONCERN KKAANN--SSERNN''
35-21 CONCERT KKAANN''--SSERTT
26-0 CONCRETE KKAANN''--KKRRIYTT
34-1 CONDUCT KKAANN''--DDUHKKTT
48-8 CONFLICT KKAANN''--FFLLIHKKTT
8-2 CONQUEST KKAANN''--KKWWEHSSTT
38-1 CONSCIENCE KKAANN''--SHEHNNSS
15-0 CONSENT KKAANN--SSEHNNTT''
9-4 CONSTANT KKAANN''--SSTTIHNNTT
54-23 CONTACT KKAANN''--TTAEKKTT
15-0 CONTEMPT KKAANN--TTEHNMPPTT''
41-16 CONTENT KKAANN''--TTEHNNTT
22-8 CONTEST KKAANN''--TTEHSSTT
34-2 CONTEXT KKAANN''--TTEHKKTTSS
6-15 CONTOUR KKAANN''--TTUWRR

54-18 CONTRACT KKAANN''--TTRRAEKKTT
69-9 CONTRAST KKAANN''--TTRRAESSTT
182-24 CONTROL KKAANN--TTRRAOLL''
5-4 CONVICT KKAANN--VVIHKKTT''
5-4 COOLER KKUW''--LLER
5-1 COOLNESS KKUWLL''--NNEHSS
36-18 COPY KKAA''--PPIY
113-18 CORNER KKAWRR''--NNER
10-18 COSTUME KKAA''--SSTTUWMM
19-6 COTTAGE KKAA''--TTIHJH
30-0 COTTON KKAA''--TTIHNN
28-4 COUNCIL KKOWNN''--SSUHLL
16-0 COUNSEL KKOWNN''--SSEHLL
24-8 COUNTER KKOWNN''--TTER
311-148 COUNTRY KKUHNN''--TTRRIY
70-31 COUNTY KKOWNN''--TTIY
122-0 COUPLE KKUH''--PPUHLL
5-3 COUPLER KKUH''--PPLLER
32-0 COURAGE KKUH''--RRUHJH
8-1 COURTYARD KKAWRRTT''--YYAARRDD
13-9 COUSIN KKUUHH''--ZZIHNN
34-17 COVER KKUH''--VVER
16-4 COWBOY KKOW''--BBOY
5-0 CRADLE KKRREY''--DDUHLL
15-20 CREATURE KKRRIY''--CHUWRR
53-5 CREDIT KKRREH''--DDIHTT
25-26 CRITIC KKRRIH''--TTIHKK
17-8 CRYSTAL KKRRIH''--SSTTUHLL
56-12 CULTURE KKUHLL''--CHUWRR
20-9 CURRENT KKUH''--RREHNNTT
11-8 CURTAIN KKER''--TTAENN
6-2 CUSHION KKOO''--SHUHNN
10-17 CUSTOM KKUH''--SSTTUHMM
24-0 CYCLE SSAY''--KKUHLL
8-0 CYCLIST SSAY''--KKLLIHSSTT
16-0 DAIRY DDEH''--RRIY
27-1 DAMAGE DDAE''--MMIHJH
31-30 DANCER DDAENN''--SSER
68-16 DANGER DDEYNN''--JHER
43-0 DARKNESS DDARKK''--NNEHSS
8-0 DARLING DDAR''--LLIYNG
71-14 DAUGHTER DDAW''--TTER
15-1 DAYLIGHT DDEY''--LLAYTT
6-1 DEADLINE DDEHDD''--LLAYNN
8-0 DEADLOCK DDEHDD''--LLAAKK
23-30 DEALER DDIY''--LLER
30-6 DEBATE DDEH--BBEYTT''
14-0 DEBUT DDEY''--BBYU
46-34 DECADE DDEH''--KKEYDD
5-1 DECREASE DDIH--KKRRIYSS''
21-2 DEFEAT DDIH--FFIYTT''
125-12 DEFENSE DDIY--FFEHNNSS
125-23 DEGREE DDIH--GGRRIY''
13-2 DELAY DDIH--LLEY''

27-2 DELIGHT DDIH--LLAYTT''
77-43 DEMAND DDUH--MMAENNDD''
12-4 DENTIST DDEHNN''--TTIHSSTT
10-0 DESCENT DDIH--SSEHNNTT''
13-3 DESERT DDIH--ZZERTT''
105-25 DESIGN DDIY''--ZZAYNN
68-20 DESIRE DDIH--ZZAYRR''
20-0 DESPAIR DDEHSS--PPEYRR
7-2 DESSERT DDIH--ZZERTT''
70-57 DETAIL DDIH--TTEYLL''
53-37 DEVICE DDIH--VVAYSS''
18-2 DEVIL DDEH''--VVIHLL
8-7 DIAMOND DDAY''--MMUHNNDD
6-0 DICTION DDIHKK''--SHUHNN
91-9 DINNER DDIH''--NNER
6-0 DIPPER DDIH''--PPER
16-9 DISCHARGE DDIHSS''--CHARJH
8-5 DISCOUNT DDIH''--SSKKOWNNTT
7-2 DISCOURSE DDIH''--SSKKAWRRSS
52-16 DISEASE DDIH--ZZIYZZ''
7-1 DISLIKE DDIH--SSLLAYKK''
5-0 DISMAY DDIHSS--MMEY''
6-3 DISPATCH DDIH--SSPPAECH''
29-15 DISPLAY DDIH--SSPPLLEY''
30-7 DISPUTE DDIH--SSPPYUTT''
107-19 DISTANCE DDIH''--SSTTAENNSS
15-1 DISTRESS DDIH--SSTTRREHSS''
77-35 DISTRICT DDIH''--SSTTRRIHKKTT
23-0 DIVORCE DDIH--VVAWRRSS''
87-28 DOCTOR DDAAKK''--TTER
39-5 DOCTRINE DDAAKK''--TTRRIHNN
44-96 DOLLAR DDAA''--LLER
9-3 DOMAIN DDAO--MMEYNN''
5-5 DONOR DDAO''--NNER
15-3 DOORWAY DDAWRR''--WWEY
10-0 DOUBLE DDUH''--BBUHLL
5-0 DOWNFALL DDOWNN''--FFAWLL
52-11 DOZEN DDUH''--ZZEHNN
13-0 DRAINAGE DDRREY''--NNIHJH
43-6 DRAMA DDAE''--MMAE
5-21 DRAWING DDRRAW''--IYNG
47-24 DRIVER DDRRAY''--VVER
5-0 DRIZZLE DDRRIH''--ZZUHLL
5-1 DRUGSTORE DDRRUHGG''--SSTTAWRR
7-0 DUGOUT DDUH''--GGOWTT
61-33 DUTY DDUW''--TTIY
9-9 EARTHQUAKE ERTH''--KKWWEYKK
5-0 EASEL IY''--ZZIHLL
6-0 ECHO EH''--KKAO
197-106 EFFECT EH--FFEHKKTT''
145-127 EFFORT EH''--FFAWRRTT
13-0 EGO IY''--GGAO
7-7 ELBOW EHLL''--BBAO
5-1 EMBRACE EHMM--BBRREYSS''

9-4 EMPIRE EHMM''--PPAYRR
48-17 ENGINE EHNN''--JHIHNN
57-0 ENTRANCE EHNN''--TTRREHNNSS
24-18 ENTRY EHNN''--TTRRIY
14-2 EPIC EH''--PPIHKK
90-1 EQUAL IY''--KKWWAALL
29-2 ERA EH''--RRAA
7-0 ERRAND EH''--RRAENNDD
34-42 ERROR EH''--RRAWRR
18-2 ESCAPE EH--SSKKEYPP''
5-1 ESCORT EH''--SSKKAWRRTT
19-8 ESSAY EH''--SSEY
15-2 ESSENCE EH''--SSEHNNSS
48-4 ESTATE EH--SSTTEYTT''
5-0 ESTEEM EH--SSTTIYMM''
133-15 EVENING IYVV''--NNIYNG
81-100 EVENT IY--VVEHNNTT
33-9 EVIL IY''--VVIHLL
6-5 EXCERPT EHKK''--SSERPPTT
22-3 EXCESS EHKK''--SSEHSS
56-5 EXCHANGE EHKK--SSCHEYNNJH''
22-1 EXCUSE EHKK--SSKKYUSS''
5-0 EXHAUST EHKK''--SSAWSSTT
7-0 EXIT EHKK''--SSIHTT
5-0 EXPANSE EHKK--SSPPAENNSS''
50-47 EXPENSE EHKK--SSPPEHNNSS''
19-38 EXPERT EHKK''--SSPPERTT
7-11 EXPORT EHKK''--SSPPAWRRTT
7-0 EXPRESS EHKK--SSPPRREHSS''
110-0 EXTENT EHKK--SSTTEHNNTT''
9-9 EXTREME EHKK--SSTTRRIYMM''
7-7 EYELID AY''--LLIHDD
15-26 FABRIC FFAE''--BBRRIHKK
7-1 FACADE FFAA--SSAADD''
5-5 FACTION FFAEKK''--SHUHNN
70-103 FACTOR FFAEKK''--TTAWRR
86-4 FAILURE FFEY''--LLYURR
6-0 FAIRNESS FFEYRR''--NNEHSS
5-2 FAIRWAY FFEYRR''--WWEY
29-0 FALLOUT FFAW''--LLOWTT
7-0 FANCY FFAENN''--SSIY
23-31 FARMER FFAARR''--MMER
8-1 FARMHOUSE FFARMM''--HHOWSS
64-3 FASHION FFAE''--SHUHNN
162-10 FATHER FFAA''--DHER
55-6 FAVOR FFEY''--VVAWRR
5-14 FEATHER FFEH''--DHER
29-74 FEATURE FFIY''--CHUWRR
127-61 FEELING FFIY''--LLIYNG
61-13 FELLOW FFEH''--LLAO
30-17 FEMALE FFIY''--MMEYLL
19-0 FEVER FFIY''--VVER
25-23 FIBER FFAY''--BBER
46-0 FICTION FFIHKK''--SHUN

9-14 FIGHTER FFAY''--TTER
151-100 FIGURE FFIH''--GGYURR
8-4 FILTER FFIHLL''--TTER
9-6 FINANCE FFAY''--NNAENNSS
10-33 FINDING FFAYNN''--DDIYNG
40-66 FINGER FFIY''--NGER
15-1 FINISH FFIH''--NNIHSH
5-0 FISSION FFIH''--SHUHNN
8-0 FITNESS FFIHTT''--NNEHSS
8-0 FLASHLIGHT FFLLAESH''--LLAYTT
16-2 FLAVOR FFLLEY''--VVER
5-0 FLOORING FFLLAW''--RRIYNG
26-0 FOCUS FFAO''--KKUHSS
6-2 FOLLY FFAA''--LLIY
29-1 FOOTBALL FFUHTT''--BBAWLL
40-9 FOREST FFAA''--RREHSSTT
5-2 FORTRESS FFAWRR''--TTRREHSS
23-6 FORTUNE FFAWRR''--CHUWNN
7-1 FORUM FFAW''--RRUHMM
12-4 FOUNTAIN FFOWNN''--TTIHNN
20-20 FRACTION FFRRAEKK''--SHUHNN
6-10 FRAGMENT FFRRAEGG''--MMEHNNTT
6-1 FRAGRANCE FFRREY''--GGRREHNNSS
5-1 FRANCHISE FFRRAENN''--CHAYSS
122-3 FREEDOM FFRRIY''--DDUHMM
5-5 FREEWAY FFRRIY''--WWEY
6-0 FRENZY FFRREHNN''--ZZIY
16-1 FRICTION FFRRIHKK''--SHUHNN
26-4 FRIENDSHIP FFRREHNNDD''--SHIHPP
25-5 FRONTIER FFRRUHNN--TTIYRR''
107-41 FUNCTION FFUHNNKK''--SHUHNN
11-1 FURNACE FFER''--NNIHSS
5-1 FURROW FFUH''--RRAO
14-0 FURY FFYU''--RRIY
106-0 FUTURE FFYU''--CHUWRR
5-6 GALLON GGAE''--LLUHNN
19-5 GARAGE GGAE--RRAAJH''
7-0 GARBAGE GGAARR''--BBUHJH
46-19 GARDEN GGAR''--DDEHNN
6-5 GARMENT GGAR''--MMEHNNTT
23-1 GENIUS JHIYNN''--YYUHSS
32-6 GESTURE JHEHSS''--CHUWRR
18-3 GLORY GGLLAW''--RRIY
7-2 GRAVEYARD GGRREYVV''--YYARDD
40-0 GUIDANCE GGAY''--DDEHNNSS
17-3 GUITAR GGIH--TTAR''
5-1 GULLY GGUH''--LLIY
6-0 GUNFIRE GGUHNN''--FFAYRR
22-21 HABIT HHAE''--BBIHTT
7-1 HALLWAY HHAWLL''--WWEY
6-0 HAMMER HHAE''--MMER
5-0 HAMMOCK HHAE''--MMAAKK
13-1 HANDFUL HHAENNDD''--FFUULL
19-0 HANDLE HHAENN''--DDUHLL

16-1 HARBOR HHAR''--BBAORR
9-5 HARDSHIP HHAARRDD''--SHIHPP
10-0 HARDWARE HHAARRDD''--WWEYRR
10-0 HARNESS HHAR''--NNEHSS
8-2 HARVEST HHAR''--VVEHSSTT
5-0 HATCH HHAECH
5-1 HAVEN HHEY''--VVEHNN
10-10 HAZARD HHAE''--ZZARDD
5-6 HEADACHE HHEH''--DDEYKK
42-8 HEARING HHIY''--RRIYNG
14-1 HEATER HHIY''--TTER
26-9 HEAVEN HHEH''--VVEHNN
6-2 HELPER HHEHLL''--PPER
46-0 HERO HHIY''--RRAO
32-15 HIGHWAY HHAY''--WWEY
9-0 HILLSIDE HHIHLL''--SSAYDD
5-0 HITCH HHIHCH
10-0 HOLSTER HHAOLL''--SSTTER
22-0 HONEY HHUH''--NNIY
48-13 HONOR AA''--NNER
11-2 HORMONE HHAWRR''--MMAONN
16-4 HORROR HHAA''--RRAORR
8-3 HOSTESS HHAOSS''--TTEHSS
84-20 HOTEL HHAO--TTEHLL''
36-9 HUMAN HHYU''--MMIHNN
44-0 HUMOR HHYU''--MMAORR
15-0 HUNGER HHUH''--NGER
7-5 HUNTER HHUH''--NNTER
131-14 HUSBAND HHUHZZ''--BBIHNNDD
191-143 IDEA AY''--DDIYUH
15-16 IDEAL AY--DDIYLL''
7-1 IDOL AY''--DDUHLL
20-2 ILLNESS IHLL''--NNIHSS
117-36 IMAGE IH''--MMIHJH
67-3 IMPACT IHMM''--PPAEKKTT
14-14 IMPORT IHMM''--PPAWRRTT
20-12 IMPULSE IHMM''--PPUULLSS
95-1 INCOME IHNN''--KKUHMM
112-42 INCREASE IHNN''--KKRRIYSS
10-3 INFANT IHNN''--FFAENNTT
7-0 INFIELD IHNN''--FFIYLLDD
7-4 INNING IH''--NNIYNG
20-0 INPUT IHNN''--PPUUTT
5-0 INQUEST IHNN''--KKWWEHSSTT
14-22 INSECT IHNN''--SSEHKKTT
18-4 INSIDE IHNN''--SSAYDD
22-16 INSIGHT IHNN''--SSAYTT
82-30 INSTANCE IHNN''--SSTTAENNSS
14-4 INSTINCT IHNN''--SSTTIYNNKKTT
5-3 INSULT IHNN''--SSUHLLTT
7-0 INTAKE IHNN''--TTEYKK
35-7 IRON AY''--ERNN
31-12 ISLAND AY''--LLAENNDD
129-61 ISSUE IH''--SHUW

55-71 ITEM AY''--TTEHMM
33-6 JACKET JHAE''--KKEHTT
6-5 JOURNAL JHER''--NNUHLL
24-2 JOURNEY JHER''--NNIY
58-27 JUDGMENT JHUHJH''--MMEHNNTT
18-0 JUNGLE JHUHNN''--GGUHLL
8-3 JUNIOR JHUWNN''--YYER
63-1 JURY JHUW''--RRIY
77-0 JUSTICE JHUH''--SSTTIHSS
6-5 KIDNEY KKIHDD''--NNIY
21-1 KILLER KKIH''--LLER
5-0 KINDNESS KKAYNNDD''--NNEHSS
16-1 KINGDOM KKIYNG''--DDUHMM
90-5 KITCHEN KKIH''--CHEHNN
5-5 KITTEN KKIH''--TTEHNN
17-2 LABEL LLEY''--BBUHLL
118-1 LABOR LLEY''--BBER
19-0 LADDER LLAE''--DDER
49-28 LADY LLEY''--DDIY
12-2 LAGOON LLAE--GGUWNN''
26-2 LANDING LLAENN''--DDIYNG
12-2 LANDLORD LLAENN''--DDLLAWRRDD
20-5 LANDSCAPE LLAENNDD''--SSKKEYPP
107-39 LANGUAGE LLAENN''--GGWWAAJH
13-2 LANTERN LLAENN''--TTERNN
5-0 LATCH LLAECH
5-0 LAUNDRY LLAWNN''--DDRRIY
43-23 LAWYER LLAW''--YYER
66-106 LEADER LLIY''--DDER
13-13 LECTURE LLEHKK''--CHUWRR
7-1 LEDGER LLEH''--JHER
26-10 LEGEND LLEH''--JHEHNNDD
14-1 LEMON LLEH''--MMUHNN
28-16 LESSON LLEH''--SSUHNN
140-113 LETTER LLEH''--TTER
195-67 LEVEL LLEH''--VVEHLL
13-6 LEVER LLEH''--VVER
35-5 LICENSE LLAY''--SSEHNNSS
14-0 LIGHTNING LLAYTT''--NNIYNG
31-36 LIMIT LLIH''--MMIHTT
6-0 LINEN LLIH''--NNEHNN
28-6 LIQUID LLIH''--KKWWIHDD
42-0 LIQUOR LLIH''--KKER
16-1 LIVER LLIH''--VVER
13-0 LIVING LLIH''--VVIYNG
19-1 LOBBY LLAA''--BBIY
6-0 LOCAL LLAO''--KKUHLL
9-0 LOCKER LLAA''--KKER
6-0 LOCUST LLAO''--KKUHSSTT
5-2 LODGING LLAA''--JHIYNG
8-1 LOTION LLAO''--SHUHNN
16-8 LOVER LLUH''--VVER
30-0 LUMBER LLUHMM''--BBER
23-2 LUNCHEON LLUHNN''--CHUHNN

7-0 LURE LLUWRR
7-15 LYRIC LLIH''--RRIHKK
98-50 MACHINE MMUH--SHIYNN''
5-3 MAJOR MMEY''--JHER
12-18 MAKER MMEY''--KKER
6-0 MANDATE MMAENN''--DDEYTT
124-14 MANNER MMAE''--NNER
7-4 MANSION MMAENN''--SHUHNN
6-0 MAPLE MMEY''--PPUHLL
18-3 MARBLE MMAARR''--BBUHLL
9-6 MARGIN MMAR''--JHIHNN
41-10 MARINE MMUH--RRIYNN''
5-0 MARKER MMAR''--KKER
140-29 MARKET MMAARR''--KKEHTT
92-27 MARRIAGE MMAE''--RRIHJH
8-0 MARTYR MMAR''--TTUHRR
49-12 MASTER MMAE''--SSTTER
281-59 MATTER MMAE''--TTER
12-5 MEADOW MMEH''--DDAO
110-21 MEANING MMIY''--NNIYNG
60-46 MEASURE MMEH''--ZHUWRR
119-28 MEETING MMIY''--TTIYNG
133-318 MEMBER MMEHMM''--BBER
6-0 MEMBRANE MMEHNM''--BBRREYNN
9-0 MENACE MMEH''--NNIHSS
17-1 MENTION MMEHNN''--SHUHNN
5-2 MENU MMEHNN''--YYUW
12-17 MERCHANT MMER''--CHIHNNTT
19-0 MERCY MMER''--SSIY
20-5 MERGER MMER''--JHER
25-11 MERIT MMEH''--RRIHTT
63-16 MESSAGE MMEH''--SSIHJH
58-6 METAL MMEH''--TTUHLL
6-11 METER MMIY''--TTER
130-133 METHOD MMEH''--THOODD
46-0 MIDDLE MMIH''--DDUHLL
23-0 MIDNIGHT MMIHDD''--NNAYTT
14-0 MILEAGE MMAY''--LLIHJH
5-3 MINOR MMAY''--NNER
43-193 MINUTE MMIH''--NNUHTT
26-1 MIRROR MMIH''--RRER
5-0 MISCHIEF MMIHSS''--CHIHFF
46-31 MISSILE MMIH''--SSIHLL
64-15 MISSION MMIH''--SHUHNN
30-15 MISTAKE MMIH--SSTTEYKK''
5-0 MISTRESS MMIH''--SSTTRREHSS
30-4 MIXTURE MMIHKKSS''--CHUWRR
57-47 MODEL MMAA''--DDEHLL
10-0 MOISTURE MMOYSS''--CHUWRR
244-48 MOMENT MMAO''--MMEHNNTT
262-2 MONEY MMUH''--NNIY
9-1 MONKEY MMUHNN''--KKIY
5-3 MONSTER MMAANN''--SSTTER
13-0 MOONLIGHT MMUWNN''--LLAYTT

5-7 MORAL MMAO''--RRUHLL
209-10 MORNING MMAORR''--NNIYNG
10-2 MORTAR MMAWRR''--TTER
16-5 MORTGAGE MMAWRR''--GGIHJH
19-7 MOTEL MMAO--TTEHLL''
192-25 MOTHER MMUH''--DHER
8-5 MOTIF MMAO--TTIYFF''
55-17 MOTION MMAO''--SHUHNN
21-20 MOTIVE MMAO''--TTIHVV
51-7 MOTOR MMAO''--TTER
26-34 MOUNTAIN MMOWNN''--TTIHNN
7-1 MOUTHPIECE MMOWTH''--PPIYSS
29-30 MOVIE MMUW''--VVIY
70-12 MURDER MMER''--DDER
40-0 MUSCLE MMUH''--SSUHLL
6-3 MUSKET MMUH''--SSKKIHTT
5-1 MUSTACHE MMUH--SSTTAESH''
10-0 MUZZLE MMUH''--ZZIHLL
118-118 NATION NNEY''--SHUHNN
10-11 NATIVE NNEY''--TTIHVV
183-4 NATURE NNEY''--CHUWRR
5-0 NAVY NNEY''--VVIY
15-0 NEEDLE NNIY''--DDUHLL
14-40 NEIGHBOR NNEY''--BBAWRR
9-5 NEPHEW NNEH''--FFYU
30-15 NETWORK NNEH''--TTWWERKK
7-1 NICKEL NNIH''--KKEHLL
9-1 NICKNAME NNIHKK''--NNEYMM
9-1 NIGHTMARE NNAYTT''--MMEYRR
412-1 NOTHING NNUH''--THIYNG
30-9 NOTICE NNAO''--TTIHSS
40-17 NOTION NNAO''--SHUHNN
48-22 NOVEL NNAA''--VVUHLL
5-1 NUISANCE NNUW''--SSIHNNSS
461-124 NUMBER NNUHMM''--BBER
53-62 OBJECT AABB''--JHEHKKTT
32-3 OCEAN AO''--SHUHNN
14-7 ODOR AO''--DDAWRR
8-5 OFFENSE AA--FFEHNNSS''
12-1 OFFER AW''--FFER
215-39 OFFICE AW''--FFIHSS
15-4 ONION UHNN''--YYUHNN
15-0 ONSET AANN''--SSEHTT
5-1 OPTION AAPP''--SHUHNN
9-4 ORANGE AA''--RRAENNJH
15-9 ORBIT AWRR''--BBIHTT
342-56 ORDER AWRR''--DDER
12-14 ORGAN AWRR''--GGIHNN
26-11 OUTCOME OWTT''--KKUHMM
16-0 OUTFIT OWTT''--FFIHTT
9-6 OUTLET OWTT''--LLEHTT
8-5 OUTLINE OWTT''--LLAYNN
35-0 OUTLOOK OWTT''--LLUUKK
35-5 OUTPUT OWTT''--PPUUTT

13-0 OUTSET OWTT''--SSEHTT
7-1 OVEN UH''--VVEHNN
33-33 OWNER AO''--NNER
6-8 OYSTER OY''--SSTTER
19-6 PACKAGE PPAE''--KKUHJH
21-13 PAINTER PPEYNN''--TTER
21-36 PAINTING PPEYNN''--TTIYNG
15-4 PALACE PPAE''--LLAESS
31-46 PANEL PPAE''--NNUHLL
19-0 PANIC PPAE''--NNIHKK
6-13 PANSY PPAENN''--SSIY
152-50 PAPER PPEY''--PPER
23-2 PARADE PPUH--RREYDD''
14-89 PARENT PPEY''--RREHNNTT
10-1 PARISH PPAA''--RRIHSH
18-1 PARLOR PPAR''--LLER
5-0 PAROLE PPUH--RRAOLL''
32-16 PARTNER PPAARRTT''--NNER
191-58 PARTY PPAARR''--TTIY
49-20 PASSAGE PPAE''--SSUHJH
27-12 PASSION PPAE''--SHUHNN
6-0 PASSPORT PPAE''--SSPPAORRTT
17-6 PASTOR PPAE''--SSTTAORR
10-2 PASTURE PPAESS''--CHUWRR
33-19 PATENT PPAE''--TTEHNNTT
75-36 PATIENT PPEY''--SHEHNNTT
18-1 PATROL PPAE--TTRRAOLL''
112-47 PATTERN PPAE''--TTERNN
50-48 PAYMENT PPEY''--MMEHNNTT
16-0 PAYROLL PPEY''--RRAOLL
6-5 PEANUT PPIY''--NNUHTT
7-12 PEASANT PPEH''--SSEHNNTT
5-1 PEDDLER PPEH''--DDLLER
34-4 PENCIL PPEHNN''--SSUHLL
9-1 PENNANT PPEH''--NNUHNNTT
25-5 PENNY PPEH''--NNIY
12-7 PENSION PPEHNN''--SHUHNN
12-0 PEPPER PPEH''--PPER
53-0 PERCENT PPER--SSEHNNTT''
10-1 PERFUME PPER''--FFYUMM
8-2 PERIL PPEH''--RRIHLL
263-47 PERIOD PPIH''--RRIY--UHDD
10-2 PERMIT PPER''--MMIHTT
170-120 PERSON PPER''--SSUHNN
5-7 PHOTO FFAO''--TTAO
9-2 PICKET PPIH''--KKEHTT
14-0 PICKUP PPIH''--KKUHPP
15-3 PICNIC PPIHKK''--NNIHKK
160-65 PICTURE PPIHKK''--CHUWRR
9-3 PIGMENT PPIHGG''--MMEHNNTT
8-3 PILLOW PPIH''--LLAO
40-8 PILOT PPAY''--LLAATT
12-4 PIRATE PPAY''--RRUHTT
27-4 PISTOL PPIH''--SSTTUHLL

7-3 PISTON PPIH''--SSTTUHNN
21-7 PITCHER PPIH''--CHER
13-0 PITY PPIH''--TTIY
21-22 PLANET PPLLAE''--NNEHTT
6-2 PLANTER PPLLAENN''--TTER
23-1 PLASTER PPLLAE''--SSTTER
23-28 PLASTIC PPLLAE''--SSTTIHKK
72-5 PLATFORM PPLLAETT''--FFAORRMN
7-3 PLATOON PPLLAE--TTUWNN''
18-26 PLAYER PPLLEY''--ER
60-6 PLEASURE PPLLEH''--ZHOORR
41-17 POCKET PPAA''--KKEHTT
9-2 POISON PPOY''--ZZUHNN
5-0 POKER PPAO''--KKER
7-6 PONY PPAO''--NNIY
6-0 PORTER PPAWRR''--TTER
62-11 PORTION PPAWRR''--SHUHNN
16-7 PORTRAIT PPAWRR''--TTRRIHTT
7-1 POSTCARD PPAOSSTT''--KKAARRDD
28-5 POWDER PPOW''--DDER
321-66 POWER PPOW''--ER
80-46 PRACTICE PPRRAEKK''--TTIHSS
9-0 PRAIRIE PPRREY''--RRIY
11-2 PREACHER PPRRIY''--CHUWRR
6-5 PRECINCT PPRRIY''--SSIYNNKKTT
5-4 PREMIERE PPRRIY--MMIYRR''
7-8 PREMISE PPRREH''--MMIHSS
75-2 PRESENCE PPRREH''--SSEHNNSS
43-6 PRESENT PPRREH''--ZZEHNNTT
181-37 PRESSURE PPRREH''--SHUWRR
6-1 PRETENSE PPRRIY''--TTEHNNSS
5-0 PRINCESS PPRRIHNN''--SSEHSS
40-3 PRISON PPRRIH''--ZZUHNN
309-240 PROBLEM PPRRAA''--BBLLEHMM
191-56 PROCESS PPRRAA''--SSEHSS
9-0 PRODUCE PPRRAO''--DDUWSS
80-95 PRODUCT PPRRAA''--DDUHKKTT
7-3 PROFILE PPRRAO''--FFAYLL
24-21 PROFIT PPRRAA''--FFIHTT
367-137 PROGRAM PPRRAO''--GGRRAEMN
108-0 PROGRESS PPRRAA''--GGRREHSS
79-60 PROJECT PPRRAA''--JHEHKKTT
36-10 PROMISE PPRRAA''--MMIHSS
25-24 PROSPECT PPRRAA''--SSPPEHKKTT
21-12 PROTEIN PPRRAO''--TTIYNN
17-8 PROTEST PPRRAO''--TTEHSSTT
5-1 PROVERB PPRRAA''--VVERBB
14-9 PROVINCE PPRRAA''--VVIHNNSS
7-0 PROXY PPRRAAKK''--SSIY
18-24 PUPIL PPYU''--PPIHLL
6-5 PUPPET PPUH''--PPEHTT
31-13 PURCHASE PPER''--CHIHSS
146-89 PURPOSE PPER''--PPUHSS
15-3 PURSUIT PPER--SSUWTT''

6-0 PUZZLE PPUH''--ZZUHLL
14-3 QUARREL KKWWAA''--RREHLL
7-0 QUARRY KKWWAA''--RRIY
31-28 QUARTER KKWWAWRR''--TTER
232-134 QUESTION KKWWEHSS''--CHUHNN
11-5 RABBIT RRAE''--BBIHTT
6-0 RABBI RRAE''--BBAY
8-0 RADISH RRAE''--DDIHSH
47-15 RAILROAD RREYLL''--RRAODD
10-1 RAILWAY RREYLL''--WWEY
5-2 RALLY RRAE''--LLIY
14-7 RANCHER RRAENN''--CHER
5-0 RANDOM RRAENN''--DDUHMM
9-3 RATION RRAE''--SHUHNN
5-0 RATTLE RRAE''--TTUHLL
15-0 RAZOR RREY''--ZZAORR
43-37 READER RRIY''--DDER
9-17 READING RRIY''--DDIYNG
237-99 REASON RRIY''--ZZUHNN
8-11 REBEL RREH''--BBUHLL
123-82 RECORD RREH''--KKAWRRDD
7-1 REDHEAD RREHDD''--HHEHDD
23-14 REFORM RRIY--FFAWRRMM''
19-1 REFUND RRIY''--FFUHNNDD
53-2 REGARD RRIY--GGARDD''
23-2 REGIME RREH--ZHIYMM''
71-35 REGION RRIY''--JHUHNN
27-6 RELEASE RRIH--LLIYSS
6-0 RELIC RREH''--LLIHKK
66-0 RELIEF RRIY--LLIYFF''
5-2 RELISH RREH''--LLIHSH
29-41 REMARK RRIY--MMARKK''
7-2 RENTAL RREHNN''--TTUHLL
15-8 REPAIR RRIY--PPEYRR''
6-0 REPEAL RRIY--PPIYLL''
24-7 REPLY RRIY--PPLLAY''
114-69 REPORT RRIY--PPAWRRTT''
42-12 REQUEST RRIH--KKWWEHSSTT
8-0 RESCUE RREH''--SSKKYU
137-1 RESEARCH RRIY''--SSERCH
19-4 RESERVE RRIY--ZZERVV''
6-1 RESORT RRIY--ZZAWRRTT''
9-69 RESOURCE RRIY--SSAWRRSS''
119-19 RESPECT RRIY--SSPPEHKKTT''
77-27 RESPONSE RRIH--SSPPAANNSS
11-7 RESTRAINT RRIY--SSTTRREYNNTT''
197-127 RESULT RRIH--ZZUHLLTT
8-0 RETAIL RRIY''--TTEYLL
11-1 RETREAT RRIY--TTRRIYTT''
103-22 RETURN RRIY--TTERNN''
35-6 REVIEW RRIY--VVYU''
8-2 REVOLT RRIY--VVAOLLTT''
13-4 REWARD RRIY--WWARDD''
12-6 RIBBON RRIH''--BBUHNN

5-0 RICHNESS RRIHCH''--NNEHSS
11-6 RIDER RRAY''--DDER
78-15 RIVER RRIH''--VVER
5-1 ROADWAY RRAODD''--WWEY
7-13 ROCKET RRAA''--KKEHTT
12-1 ROMANCE RRAO''--MMAENNSS
8-4 ROOKIE RRUU''--KKIY
6-0 ROTOR RRAO''--TTAORR
18-3 ROUTINE RRUW--TTIYNN''
13-0 RUBBER RRUH''--BBER
4-0 RUBBISH RRUH''--BBIHSH
9-8 RUIN RRUW''--IHNN
7-2 RULING RRUW''--LLIYNG
8-6 RUMOR RRUW''--MMAORR
22-0 SADDLE SSAE''--DDUHLL
6-0 SADNESS SSAEDD''--NNEHSS
9-3 SALAD SSAE''--LLAEDD
10-8 SALOON SSAE--LLUWNN''
54-0 SAMPLE SSAEMM''--PPUHLL
7-6 SANCTION SSAENNKK''--SHUHNN
9-4 SANDWICH SSAENNDD''--WWIHCH
9-0 SATIRE SSAE''--TTAYRR
6-0 SCAFFOLD SSKKAE''--FFAOLLDD
5-7 SCANDAL SSKKAENN''--DDUHLL
33-10 SCHEDULE SSKKEH''--JHUWLL
11-26 SCHOLAR SSKKAA''--LLER
6-1 SCULPTOR SSKKUHLLPP''--TTER
11-7 SCULPTURE SSKKUHLLPP''--CHUWRR
105-17 SEASON SSIY''--ZZUHNN
27-27 SECOND SSEH''--KKUHNNDD
32-20 SECRET SSIY''--KKRREHTT
140-69 SECTION SSEHKK''--SHUHNN
13-10 SECTOR SSEHKK''--TTER
10-10 SEGMENT SSEHGG''--MMEHNNTT
6-0 SEIZURE SSIY''--ZHUWRR
6-0 SELLER SSEH''--LLER
5-1 SENIOR SSIYNN''--YYER
33-13 SENTENCE SSEHNN''--TTEHNNSS
5-0 SENTRY SSEHNN''--TTRRIY
35-6 SEQUENCE SSIY''--KKWWEHNNSS
10-1 SERGEANT SSAR''--JHEHNNTT
10-2 SERMON SSER''--MMUHNN
18-0 SERUM SSIY''--RRUHMM
18-22 SERVANT SSER''--VVAENNTT
242-126 SERVICE SSER''--VVIHSS
77-26 SESSION SSEH''--SHUHNN
15-9 SETTING SSEH''--TTIYNG
7-0 SETUP SSEH''--TTUHPP
9-4 SEWER SSUW''--ER
27-20 SHADOW SHAE''--DDAO
64-23 SHELTER SHEHLL''--TTER
15-3 SHERIFF SHEH''--RRIHFF
14-3 SHORTAGE SHAORR''--TTIHJH
6-0 SHORTSTOP SHAORRTT''--SSTTAAPP

8-0 SHOTGUN SSHHAATT''--GGUHNN
58-51 SHOULDER SHAOLL''--DDER
5-3 SHOVEL SHUH''--VVUHLL
5-5 SHUTTER SHUH''--TTER
6-0 SICKNESS SSIHKK''--NNEHSS
52-28 SIGNAL SSIHGG''--NNUHLL
49-3 SILENCE SSAY''--LLIHNNSS
22-0 SILVER SSIHLL''--VVER
8-13 SINGER SSIY''--NGER
7-0 SINGLE SSIY''--NGUHLL
35-9 SISTER SSIH''--SSTTER
24-2 SITTER SSIH''--TTER
8-0 SLAUGHTER SSLLAW''--TTER
6-5 SLOGAN SSLLAO''--GGUHNN
6-3 SOFA SSAO''--FFAA
38-55 SOLDIER SSAOLL''--JHER
7-13 SOLID SSAA''--LLIHDD
6-2 SOLO SSAO''--LLAO
5-3 SOLVENT SSAALL''--VVEHNNTT
9-2 SORROW SSAA''--RRAO
5-6 SOYBEAN SSOY''--BBIYNN
22-14 SPEAKER SSPPIY''--KKER
8-0 SPINDLE SSPPIHNN''--DDUHLL
7-0 SPIRAL SSPPAY''--RRUHLL
161-42 SPIRIT SSPPIH''--RRIHTT
8-7 SPONSOR SSPPAANN''--SSER
6-0 SPOTLIGHT SSPPAATT''--LLAYTT
14-0 STABLE SSTTEY''--BBUHLL
8-1 STAIRCASE SSTTEYRR''--KKEYSS
6-2 STAIRWAY SSTTEYRR''--WWEY
29-72 STANDARD SSTTAENN''--DDERDD
13-0 STANDPOINT SSTTAENNDD''--PPOYNNTT
141-67 STATEMENT SSTTEYTT''--MMEHNNTT
92-85 STATION SSTTEY''--SHUHNN
16-8 STATUE SSTTAE''--CHUW
12-7 STATUTE SSTTAE''--CHUWTT
9-0 STEEPLE SSTTIY''--PPUHLL
9-0 STILLNESS SSTTIHLL''--NNIHSS
12-0 STOCKADE SSTTAA--KKEYDD''
5-5 STOCKING SSTTAA''--KKIYNG
37-0 STOMACH SSTTUH''--MMAEKK
149-59 STORY SSTTAW''--RRIY
38-8 STRANGER SSTTRREYNN''--JHER
13-2 STREETCAR SSTTRRIYTT''--KKAR
87-28 STRUCTURE SSTTRRUHKK''--CHUWRR
55-0 STRUGGLE SSTTRRUH''--GGUHLL
112-211 STUDENT SSTTUW''--DDEHNNTT
200-95 STUDY SSTTUH''--DDIY
121-79 SUBJECT SSUHBB''--JHEHKKTT
31-18 SUBSTANCE SSUHBB''--SSTTAENNSS
13-16 SUBURB SSUH''--BBERBB
6-1 SUBWAY SSUHBB''--WWEY
89-21 SUCCESS SSUHKK--SSEHSS''
33-0 SUGAR SHOO''--GGUHRR

20-5 SUITCASE SSUWTT''--KKEYSS
131-10 SUMMER SSUH''--MMER
5-0 SUNBURN SSUHNN''--BBERNN
10AY SSUHNN''--DDEY
6-0 SUNDOWN SSUHNN''--DDOWNN
17-0 SUNLIGHT SSUHNN''--LLAYTT
8-0 SUNRISE SSUHNN''--RRAYZZ
12-0 SUNSET SSUHNN''--SSEHTT
7-0 SUNSHINE SSUHNN''--SHAYNN
31-1 SUPPER SSUH''--PPER
54-35 SUPPLY SSUH--PPLLAY''
123-6 SUPPORT SSUH--PPAORRTT''
193-28 SURFACE SSER''--FFUHSS
24-4 SURPLUS SSER''--PPLLUHSS
44-5 SURPRISE SSER--PPRRAYZZ''
28-11 SURVEY SSER''--VVEY
7-0 SUSPECT SSUH''--SSPPEHKKTT
6-0 SUSPENSE SSUH--SSPPEHNNSS''
14-4 SWEATER SSWWEH''--TTER
9-1 SWEETHEART SSWWIYTT''--HHARTT
54-31 SYMBOL SSIHMM''--BBAOLL
5-14 SYMPTOM SSIHMMPP''--TTUHMM
393-126 SYSTEM SSIH''--SSTTEHMM
147-39 TABLE TTEY''--BBUHLL
5-0 TACKLE TTAE''--KKUHLL
39-28 TALENT TTAE''--LLIHNNTT
7-0 TANGLE TTAE''--NGUHLL
45-22 TARGET TTAARR''--GGEHTT
5-0 TARIFF TTAE''--RRIHFF
16-3 TAXI TTAEKK''--SSIY
77-67 TEACHER TTIY''--CHER
12-2 TEMPER TTEHMM''--PPER
5-0 TEMPLATE TTEHMM''--PPLLEYTT
22-0 TEMPLE TTEHMM''--PPUHLL
5-9 TENANT TTEH''--NNUHNNTT
6-1 TENOR TTEH''--NNAORR
55-18 TENSION TTEHNN''--SHUHNN
7-7 TERRACE TTEH''--RRIHSS
8-1 TERRAIN TTEH--RREYNN''
24-0 TERROR TTEH''--RRAORR
24-15 TEXTILE TTEHKK''--SSTTAYLL
15-6 TEXTURE TTEHKK''--SSCHUWRR
38-11 THEATER THIY''--TTER
8-0 THEOREM THIY''--RREHMM
126-19 THEORY THIY''--RRIY
6-6 THINKER THIYNN''--KKER
14-0 THRESHOLD THRREHSH''--HHAOLLDD
6-0 THROTTLE THRRAA''--TTUHLL
16-14 TICKET TTIH''--KKEHTT
5-0 TIGER TTAY''--GGER
19-5 TIMBER TTIHMM''--BBER
41-13 TISSUE TTIH''--SHUW
284-0 TODAY TTUH--DDEY
13-4 TOILET TTOY''--LLEHTT

8-2 TOKEN TTAO''--KKEHNN
6-0 TOOTHBRUSH TTUWTH''--BBRRUHSH
9-10 TOPIC TTAA''--PPIHKK
7-3 TORSO TTAWRR''--SSAO
131-3 TOTAL TTAO''--TTUHLL
6-1 TOUCHDOWN TTUHCH''--DDOWNN
15-12 TOURIST TTUW''--RRIHSSTT
6-11 TOWEL TTOW''--EHLL
12-4 TOWER TTOW''--ER
23-7 TRACTOR TTRRAEKK''--TTAORR
6-26 TRADER TTRREY''--DDER
65-0 TRAFFIC TTRRAE''--FFIHKK
11-12 TRAILER TTRREY''--LLER
31-9 TRANSFER TTRRAENNSS''--FFER
14-4 TRANSPORT TTRRAENN''--SSPPAORRTT
30-2 TRAVEL TTRRAE''--VVUHLL
124-11 TREATMENT TTRRIYTT''--MMIHNNTT
13-4 TREATY TTRRIY''--TTIY
23-1 TRIBUTE TTRRIH''--BBYUTT
9-0 TRIFLE TTRRAY''--FFUHLL
5-0 TROLLEY TTRRAA''--LLIY
6-6 TROOPER TTRRUW''--PPER
130-0 TROUBLE TTRRUH''--BBUHLL
6-0 TRUMPET TTRRUHMM''--PPEHTT
59-0 TUESDAY TTUWZZ''--DDEY
13-8 TUMOR TTUW''--MMAORR
9-3 TUNNEL TTUH''--NNEHLL
5-1 TURBINE TTER''--BBAYNN
9-1 TURKEY TTER''--KKIY
6-10 TURNPIKE TTERNN''--PPAYKK
7-0 TURTLE TTER''--TTUHLL
5-0 ULCER UHLL''--SSER
17-0 UNCLE UHNN''--KKUHLL
78-29 UNION.YUNN''--YYUHNN
96-81 UNIT YU''--NNIHTT
5-0 UNREST UHNN--RREHSSTT''
6-0 UPKEEP UHPP''--KKIYPP
5-0 UPTAKE UHPP''--TTEYKK
7-0 UPTURN UHPP''--TTERNN
20-0 VACUUM VVAE''--KKYUMM
48-5 VALLEY VVAE''--LLIY
197-182 VALUE VVAE''--LLYU
6-0 VANTAGE VVAENN''--TTIHJH
11-0 VAPOR VEY''--PPAORR
19-7 VECTOR VVEHKK''--TTAORR
10-0 VENGEANCE VVEHNN''--JHEHNNSS
13-4 VENTURE VVEH''--CHUWRR
15-0 VERDICT VVER''--DDIHKKTT
47-9 VERSION VVER''--ZHUHNN
15-12 VESSEL VVEH''--SSUHLL
9-0 VETO VVIY''--TTAO
27-19 VICTIM VVIHKK''--TTIHMM
16-3 VIEWPOINT VVYU''--PPOYNNTT
47-12 VILLAGE VVIH''--LLIHJH

30-15 VIRTUE VVER''--CHUW
12-0 VIRUS VVAY''--RRUHSS
5-0 VISA VVIY''--ZZUH
55-7 VISION VVIH''--ZHUHNN
59-15 VISIT VVIH''--ZZIHTT
6-0 VOLLEY VVAA''--LLIY
16-4 VOLTAGE VVAOLL''--TTIHJH
116-41 VOLUME VVAA''--LLYUMM
6-3 VOWEL VVOW''--EL
52-17 WAGON WWAE''--GGUHNN
10-5 WAITER WWEY''--TTER
6-0 WALLET WWAE''--LLEHTT
11-5 WALNUT WWAWLL''--NNUHTT
8-0 WARDROBE WWAR''--DDRRAOBB
42-0 WARFARE WWAR''--FFEYRR
13-9 WARNING WWAR''--NNIYNG
9-5 WARRANT WWAA''--RREHNNTT
6-0 WARTIME WWAWRR''--TTAYMM
426-36 WATER WWAW''--TTER
46-6 WEAKNESS WWIYKK''--NNEHSS
42-61 WEAPON WWEH''--PPUHNN
66-0 WEATHER WWEH''--DHER
12-2 WEDDING WWEH''--DDIYNG
27-7 WEEKEND WWIY''--KKEHNNDD
12-0 WELCOME WWEHLL''--KKUHMM
16-0 WHISKEY HWIHSS''--KKIY
8-4 WHISPER HWIH''--SSPPER
24-1 WIDOW WWIH''--DDAO
8-0 WILLOW WWIH''--LLAO
119-53 WINDOW WWIHNN''--DDAO
6-0 WINDSHIELD WWIHNNDD''--SHIYLLDD
6-3 WINNER WWIH''--NNER
77-2 WINTER WWIHNN''--TTER
42-0 WISDOM WWIHZZ''--DDUHMM
18-19 WITNESS WWIHTT''--NNEHSS
28-6 WONDER WWUHNN''--DDER
5-0 WOODWORK WWUUDD''--WWERKK
8-0 WORKBENCH WWERKK''--BBEHNNCH
30-81 WORKER WWER''--KKER
6-3 WORKOUT WWER''--KKOWTT
18-6 WORKSHOP WWERKK''--SHAAPP
12-15 WORRY WWUH''--RRIY
29-0 WORSHIP WWER''--SHIHPP
71-71 WRITER RRAY''--TTER
8-16 YOUNGSTER YYUHNG''--SSTTER
6-2 ZERO ZZIY''--RRAO

ONE-SYLLABLE VERBS

%%74-11-11 ACT AEKKTT with
88-10-81 ADD AEDD on
22-6-2 AID EYDD
10-3-10 AIM EYMM at
123-17-300 ASK AESSKK for
25-1-21 BACK BBAEKK
7-0-0 BAIL BBEYLL
5-1-1 BAT BBAETT to
%%21-0-0 BEAM BBIYMM at
43-17-0 BEAR BBEYRR with
||25-3-12 BEAT BBIYTT in ||68 beat BBIYTT
%%11-BBEHGG with from
||12-1-14 BEND BBEHNNDD to ||24 bent BBEHNNTT
||14-0-0 BET BBEHTT on ||0 BET BBEHTT
||7-0-1 BID BBIHDD on for ||22 bid BBIHDD
143-0-0 BILL BBIHLL
||7-2-0 BITE BBAYTT ||0 BIT BBIHTT
23-0-5 BLAME BBLLEYMM
7-0-0 BLESS BBLLEHSS
5-0-5 BLOCK BBLLAAKK in
%%||8-5-12 BLOW BBLLAO on ||33 blew BBLLUW
%%7-2-5 BOAST BBAOSSTT of to
7-1-1 BOIL BBOYLL
5-0-2 BOOST BBUWSSTT
7-1-3 BORE BBAWRR
||65-9-66 BREAK BBRREYKK with ||88 broke BBRRAOKK
7-2-9 BREATHE BBRRIYDH in on
||158-39-133 BRING BBRRIYNG in ||158 brought BBRRAWTT
13-0-14 BRUSH BBRRUHSH by
||82-7-21 BUILD BBIHLLDD on for ||103 built BBIHLLTT
10-2-15 BURN BBERNN
9-0-0 BURST BBERSSTT by on
||68-11-32 BUY BBAY from ||70 bought BBAWTT
134-44-165 CALL KKAWLL to for
6-0-3 CALM KKAAMM
%%75-7-9 CARE KKEYRR for
||6-3-4 CAST KKAESSTT in ||0 CAST KKAESSTT
||39-1-54 CATCH KKAECH ||43 caught KKAWTT
52-27-39 CAUSE KKAWZZ
76-10-26 CHANGE CHEYNNJH by at
15-1-17 CHARGE CHARJH to by at
51-1-10 CHECK CHEHKK on in
9-0-4 CHOKE CHAOKK on
||50-8-37 CHOOSE CHUWZZ for ||50 chose CHAOZZ
7-9-11 CITE SSAYTT
28-18-25 CLAIM KKLLEYMM
18-1-3 CLEAN KKLLIYNN
14-1-13 CLEAR KKLLIYRR
11-0-41 CLIMB KKLLAYMM on by
%%||6-3-0 CLING KKLLIYNG on ||0 CLUNG KKLLUHNG
39-6-39 CLOSE KKLLAOZZ
28-1-1 CLOUD KKLLOWDD

24-0-0 COACH KKAOCH
%%||431-135-618 COME KKUHMM with to ||630 came KKEYMM
14-0-2 COOK KKUUKK on with for
7-2-3 COOL KKUWLL
%%21-1-0 COPE KKAOPP with
26-6-11 COUNT KKOWNNTT on up
9-1-11 CRACK KKRRAEKK on
%%4-0-7 CRASH KKRRAESH on
%%9-0-17 CRAWL KKRRAWLL on to by
%%6-1-6 CREAK KKRRIYKK by in
%%||7-1-9 CREEP KKRRIYPP on to ||0 CREPT KKRREHPPTT
25-3-26 CROSS KKRRAWSS by at
%%2-0-10 CROUCH KKRROWCH on
2-0-8 CROWD KKRROWDD
%%18-1-25 CRY KKRRAY on
12-0-1 CURE KKYURR
2-0-6 CURL KKERLL
||87-14-24 CUT KKUHTT ||192 cut KKUHTT
%%17-2-8 DANCE DDAENNSS on with
20-3-7 DARE DDEYRR
5-8-0 DATE DDEYTT
||41-14-8 DEAL DDIYLL with ||0 DEALT DDEHLLT
%%57-9-63 DIE DDAY by on
||9-1-7 DIG DDIHGG in ||10 dug DDUHGG
19-0-0 DIM DDIHMM
%%16-0-9 DOUBT DDOWTT at
10-0-8 DRAG DDRRAEGG to
7-1-3 DRAIN DDRREYNN
||46-14-63 DRAW DDRRAW on with ||56 drew DDRRUW
%%||11-2-1 DREAM DDRRIYMM of ||0 DREAMT DDRREHMMTT
14-0-10 DRESS DDRREHSS
%%3-1-5 DRIFT DDRRIHFFTT to on
16-0-0 DRILL DDRRIHLL
||25-3-18 DRINK DDRRIYNNKK to from ||83 drank DDRRAENNKK
||46-5-58 DRIVE DDRRAYVV on to ||105 drove DDRRAOVV
34-8-76 DROP DDRRAAPP on by
15-1-6 DRY DDRRAY
7-0-5 DUCK DDUHKK
%%8-1-0 DWELL DDWWEHLL by in on
15-2-9 EARN ERNN
%%14-0-2 EASE IYZZ by
||57-2-0 EAT IYTT from with at ||61 ate EYTT
40-13-41 END EHNNDD at
50-12-22 FACE FFEYSS
37-13-52 FAIL FFEYLL
||66-19-87 FALL FFAWLL on by ||147 fell FFEHLL
28-3-10 FEAR FFIYRR for
||45-7-8 FEED FFIYDD on ||123 fed FFEHDD
||201-44-302 FEEL FFIYLL for ||216 felt FFEHLLTT
6-0-0 FETCH FFEHCH
||42-3-23 FIGHT FFAYTT with by ||0 FOUGHT FFAWTT
30-1-12 FILE FFAYLL by
49-5-31 FILL FFIHLL up in
||397-58-0 FIND FFAYNNDD ||397 found FFOWNNDD

10-0-19 FIRE FFAYRR at
%%35-1-0 FISH FFIHSH in with
38-10-5 FIT FFIHTT in
13-0-12 FIX FFIHKKSS
6-0-12 FLASH FFLLAESH by
2-0-5 FLOOD FFLLUHDD
%%13-4-4 FLOW FFLAO on to
||18-3-0 FLY FFLLAY to by ||18 flew FFLLUW
5-0-0 FOOL FFUWLL
24-6-19 FORCE FFAWRRSS
51-5-19 FORM FFAWRRMM by
11-2-2 FREE FFRRIYDD
||5-1-1 FREEZE FFRRIYZZ ||6 froze FFRRAOZZ
23-1-18 GAIN GGEYNN
%%5-1-7 GAZE GGEYZZ at
||742-64-338 GET GGEHTT by ||750 got GGAATT by
||387-114-285 GIVE GGIHVV up to ||391 gave GGEYVV
%%10-0-25 GLANCE GGLLAENNSSDD at
%%1-1-6 GLOW GGLLAO by
%%||613-0-0 GO GGAO to for ||626 WENT WWEHNNTT
12-0-19 GRAB GGRRAEBB at
13-0-7 GRANT GGRRAENNTT to
10-0-5 GRASP GGRRAESSPP at
7-0-15 GREET GGRRIYTT
%%1-0-29 GRIN GGRRIHNN at
||60-22-65 GROW GGRRAO on ||63 grew GGRRUW
8-0-1 GUARD GGARDD
%%52-0-7 GUESS GGEHSS at
18-3-4 GUIDE GGAYDD
7-0-10 HALT HHAWLLTT at
8-0-25 HAND HHAENNDD to
26-4-1 HANG HHAENG on ||26 hung HHUHNG
33-3-18 HATE HHEYTT
13-2-23 HEAD HHEHDD to for
||153-7-129 HEAR HHIYRR of ||153 heard HHERDD
5-0-0 HEAT HHIYTT
7-0-1 HEED HHIYDD
211-27-40 HELP HHEHLLPP
||18-1-6 HIDE HHAYDD at by ||0 HID HHIHDD
15-1-6 HIRE HHAYRR
||38-6-38 HIT HHIHTT ||115 hit HHIHTT
5-0-0 HITCH HHIHCH to
||144-38-0 HOLD HHAOLLDD in up ||0 held HHEHLLDD
%%68-18-33 HOPE HHAOPP for
9-3-4 HOUSE HHOWZZ
5-1-2 HUNT HHUHNNTT for
18-0-18 HURRY HHUHRRIY to by
||15-3-1 HURT HHERTT ||0 HURT HHERTT
63-2-33 JOIN JHOYNN with
15-0-3 JUDGE JHUHJH for
15-1-32 JUMP JHUHMMPP on at
||257-19-115 KEEP KKIYPP in ||264 kept KKEHPPTT
4-1-10 KICK KKIHKK at
60-6-34 KILL KKIHLL

9-1-15 KISS KKIHSS
%%||5-1-7 KNEEL NNIYLL at by ||0 KNELT NNEHLLTT
11-1-17 KNOCK NNAAKK at
||674-99-394 KNOW NNAO of ||683 knew NNUW
13-6-15 LACK LLAEKK
9-1-12 LAND LLAENNDD at by
9-1-46 LAUGH LLAEFF at with
7-2-3 LAUNCH LLAWNNCH
%%||48-5-24 LAY LLEY on by ||0 LAID LLEYDD
||81-31-82 LEAD LLIYDD in ||129 led LLEHDD
%%7-1-37 LEAN LLIYNNDD to on
%%||8-1-2 LEAP LLIYPP at on ||0 LEAPT LLEHPPTT
%%83-10-54 LEARN LLERNN of from
||191-26-157 LEAVE LLIYVV from ||205 left LLEHFFTT
||13-4-3 LEND LLEHNNDD to ||5 lent LLEHNNTT
%%||335-5-36 LET LLEHTT in ||384 let LLEHTT
%%50-41-5 LIE LLAY to for
18-1-34 LIFT LLIHFFTT up
||10-1-9 LIGHT LLAYTT up ||17 lit LLIHTT
210-18-45 LIKE LLAYKK
4-1-7 LINE LLAYNN up
7-5-11 LIST LLIHSSTT on
%%154-29-72 LIVE LLIHVV with for
2-0-9 LOCK LLAAKK up in
%%302-69-326 LOOK LLUUKK at to
||57-12-49 LOSE LLUWZZ ||58 lost LLAWSSTT
53-17-45 LOVE LLUHVV
5-0-3 MAIL MMEYLL
||791-168-466 MAKE MMEYKK up ||794 made MMEYDD
%%10-3-6 MARCH MMAARRCH on to
18-14-15 MARK MMAARRKK up
26-4-2 MATCH MMAECH with
||141-31-80 MEET MMIYTT with ||132 met MMEHTT
10-2-1 MERGE MMERJH with
38-0-1 MIND MMAYNNDD
20-3-17 MISS MMIHSS
11-0-1 MIX MMIHKKSS with in
133-26-138 MOVE MMUWVV to
6-0-3 NAIL NNEYLL in
21-1-13 NAME NNEYMM
160-57-57 NEED NNIYDD
53-4-27 NOTE NNAOTT
10-5-12 OWE AO to
22-13-15 OWN AONN
4-0-10 PACE PPEYSS on
11-0-7 PACK PPAEKK up in
19-4-9 PAINT PPEYNNTT on
%%9-0-1 PANT PPAENNTT at
1-0-8 PARK PPAARRKK at by
64-16-91 PASS PPAESS in by
%%5-1-25 PAUSE PPAWZZ by
||130-17-50 PAY PPEY to with ||172 paid PPEYDD
5-2-3 PHONE FFAONN from
49-3-51 PICK PPIHKK up on at

3-1-7 PILE PPAYLL up on
%%8-0-0 PINE PPAYNN for
74-8-25 PLACE PPLLEYSS
29-11-19 PLAN PPLLAENN on for
4-0-5 PLANT PPLLAENNTT by
110-34-65 PLAY PPLLEY by at with
%%5-1-7 PLEAD PPLLIYDD for to
46-2-11 PLEASE PPLLIYZZ
%%1-1-10 PLUNGE PPLLUHNNJH in
26-19-48 POINT PPOYNNTT at to
9-1-3 POSE PPAOZZ on by
7-2-0 POUR PPAWRR on
%%12-0-8 PRAY PPRREY with to
%%8-1-6 PREACH PPRRIYCH to on
27-2-12 PRESS PPRREHSS
4-0-9 PRINT PPRRIHNNTT on
5-0-3 PROBE PPRRAOBB in
53-16-48 PROVE PPRRUWVV to
6-0-0 PRY PPRRAY in
39-8-54 PULL PPUWLL at in
30-2-31 PUSH PPUUSH on
%%||196-20-130 PUT PPUUTT on ||437 put PPOOTT
12-1-0 QUIT KKWWIHTT
15-4-8 QUOTE KKWWAOTT from
47-13-42 RAISE RREYZZ up
91-21-106 REACH RRIYCH for
||89-15-36 READ RRIYDD with to by ||173 read RREHDD
3-0-7 REAR RRIYRR at
12-0-0 RENT RREHNNTT from
24-16-12 REST RREHSSTT by
||32-4-40 RIDE RRAYDD to in ||0 RODE RRAODD
||7-1-21 RING RRIYNG at in ||47 rang RRAENG
5-0-5 RIP RRIHPP
||48-17-0 RISE RRAYZZ with ||102 rose RRAOZZ
11-0-2 RISK RRIHSSKK for
6-0-1 ROAM RRAOMM by
18-2-34 ROLL RRAOLL on
6-0-5 ROUND RROWNNDD
7-3-13 RULE RRUWLL on for
%%||126-16-134 RUN RRUHNN on by ||55 ran
3-2-20 RUSH RRUHSH to
6-0-7 SAIL SSEYLL on
53-4-11 SAVE SSEYVV up
16-0-8 SCORE SSKKAWRR
%%7-0-14 SCREAM SSKKRRIYMM at for to
5-0-1 SCREEN SSKKRRIYNN
6-0-0 SCRUB SSKKRRUHBB with
8-2-7 SEARCH SSERCH for
||771-35-337 SEE SSIY to ||772 saw
69-9-0 SEEK SSIYKK for
5-0-12 SEIZE SSIYZZ
||39-13-20 SELL SSEHLL to ||41 sold SSAOLLDD
||73-4-69 SEND SSEHNNDD to ||74 sent SSEHNNTT
10-3-16 SENSE SSEHNNSS

107-37-52 SERVE SSERVV with to
||92-14-71 SET SSEHTT up ||414 set SSEHTT
||15-4-57 SHAKE SHEYKK at ||17 shook SHOOKK
6-4-3 SHAPE SHEYPP
40-4-19 SHARE SHEYRR in
6-0-4 SHAVE SHEYVV with
15-2-12 SHIFT SHIHFFTT with
%%||2-4-5 SHINE SHAYNN on ||5 shone SHAONN
6-0-1 SHIP SHIHPP to
||26-0-18 SHOOT SHUWTT to at ||0 SHOT SHAATT
%%7-0-0 SHOP SHAAPP in for
%%5-3-36 SHOUT SHOWTT at for to
202-72-138 SHOW SHAO in
||5-2-1 SHRINK SHRRIYNNKK from ||0 SHRANK SHRRAENNKK
||15-1-7 SHUT SHUHTT on in ||46 shut SHUHTT
%%380-0-0 SIDE SSAYDD with
18-2-15 SIGN SSAYNN on
%%||27-9-28 SING SSIYNG for with ||34 sang SSAENG
||11-0-18 SINK SSIYNNKK in ||6 sank SSAENKK
%%||66-6-139 SIT SSIHTT on with ||67 sat SSAETT
||31-1-18 SLEEP SSLLIYPP at with ||65 slept SSLLEHPPTT
||8-0-24 SLIDE SSLLAYDD on ||24 slid SSLLIHDD
%%7-1-26 SLIP SSLLIHPP on
8-0-12 SLOW SSLLAO
9-7-15 SMELL SSMMEHLL of
%%10-3-68 SMILE SSMMAYLL at
8-1-6 SMOKE SSMMAOKK
6-0-4 SMOOTH SSMMUWDH
%%11-0-16 SNAP SSNNAEPP at
7-0-1 SOAK SSAOKK in
18-2-1 SOLVE SSAALLVV
5-0-1 SORT SSAWRRTT
8-1-3 SPARE SSPPEYRR
||110-17-86 SPEAK SSPPIYKK to of ||18 spoke SSPPAOKK
||5-1-9 SPEED SSPPIYDD on by ||83 sped SSPPEHDD
5-2-1 SPELL SSPPEHLL
||53-8-40 SPEND SSPPEHNNDD on ||53 spent SSPPEHNNTT
||4-0-14 SPIN SSPPIHNN on ||5 spun SSPPUHNN
%%||6-0-3 SPIT SSPPIHTT at on ||0 SPIT SSPPIHTT
||2-1-5 SPLIT SSPPLLIHTT from ||30 split SSPPLLIHTT
||27-9-0 SPREAD SSPPRREHDD on ||83 spread SSPPRREHDD
%%||6-1-13 SPRING SSPPRRIYNG at ||127 sprang SSPPRRAENG
8-0-8 SQUEEZE SSKKWNIYZZ by
%%5-0-2 STAMP SSTTAEMMPP on at
%%||108-48-198 STAND SSTTAENNDD for on by ||148 stood SSTTOODD
%%9-0-58 STARE SSTTEYRR at
102-21-139 START SSTTAARRTT from
%%20-17-38 STATE SSTTEYTT to
%%97-3-60 STAY SSTTEY at with
||5-1-10 STEAL SSTTIYLL from ||10 stole SSTTAOLL
5-14-0 STEM SSTTEHMM from
%%20-1-0 STEP SSTTEHPP in by
||16-3-13 STICK SSTTIHKK on to ||0 STUCK SSTTUHKK
13-0-0 STILL SSTTIHLL

7-3-0 STIR SSTTER in
94-2-103 STOP SSTTAAPP at by
7-0-1 STORE SSTTAWRR
11-4-11 STRESS SSTTRREHSS to
7-4-21 STRETCH SSTTRREHCH on
||22-8-40 STRIKE SSTTRRAYKK at ||50 struck SSTTRRUHKK
5-0-7 STRIP SSTTRRIHPP
%%7-3-0 STRIVE SSTTRRAYVV for
8-0-0 STUN SSTTUHNN
12-1-2 SUE SSUW
8-1-3 SUIT SSUWTT
1-0-7 SWAY SSWWEY by
%%||10-2-13 SWEAR SSWWEYRR at ||0 SWORE SSWWAORR
||7-0-19 SWEEP SSWWIYPP up ||0 SWEPT SSWWEHPPTT
||10-0-6 SWIM SSWWIHMM in ||15 swam SSWWAEMM
5-1-10 SWITCH SSWWIHCH with
||604-85-0 TAKE TTEYKK from ||604 took TTUHKK
%%114-3-41 TALK TTAWKK of
9-0-0 TAN TTAENN
10-0-2 TAP TTAEPP at
35-0-0 TAPE TTEYPP up
12-0-0 TAR TTAR
5-4-7 TASTE TTEYSSTT of from
5-0-1 TAX TTAEKKSS
||41-11-19 TEACH TTIYCH with to ||41 taught TTAWTT
||9-0-14 TEAR TTEYRR ||11 tore TTAWRR
||262-34-286 TELL TTEHLL to on ||268 told TTAOLLDD
43-34-15 TEND TTEHNNDD to
18-1-3 TEST TTEHSSTT
35-0-5 THANK THAENNKK
||433-23-340 THINK THIYNNKK for of ||433 thought THAWTT
||35-5-46 THROW THRRAO to at ||42 threw THRRUW
9-2-13 TIE TTAY in
2-2-6 TILT TTIHLLTT on to
5-0-1 TOAST TTAOSSTT
6-0-22 TOSS TTAWSS at by to
32-5-24 TOUCH TTUHCH up
7-1-2 TRACE TTRREYSS
13-1-3 TRADE TTRREYDD with
2-0-6 TRAIL TTRREYLL on
10-1-2 TRAIN TTRREYNN with
20-1-0 TRAP TTRRAEPP
24-12-11 TREAT TTRRIYTT
11-0-0 TRIM TTRRIHMM
6-0-5 TROT TTRRAATT on
23-2-2 TRUST TTRRUHSSTT in
136-8-120 TRY TTRRAY with
144-29-253 TURN TTERNN from on
5-0-12 TWIST TTWWIHSSTT on
13-6-21 URGE ERJH
228-32-137 USE YUZZ
18-2-2 VIEW VVYU
%%26-3-22 VOTE VVAOTT for
%%82-2-68 WAIT WWEYTT for on

||16-1-14 WAKE WWEYKK up ||23 woke WWAOKK
66-7-143 WALK WWAWKK on to
318-63-204 WANT WWAANNTT
11-3-14 WARN WWAWRRNN
10-0-10 WASH WWAASH
8-0-5 WASTE WWEYSSTT
53-1-68 WATCH WWAACH for
2-0-16 WAVE WWEYVV at to
||32-5-65 WEAR WWEYRR ||36 wore WWAWRR
%%||13-0-7 WEEP WWIYPP at for ||0 WEPT WWEHPPTT
10-0-7 WHEEL HWIYLL in
5-0-7 WHIP HWIHPP up
2-0-6 WHIRL HWERLL on
||53-5-45 WIN WWIHNN at ||55 won WWUHNN
||7-3-7 WIND WWAYNNDD up ||21 wound WWOWNNDD
10-0-11 WIPE WWAYPP up
42-0-4 WIRE WWAYRR
%%87-13-52 WISH WWIHSH for
179-34-76 WORK WWERKK on
5-0-2 WRAP RRAEPP up
||106-40-179 WRITE RRAYTT to of ||106 wrote RRAOTT
%%3-0-21 YELL YYEHLL at to
16-5-7 YIELD YYIYLLDD to

TWO-SYLLABLE VERBS

6-2-0 ABIDE UH--BBAYDD'' by
13-1-2 ABSORB AEBB--ZZAWRRBB''
72-6-28 ACCEPT AEKK--SSEHPPTT''
10-2-5 ACCUSE UH--KKYUZZ''
51-5-12 ACHIEVE UH--CHIYVV''
27-2-8 ACQUIRE UH--KKWWAYRR''
5-0-1 ADAPT UH--DDAEPPTT'' to
8-4-7 ADDRESS AE--DDRREHSS''
16-2-3 ADJUST AE--JHUHSSTT'' to
10-1-9 ADMIRE AEDD--MMAYRR''
37-2-0 ADMIT AEDD--MMIHTT ''
13-2-11 ADOPT AE--DDAAPPTT''
15-1-9 ADVANCE AEDD--VVAENNSS'' with to
8-2-17 ADVISE AEDD--VVAYZZ''
32-18-4 AFFECT AE--FFEHKKTT''
12-1-4 AFFIRM AE--FFERMM''
40-5-4 AFFORD AE--FFAWRRDD'
%%51-11-52 AGREE UH--GGRRIY'' with
5-1-1 ALERT UH--LLERTT''
15-1-2 ALTER AWLL''--TTER
18-3-53 ANNOUNCE UH--NNOWNNSS''
43-8-47 ANSWER AENN''--SSER for
10-1-10 APPEAL UH--PPIYLL'' to
%%117-84-118 APPEAR UH--PPIYRR'' at to
5-0-1 APPLAUD UH--PPLLAWDD'' for
56-19-22 APPLY UH--PPLLAY'' to
6-1-8 APPOINT UH--PPOYNNTT''
15-8-32 APPROACH UH--PPRRAOCH''
14-1-12 APPROVE UH--PPRRUWVV'' of
%%29-9-17 ARGUE AR''--GGYU with at
%%||28-14-18 ARISE UH--RRAYZZ'' from ||0 AROSE UH--RRAOZZ''
5-2-5 AROUSE UH--RROWZZ''
10-1-11 ARRANGE UH--RREYNNJH'' for
6-0-4 ARREST UH--RREHSSTT''
%%24-0-43 ARRIVE UH--RRAYVV with
19-5-11 ASSERT UH--SSERTT''
6-0-0 ASSESS UH--SSEHSS''
18-4-2 ASSIGN UH--SSAYNN'' to
21-0-3 ASSIST UH--SSIHSSTT'' with
14-2-3 ATTACH UH--TTAECH''
24-3-12 ATTACK UH--TTAEKK
52-6-24 ATTEND UH--TTEHNNDD'' to
19-3-11 ATTRACT UH--TTRRAEKKTT''
58-3-7 AVOID UH--VVOYDD''
9-3-6 AWAIT UH--WWEYTT''
8-0-1 BALANCE BBAE''--LLAENNSS on
||296-104-246 BECOME BBIY--KKEYMM'' ||0 BECAME BBIY--KKEYMM''
200-43-52 BELIEVE BBIY--LLIYVV'' in
%%36-22-14 BELONG BBIY--LLAWNG'' to
4-3-6 BETRAY BBIY--TTRREY
9-1-5 BORROW BBAA''--RRAO from
22-3-7 BOTHER BBAA''--DHER with

15-1-0 BOTTLE BBAA''--TTUHLL up
8-2-3 BROADEN BBRRAW''--DDEHNN
5-1-3 BURY BBEH''--RRIY
10-0-0 BUTTON BBUH''--TTUHNN up on
%%5-0-4 CAMPAIGN KKAEMM--PPEYNN'' for
7-1-1 CANCEL KKAENN''--SSEHLL
13-1-2 CAPTURE KKAEPP''--CHUWRR
88-22-60 CARRY KKAE''--RRIY in
9-7-5 CENTER SSEHNN''--TTER
14-3-4 CHALLENGE CHAE''--LLEHNNJH
5-0-4 CHERISH CHEH''--RRIHSH
2-0-9 CIRCLE SSER''--KKUHLL by
5-0-1 CLUSTER KKLLUH''--SSTTER by
%%1-0-10 COLLAPSE KKUH--LLAEPPSS on at by
16-4-7 COLLECT KKAO--LLEHKKTT'' from
5-3-0 COLOR KKUH''--LLER
15-7-6 COMBINE KKAAMM--BBAYNN'' with
10-3-10 COMMAND KKAA--MMAENNDD''
7-1-1 COMMEND KKAA--MMEHNNDD''
%%7-1-16 COMMENT KKAA''--MMEHNNTT to on
15-2-0 COMMIT KKAA--MMIHTT''
10-2-1 COMMUTE KKAA--MMYUTT'' with to
28-5-10 COMPARE KKAAMM--PPEYRR'' with
%%23-1-2 COMPETE KKAAMM--PPIYTT'' with for
%%11-3-21 COMPLAIN KKAAMM--PPLLEYNN'' to of
19-5-6 COMPLETE KKAAMM--PPLLIYTT''
5-0-2 COMPLY KKAAMM--PPLLAY'' with
6-2-4 COMPOSE KKAAMM--PPAOZZ'' for
7-2-0 COMPUTE KKAAMM--PPYUTT''
7-2-1 CONCEAL KKAANN--SSIYLL'' from
5-0-5 CONCEDE KKAANN--SSIYDD'' to
14-2-7 CONCEIVE KKAANN--SSIYVV'' of
16-4-21 CONCLUDE KKAANN--KKLLUWDD'' by at
20-3-14 CONDUCT KKAANN--DDUHKKTT''
11-3-6 CONFESS KKAANN--FFEHSS'' to for
16-3-8 CONFIRM KKAANN--FFERMM''
%%10-5-1 CONFORM KKAANN--FFAWRRMM'' to
8-5-5 CONFRONT KKAANN--FFRRUHNNTT''
5-1-4 CONFUSE KKAANN--FFYUZZ''
%%17-43-22 CONSIST KKAANN--SSIHSSTT'' of
12-0-2 CONSTRUCT KKAANN--SSTTRRUHKKTT'' by for
11-0-6 CONSULT KKAANN--SSUHLLTT'' with
45-38-35 CONTAIN KKAANN--TTEYNN''
%%6-5-6 CONTEND KKAANN--TTEHNNDD'' with
6-4-4 CONTRACT KKAANN--TTRRAEKKTT'' with for
5-2-0 CONTRAST KKAANN--TTRRAESSTT'' with
28-5-0 CONTROL KKAANN--TTRRAOLL''
9-0-2 CONVERT KKAANN--VVERTT''
13-4-3 CONVEY KKAANN--VVEY'' to at
12-0-3 CORRECT KKAO--RREHKKTT''
53-15-14 COVER KKUH''--VVER up
5-2-5 DAMAGE DDAE''--MMAEJH
%%39-12-0 DECIDE DDIH--SSAYDD on
8-11-52 DECLARE DDIY--KKLLEYRR'' to

7-4-15 DECLINE DDIY--KKLLAYNN''
12-0-1 DEDUCT DDIY--DDUHKKTT'' from
7-0-5 DEFEAT DDIY--FFIYTT''
20-2-9 DEFEND DDIY--FFEHNNDD''
19-5-1 DEFINE DDIY--FFAYNN''
7-0-2 DEFY DDIY--FFAY''
8-1-6 DELAY DDIY--LLEY''
5-1-2 DENOUNCE DDIY--NNOWNNSS''
46-6-10 DENY DDIY--NNAY''
%%7-1-5 DEPART DDIY--PPARTT'' from with
%%45-46-9 DEPEND DDIY--PPEHNNDD'' on
13-9-1 DERIVE DDIY--RRAYVV''
41-22-28 DESCRIBE DDEH--SSKKRRAYBB''
12-0-10 DESERVE DDIY--ZZERVV
4-2-9 DESIGN DDIY--ZZAYNN
11-4-9 DESIRE DDIY--SSAYRR''
7-1-2 DESPISE DDIH--SSPPAYZZ''
48-0-8 DESTROY DDIH--SSTTRROY''
10-0-0 DETECT DDIY--TTEHKKTT''
8-0-2 DEVISE DDIY--VVAYZZ''
15-0-14 DEVOTE DDIY--VVAOTT''
%%18-10-12 DIFFER DDIH''--FFER from
14-5-10 DIRECT DDAY--RREHKKTT''
9-1-7 DISCLOSE DDIHSS--KKLLAOZZ''
28-0-18 DISCUSS DDIH--SSKKUHSSDD with
7-3-11 DISLIKE DDIHSS--LLAYKK
5-1-7 DISMISS DDIH--SSMMIHSS''
12-6-8 DISPLAY DDIH--SSPPLLEY'' to
%%5-0-4 DISPOSE DDIH--SSPPAOZZ'' with
5-1-2 DISRUPT DDIHSS--RRUHPPTT''
5-0-0 DISSOLVE DDIH--ZZAALLVV'' in at
10-0-4 DISTURB DDIH--SSTTERBB''
14-6-11 DIVIDE DDIH--VVAYDD''
6-0-2 DIVORCE DDIH--VVAWRRSS''
5-0-0 DOUBLE DDUH''--BBUHLL
8-0-2 ELECT IY--LLEHKKTT''
%%5-0-1 EMBARK EHMM--BBARKK'' from
8-3-4 EMBRACE EHMM--BBRREYSS''
%%17-9-23 EMERGE IY--MMERJH'' from
9-9-6 EMPLOY EHMM--PPLLOY''
7-0-2 ENACT EH--NNAEKKTT''
6-0-1 ENDORSE EHNN--DDAWRRSS''
8-2-4 ENDURE EHNN--DDUWRR
8-1-0 ENFORCE EHNN--FFAWRRSS''
14-1-5 ENGAGE EHNN--GGEYJH''
5-1-0 ENHANCE EHNN--HHAENNSS''
44-10-36 ENJOY EHNN--JHOY''
7-0-1 ENLARGE EHNN--LLARJH''
5-1-5 ENLIST EHNN--LLIHSSTT'' in
5-0-0 ENRICH EHNN--RRIHCH''
5-0-2 ENROLL EHNN--RRAOLL'' in
8-1-0 ENSURE EHNN--SHUWRR''
78-13-76 ENTER EHNN''--TTER
6-7-0 EQUAL IY''--KKWWAALL

5-0-3 ERECT IY--RREHKKTT''
44-2-8 ESCAPE EH--SSKKEYPP'' from
28-0-0 EVEN IY''--VVEHNN
6-5-2 EVOKE IY--VVAOKK''
%%5-1-2 EVOLVE IY--VVAALLVV'' from
18-10-2 EXCEED EHKK--SSIYDD''
7-3-0 EXCLUDE EHKK--SSKKLLUWDD''
6-1-2 EXCUSE EHKK--SSKKUWZZ''
11-3-3 EXERT EHKK--ZZERTT''
%%59-42-27 EXIST EHKK--ZZIHSSTT'' for with
13-2-7 EXPAND EHKK--SSPPAENNDD'' with
108-22-30 EXPECT EHKK--SSPPEHKKTT''
63-19-61 EXPLAIN EHKK--SSPPLLEYNN'' to for
6-1-4 EXPLODE EHKK--SSPPLLAODD'' by in
8-0-2 EXPLOIT EHKK--SSPPLLOYTT''
12-1-2 EXPLORE EHKK--SSPPLLAWRR'' in by
7-2-4 EXPOSE EHKK--SSPPAOZZ''
29-12-12 EXTEND EHKK--SSTTEHNNDD''
5-1-2 EXTRACT EHKK--SSTTRRAEKKTT''
23-4-0 FAVOR FFEY''--VVAWRR
7-5-3 FEATURE FFIY''--CHUWRR
20-3-15 FIGURE FFIH''--GGYURR
18-0-0 FINANCE FFAY''--NNAENNSS
24-0-31 FINISH FFIH--NNIHSH
12-2-6 FOCUS FFAO''--KKUHSS at on
97-75-91 FOLLOW FFAA''--LLAO
||53-0-17 FORGET FFAWRR--GGEHTT ||54 forgot FFAWRR--GGAATT
||24-0-2 FORGIVE FFAWRR--GGIHVV'' ||0 FORGAVE FFAWRR--GGEYVV''
11-0-2 FRIGHTEN FFRRAY''--TTEHNN
9-2-3 FULFILL FFUULL--FFIHLL''
6-4-2 FUNCTION FFUHNNKK''--SHUHNN with
29-5-4 FURNISH FFER''--NNIHSH
8-0-2 FURTHER FFER''--DHER
19-1-22 GATHER GGAE''--DHER in
7-2-1 GOVERN GGUH''--VVERNN
%%5-0-0 GRUMBLE GGRRUHMM''--BBUHLL at to
34-0-0 HANDLE HHAENN''--DDUHLL
13-1-2 HONOR AA''--NNER
19-5-13 IGNORE IHGG--NNAWRR''
13-16-5 IMPLY IHMM--PPLLAY'' to
9-4-4 IMPOSE IHMM--PPAOZZ'' on
39-0-7 IMPROVE IHMM--PPRRUWVV
113-45-41 INCLUDE IHNN--KKLLUWDD''
5-1-0 INCUR IHNN-KKER''
9-3-1 INDUCE IHNN--DDUWSS''
9-0-5 INDULGE IHNN--DDUHLLJH'' in
7-6-22 INFORM IHNN--FFAWRRMM on
6-0-1 INJECT IHNN--JHEHKKTT''
%%6-0-14 INQUIRE IHNN--KKWWAYRR'' at of by
9-0-5 INSERT IHNN--SSERTT''
%%27-10-39 INSIST IHNN--SSIHSSTT'' on to
12-0-1 INSPECT IHNN--SSPPEHKKTT''
8-0-5 INSTALL IHNN--SSTTAWLL''
24-1-1 INSURE IHNN--SHUWRR''

5-1-1 INVADE IHNN--VVEYDD''
7-0-5 INVENT IHNN--VVEHNNTT''
10-7-11 INVITE IHNN--VVAYTT''
31-40-23 INVOLVE IHNN--VVAALLVV''
14-3-20 ISSUE IH''--SHUW to
5-1-3 LESSEN LLEH''--SSUHNN
17-4-0 LIMIT LLIH''--MMIHTT
%%7-2-2 LINGER LLIY''--NGER at
%%49-2-29 LISTEN LLIH''--SSEHNN to with
16-0-4 LOCATE LLAO''--KKEYTT
7-0-10 LOWER LLAO''--WWER
60-16-13 MAINTAIN MMEYNN--TTEYNN''
20-4-23 MANAGE MMAE''--NNIHJH
18-3-22 MARRY MMAE''--RRIY
7-0-1 MASTER MMAE''--SSTTER
28-3-7 MEASURE MMEH''--ZHUWRR
33-6-18 MENTION MMEHNN''--SHUHNN
11-0-1 MUFFLE MMUH''--FFUHLL
29-0-28 NOTICE NNAO--TTIHSS''
8-1-5 OBEY AO--BBEY''
12-2-0 OBJECT AABB--JHEHKKTT to
6-1-2 OBSCURE AABB--SSKKYURR''
25-8-15 OBSERVE AABB--ZZERVV''
42-0-8 OBTAIN AABB--TTEYNN'' from
%%43-27-0 OCCUR AA--KKER by
68-43-43 OFFER AW''--FFER to
7-0-0 OFFSET AWFF''--SSEHTT
54-16-94 OPEN AO''--PPEHNN up
15-2-9 OPPOSE UH--PPAOZZ''
17-1-28 ORDER AWRR''--DDER for
13-3-3 PERCEIVE PPER--SSIYVV''
29-4-11 PERFORM PPER--FFAWRRMM'' with
17-0-6 PERSUADE PPER--SSWWEYDD''
46-0-0 POCKET PPAA''--KKEHTT
4-0-3 POLISH PPAA''--LLIHSH up
6-5-0 PORTRAY PPAWRR--TTRREY''
17-8-18 POSSESS PPAO--ZZEHSS''
7-0-1 POSTPONE PPAOSSTT--PPAONN''
%%12-1-2 PRACTICE PPRRAEKK''--TTIHSS with
8-3-5 PREDICT PPRRIY--DDIHKKTT''
27-5-0 PREFER PPRRIY--FFER''
35-4-12 PREPARE PPRRIY--PPEYRR''
5-1-2 PRESCRIBE PPRRIY--SSKKRRAYBB'' to
39-27-16 PRESENT PPRREH''--ZZEHNNTT to
31-0-2 PRESERVE PPRRIY--ZZERVV
%%7-7-7 PREVAIL PPRRIY--VVEYLL'' on
83-10-11 PREVENT PPRRIY--VVEHNNTT''
%%18-6-22 PROCEED PPRRAO--SSIYDD'' to
%%13-4-5 PROCLAIM PPRRAO--KKLLEYMM'' to
73-19-28 PRODUCE PPRRAO--DDUWSS''
5-0-0 PROGRAM PPRRAO''--GGRRAEMM
12-4-2 PROJECT PPRRAO--JHEHKKTT'' to
32-4-1 PROMOTE PPRRAO--MMAOTT''
13-7-19 PROPOSE PPRRAO--PPAOZZ'' to

33-4-5 PROTECT PPRRAO--TTEHKKTT''
%%6-3-11 PROTEST PPRRAO--TTEHSSTT'' to at
216-81-29 PROVIDE PPRRAO--VVAYDD'' for
11-2-4 PURCHASE PPER''--CHAESS
20-2-3 PURSUE PPER--SSUW''
%%6-1-2 QUARREL KKWWAA''--RREHLL with
17-1-8 QUESTION KKWWEHSS''--JHUHNN
5-1-1 RALLY RRAE''--LLIY to
||5-1-0 REBUILD RRIY--BBIHLLDD'' ||0 REBUILT RRIY--BBIHLLTT'
6-0-0 REBUT RRIY--BBUHTT''
35-12-19 RECALL RRIY--KKAWLL''
76-20-65 RECEIVE RRIY--SSIYVV'' from
%%7-1-0 RECKON RREH''--KKAANN with on
11-4-0 RECORD RREH--KKAWRRDD on
9-0-1 RECRUIT RRIY--KKRRUWTT'' from
62-7-10 REDUCE RRIY--DDUWSS''
27-18-0 REFER RRIY--FFER'' to
25-23-13 REFLECT RRIY--FFLLEHKKTT'' on
%%6-0-1 REFRAIN RRIY--FFRREYNN'' from
15-5-44 REFUSE RRIY--FFYUZZ''
36-5-12 REGARD RRIY--GGARDD''
6-1-0 REGRET RRIY--GGRREHTT''
10-11-12 REJECT RRIY--JHEHKKTT''
%%19-3-6 RELAX RRIY--LLAEKKSS with
9-0-7 RELEASE RRIY--LLIYSS
13-2-3 RELIEVE RRIY--LLIYVV''
%%13-4-2 RELY RRIY--LLAY'' on
%%92-72-84 REMAIN RRIY--MMEYNN'' with
15-8-19 REMIND RRIY--MMAYNNDD''
58-5-11 REMOVE RRIY--MMUWVV'' from
5-0-2 REPAIR RRIY--PPEYRR''
7-0-0 REPAY RRIY--PPEY''
23-4-18 REPEAT RRIY--PPIYTT''
8-1-0 REPEL RRIY--PPEHLL''
30-0-12 REPLACE RRUH--PPLLEYSS
%%14-2-55 REPLY RRIY--PPLLAY'' to
37-13-51 REPORT RRIY--PPAWRRTT'' to
7-2-0 REQUEST RREH--KKWWEHSSTT of
86-55-31 REQUIRE RRIY--KKWWAYRR'' of
6-0-1 RESCUE RREH''--SSKKYU
8-0-5 RESENT RRIY--ZZEHNNTT''
7-1-3 RESERVE RRIY--ZZERVV''
22-1-4 RESIST RRIY--ZZIHSSTT''
11-2-3 RESOLVE RRIY--ZZAALLVV''
5-3-5 RESPECT RRIY--SSPPEHKKTT''
%%21-7-13 RESPOND RRIY--SSPPAANNDD'' to
10-1-0 RESTRAIN RRIY--SSTTRREYNN''
10-0-12 RESUME RRIY--ZZUWMM''
11-9-4 RETAIN RRIY--TTEYNN''
9-2-10 RETIRE RRIY--TTAYRR'' to
74-8-81 RETURN RRIY--TTERNN'' from
29-21-21 REVEAL RRIY--VVIYLL'' to
11-2-0 REVERSE RRIY--VVERSS''
10-3-3 REVIEW RRIY--VVYU''

5-0-5 REVISE RRIY--VVAYZZ''
8-0-3 REVIVE RRIY--VVAYVV''
5-0-0 RUIN RRUW''--IHNN
%%8-0-0 SECEDE SSEH--SSIYDD'' from
373-0-0 SECOND SSEH''--KKUHNNDD
16-0-1 SECURE SSEH--KKYURR''
18-5-8 SELECT SSEH--LLEHKKTT'' from
23-2-31 SETTLE SSEH''--TTUHLL with
%%5-0-5 SHUDDER SHUH''--DDER at
5-0-0 SINNER SSIH''--MMER in
7-3-7 SPONSOR SSPPAANN''--SSER
5-0-0 SPRINKLE SSPPRRIYNN''--KKUHLL in
7-1-15 STRAIGHTEN SSTTRREY''--TTEHNN
16-4-1 STRENGTHEN SSTTRREHNN''--DHEHNN
%%7-0-0 STRUGGLE SSTTRRUH''--GGUHLL with
40-1-34 STUDY SSTTUH''--DDIY with
18-3-0 SUBMIT SSUHBB--MMIHTT'' to
13-8-18 SUCCEED SSUHKK--SSIYDD'' with at
%%33-5-22 SUFFER SSUH''--FFER at
%%5-0-0 SUFFICE SSUH--FFAYSS for
54-29-49 SUGGEST SSUHGG--JHEHSSTT'' to
43-11-9 SUPPLY SSUH--PPLLAY'' to
54-8-17 SUPPORT SSUH--PPAWRRTT''
6-0-1 SUPPRESS SSUH--PPRREHSS''
5-0-9 SURPRISE SSER--PPRRAYZZ''
5-0-4 SURROUND SSER--RROWNNDD''
33-1-5 SURVIVE SSER--VVAYVV''
20-4-12 SUSPECT SSUH--SSPPEHKKTT''
14-1-1 SUSTAIN SSUH--SSTTEYNN''
5-0-6 SWALLOW SSWWAA''--LLAO
11-5-15 THREATEN THRREH''--TTEHNN
6-3-6 TOTAL TTAO''--TTUHLL up in
6-1-0 TRANSFER TTRRAENNZZ--FFER'' to
7-3-4 TRANSFORM TTRRAENNZZ--FFAWRRMM''
15-1-1 TRANSLATE TTRRAENN''--SSLLEYTT from for
%%28-1-13 TRAVEL TTRRAE''--VVUHLL with to
%%10-0-0 TREMBLE TTRREHMM''--BBUHLL at
1-0-7 TUMBLE TTUHNM''--BBUHLL on
7-1-0 UNLOAD UHNN--LLAODD''
7-0-0 UPHOLD UHPP--HHAOLLDD''
%%5-1-9 VANISH VVAE''--NNIHSH from
34-11-7 VARY VVEY''--RRIY with
6-0-2 VENTURE VVEHNN''--CHUWRR by
50-1-0 VISIT VVIH''--ZZIHTT by at
7-2-7 WANDER WWAENN''--DDER to
7-1-1 WEAKEN WWIY''--KKEHNN at
15-1-6 WELCOME WWEHLL''--KKUHMM
5-1-2 WIDEN WWAY''--DDEHNN
8-0-0 WITHDRAW WWIHDH--DDRRAW'' to from
9-0-7 WITNESS WWIHTT''--NNEHSS
%%38-2-55 WONDER WWUHNN''--DDER at
43-5-7 WORRY WWUH''--RRIY
5-0-1 WORSHIP WWER''--SHIHPP

AUXILIARY VERBS

1772 can KKAENN
1599 could KKUUDD
1400 may MMEY
1013 must MMUHSSTT
888 should SHUUDD
2244 will WWIHLL
2714 would WWUUDD

ARTICLES

69971 the DHUH
23237 a UH
1319 my MMAY
923 your YYAWRR
6997 his HHIHZZ
3037 her HHER
1252 our OWRR
2670 their DHEYRR
1.0 5378 at AETT

PREPOSITIONS

5305 by BBAY
9489 for FFAWRR
4369 from FFRRUHMM
21341 in IHNN
36411 of AAVV
6742 on AANN
26149 to TTUW
1895 up UHPP
7289 with WWIHDH

APPENDIX B

Lists of Nonsense Sentences Recorded by Speakers

The following sections contain a list of the sentences recorded clearly and conversationally by each of the three speakers. Each list has a speaker number (MM-1, MP-2, MS-3), and a test list number (1-14). The first 8 lists for each speaker were used in the intelligibility tests described in Picheny, Durlach, and Braida (1981a).

SPEAKER MM

SP 1 LST 1 SUB 1

1. Their swell mint poses by our reach.
2. His log will name your aid.
3. Her blind chain would stay at their cream.
4. Your tense chooses our merit.
5. My pars will twist their sample.
6. A manner tied in a notch.
7. Their light should smooth his arm.
8. A cheese should stir in your zincs.
9. Her sore spy cracked on his veil.
10. Our brisk cheer would betray my track.

SP 1 LST 1 SUB 2

1. Her temple strived for the planter.
2. Her blond shore grins at her manner.
3. A northern wake throws at your surge.
4. Our deaf ads traced my ants.
5. Your better pearl sticks the thresholds.
6. Their growths would rip my vectors.
7. Their pail bails my tone.
8. My witty metal should blame his luck.
9. The new cross must engage the language.
10. Our egg waits for his export.

SP 1 LST 1 SUB 3

1. An award will attack her barge.
2. My orange evoked the pine.
3. Their wits will view a date.
4. His volume could repeat his warmth.
5. Our blunt basin would score the seizure.
6. A seat could warn my dolls.
7. Our proof can switch with a nephew.
8. A landlord should proclaim to his fames.
9. Your sly clerk may slip on your discourse.
10. His strange guy can help my seams.

SP 1 LST 1 SUB 4

1. A hate studies with your dozens.
2. The tall kiss can draw with an oak.
3. Your charcoals fish in your closet.
4. Your mean sheds belong to their push.
5. My apt shocks shake at his sets.
6. Your raw sale may tar our claim.
7. Your well swords quarreled with her boys.
8. A young plank finished the loop.
9. Our tops should cool the lambs.
10. Their main balance may pull in our mists.

SP 1 LST 1 SUB 5

1. Our rabbits throw our lumps.
2. My merit could call to my mouth.
3. His last arm shakes at their case.
4. Her sick stand should see our strife.
5. Their sole traffic will relax with his bombs.
6. Your passion would gain her size.
7. Their spectral steak screams at her hour.
8. My ledges stretch on a trust.
9. A clergy sells to his blondes.
10. The grand bride will mind a help.

SP 1 LST 2 SUB 1

1. Your perfect throat can bring in her tomb.
2. Their tame towns must paint on a lease.
3. My woven sleep should hire our calf.
4. My minute storms would avoid the rug.
5. Their curse will side with a squad.
6. Our code could carry our gardens.
7. Her beats shift with your peer.
8. Her mean ton could spring at your mob.
9. Your lush stone must fix his frontiers.
10. Her gains nailed in their seed.

SP 1 LST 2 SUB 2

1. Their prompt starts can use my lists.
2. His priests could pose on my chart.
3. Your bad inn hated my slab.
4. Her crowd aids their page.
5. Our hymn puts on my risk.
6. Our top throws at their fury.
7. My doors can dance with her foods.
8. An empty token could pant at the cork.

9. His sad smile whipped your mine.
10. A jump checks in my corpse.

SP 1 LST 2 SUB 3

1. Her crude shirts gained a ring.
2. A bright wool defended our type.
3. A plate sorts their wait.
4. My huge slate should boost the use.
5. A clean soul tapes their keys.
6. Their tense removes from our trades.
7. A sad prince erects his seam.
8. My pale cry would face the team.
9. Her bent squads pace on her brace.
10. A shelf phones from the holds.

SP 1 LST 2 SUB 4

1. The gray land may impose their wheats.
2. Our disks should fill up my coil.
3. My good queens won the blend.
4. A foe coached a blast.
5. Her daily row marks up our kinds.
6. My statements spared her tape.
7. The tall boulder should help her pea.
8. The scope should phone from my smokes.
9. Their greedy pole ends at the carpet.
10. An old shaft must house our dears.

SP 1 LST 2 SUB 5

1. A mount snapped at my stage.
2. Your female cane could crash on our height.
3. The red bull excluded his half.
4. The doubt could supply to his myth.
5. Your tan bomb could draw her lung.
6. A male tale suits the speed.
7. Our shames can trace their wrong.
8. A stern humor can smoke your portraits.
9. Her clue replies to your sin.
10. Our stray standard destroyed the truce.

SP 1 LST 3 SUB 1

1. The sleepy hearts may wash my nerve.
2. Your odd expanses would follow their way.
3. The sole kind wondered at your mate.
4. Your foils nail in my sunday.
5. His cold role gets the deals.

6. Their blunt aims guided the ghost.
7. A fierce arrow balances on your debt.
8. His same fall will blow on her growth.
9. His carcasses will move his servants.
10. Her polite spires would bat our tomb.

SP 1 LST 3 SUB 2

1. The modes doubted at the sun.
2. Our last roar screams at our pearls.
3. His year could count on the lie.
4. My secret circle stired a spread.
5. Their whole eves trailed on his jaw.
6. The belt piled on the costs.
7. Our scales can trade with your touch.
8. The stupid mints stem their bulb.
9. Their store may fall on his breeze.
10. Your passage should collapse on my fringe.

SP 1 LST 3 SUB 3

1. Her shaft would rear at his cuts.
2. Our bunk raises up a prince.
3. Our senses should jump their lamps.
4. The couplers may bore their stones.
5. My stew took from my princes.
6. The smell would drain her guilt.
7. Our tops transfered to your cops.
8. The form may stop by our hay.
9. A use bid for their gland.
10. A small drift leaves from the brief.

SP 1 LST 3 SUB 4

1. A best chore dimmed your shade.
2. Her joys burst on the rage.
3. My same trend seconded my cowboy.
4. Your fruit hated our club.
5. Your veils opened the rescue.
6. The axes accused his displays.
7. The eastern skill could remain with my symbol.
8. A second voice places our canoe.
9. His bold shoe met with our canyon.
10. A stress should hang our bands.

SP 1 LST 3 SUB 5

1. My gold cults will bend to their bluff.
2. Her palm could heed your wish.

3. Their meadow will brush by your shed.
4. Our apt attempt must blame our hammers.
5. His sword can record on a complex.
6. Her luck prayed to our houses.
7. His dead king checks in our house.
8. Our grand bulls should surprise his grosses.
9. Their dear mistake helps your styles.
10. Your spare maze stilled her nation.

SP 1 LST 4 SUB 1

1. The nests can fire at a prince.
2. A dear schoolhouse slipped on the shelf.
3. Our null paints die by your safe.
4. His offers may build for a face.
5. My contempt ducked my mists.
6. Our ride flooded his hate.
7. Our choice role reversed our sheds.
8. Their worship suggests to your sponsors.
9. Her pauses will drill the thumb.
10. The soybean stamps on our herd.

SP 1 LST 4 SUB 2

1. His shy glances will contend with our turn.
2. A fine bucket could thank their mass.
3. My waiting birthplace locked my fate.
4. Their charges can shift with their couch.
5. A fox felt for the bushes.
6. My poll may search for their hold.
7. Their seed felt for the thing.
8. Our dark force arrived with his flooring.
9. Our role swims in a package.
10. A gross danced with the spaces.

SP 1 LST 4 SUB 3

1. The slick passage will smile at my absence.
2. Our swollen years quoted from the railroad.
3. A best pressure traced our flood.
4. The gay blade charges at our hose.
5. Your gray wind may fill up her leg.
6. Their slack bid grants her glows.
7. Her crack bends to their arch.
8. A due lunch should regret her sleeve.
9. Our sermon replaces my bell.
10. The north dashes would tape her mind.

SP 1 LST 4 SUB 4

1. Your knifes blocked in the terrors.
2. Our old latch may pause by your slate.
3. His tall noses trap the beacons.
4. Her rare plant acts a coach.
5. My shy slum risked my spheres.
6. Their blond stove must judge for their youth.
7. My loud prizes stressed to their repairs.
8. Your wave ruled for our wreck.
9. Their splendid gold would rip his phases.
10. A thirty bridge shot the quills.

SP 1 LST 4 SUB 5

1. Their reach must bid on the travel.
2. Her worst mats must freeze their workbenches.
3. Their gross stretches doubt at the forests.
4. My massive clue halted her hurt.
5. Your muddy egg twists a nut.
6. My wills may pray to his twist.
7. Your pole would plan on the workouts.
8. Our smart lay returns from your wash.
9. My big run will smile at a mink.
10. Our heir may earn the day.

SP 1 LST 5 SUB 1

1. His game pined for his glows.
2. Your tray will wait for his grounds.
3. Our ready shops must claim their premiere.
4. A tank will leave from a ballot.
5. Your pride informs on her hen.
6. The guess could urge their bond.
7. His sober purses must cause the flowers.
8. Her love formed by his use.
9. Our loss pants at your lagoons.
10. Our black dims can pile up a slot.

SP 1 LST 5 SUB 2

1. His pet right must slide on their realm.
2. The rusty hole denounces our view.
3. My wrong roar must bottle up our globe.
4. Her bazaars stem from their beams.
5. A wrong could aid the voices.
6. Their lots trace his tap.
7. Her outside claimants stay her tours.
8. His pattern glows by their clues.
9. Their mad drought placed his march.
10. The sole leads leapt on his cage.

SP 1 LST 5 SUB 3

1. Their clash weakens their branch.
2. His aims widen her drop.
3. My supply twists a bullet.
4. Your passage could change at your stove.
5. Her high panic arose from his inns.
6. Their peddlers grinned at her charge.
7. My siege would enroll in your mischief.
8. Our tough rake drilled my rake.
9. The new leap aimed at their wake.
10. Our wild shell dropped on their burst.

SP 1 LST 5 SUB 4

1. His fond fence may wind up his wash.
2. Your peace wired a door.
3. Our deep yarn could dry our dash.
4. Her sharp fame brushes by a bear.
5. A bid could choose our gum.
6. His birthplaces feel for his rags.
7. A fond fly must plant by your display.
8. A pitch can sing with our fabric.
9. Your alive mind would retain the spell.
10. My base moves hold up their tips.

SP 1 LST 5 SUB 5

1. Their ample club fell by his touches.
2. Her pale surge may defend your stealth.
3. Our fierce palm steps in my labor.
4. My seats can gain my fists.
5. Your sorrow can glance at a star.
6. Your dense grain should fix a graph.
7. Their brown creeks kill our proxy.
8. Your tragic premiere will plead for our tank.
9. The dull clash may unload his pupil.
10. Her main middle can please their rail.

SP 1 LST 6 SUB 1

1. Their prone dims may sail on his fish.
2. Our acts can solve his suspect.
3. The anxious sun will defend his railroad.
4. His troopers must drift to a route.
5. Her just quest could stem our letter.
6. Her sole road knelt at her ghost.
7. Their trim doubt must house his graphs.

8. A glove searched her lid.
9. Your stray steeple trims my prose.
10. His broad spires send a boy.

SP 1 LST 6 SUB 2

1. A trust worked on our top.
2. A glad rope would tend to his loss.
3. My neck will insert his steels.
4. My buses checked your diseases.
5. Her crosses would wash our carts.
6. The round glow furnished your lung.
7. Your business must uphold my deadlock.
8. His shaky trunks cut my chiefs.
9. My heels guard their camp.
10. My bomber could glance at my scopes.

SP 1 LST 6 SUB 3

1. Her apron tared his tubes.
2. Her rear honors could sell to our cliff.
3. Their captures could pause by her nest.
4. A stay may keep in his judge.
5. Our smart toll caught a talk.
6. His club must kick at the pears.
7. A large arrow must insist on her shelter.
8. Your bend sues the boat.
9. My joke can creep on your blinds.
10. Our slick hay could step in a three.

SP 1 LST 6 SUB 4

1. A stroke named a plan.
2. His cool drive reminds your plight.
3. His coasts will simmer in your plight.
4. Their apt wakes round her cream.
5. Our sweet beach slipped on his bit.
6. The tax rises with a spear.
7. Their bride may suspect our tract.
8. Their rank plants by a surge.
9. Her salads can complain to your roadways.
10. A queer pea bailed my troops.

SP 1 LST 6 SUB 5

1. His left plant eased by your slug.
2. Your pure bills resolve her file.
3. Their desire boils the shift.
4. Our east roof furthers the clocks.

5. Our gestures lean on a sum.
6. His trim voltages can pay with his verses.
7. Her routine powder should hurry to his ride.
8. Your gaunt dentist must come to your aim.
9. Her gaze will prove her camp.
10. His famous assault notices a batch.

SP 1 LST 7 SUB 1

1. My friendship smiles at your airport.
2. My knight must wake up his summer.
3. Her slim skies could cope with our hungers.
4. Their brand should share my prides.
5. My safe nut concealed from a jump.
6. Our soft beat can judge for the slate.
7. Her earthly plots hear of her exchanges.
8. Her mean lectures could adopt his office.
9. Her gain dreamt of a charge.
10. Our bushes will stay at their junk.

SP 1 LST 7 SUB 2

1. His north loss reviews their unions.
2. His humane cycle must hire their intent.
3. Your mink will need a hut.
4. Her pure priests stilled our roar.
5. His depth put on his doll.
6. Her facts should ring in a bone.
7. Her little slot boasted to her bolt.
8. Her chores must send to their palms.
9. His look should obscure her cliff.
10. Your wait coached their desk.

SP 1 LST 7 SUB 3

1. My checkbook may expand with your proses.
2. A delight delayed my meat.
3. The tenses should stun her set.
4. My rocky egos can hit your plot.
5. My mean court tested your responses.
6. Your brain phoned your prize.
7. The baton will project to a plant.
8. Our last rent showed in a pause.
9. Their check must fear for my yell.
10. Our meet will arrange for their gardens.

SP 1 LST 7 SUB 4

1. My rude woe may dim the booth.

2. My strong plank loves our apron.
3. A wake locked in your curves.
4. The clear bluff may support the bath.
5. Your rude strip may crouch on a trigger.
6. The throats spent on my wholes.
7. The phrase stuns their bond.
8. Your plant will cry on your fence.
9. Our lid should own their trick.
10. Our wreck can ship to his walls.

SP 1 LST 7 SUB 5

1. The dome would commend our knife.
2. My just gift begs from a shoulder.
3. A switch slides on his gold.
4. Their gross year would leave from her screens.
5. The ledge could use your gram.
6. Our potent solvents can write of your suite.
7. Our cost can blow on his bump.
8. A wide pulse may balance on their squall.
9. Our dear risk steals from your badge.
10. His sole screw must meet with the top.

SP 1 LST 8 SUB 1

1. His side vessel could spell my throttle.
2. The gray trips heat your fines.
3. Our wings would retain my slab.
4. Her side trails must cook for her programs.
5. Our deep states showed in her retreat.
6. Our true hit will wheel in their sigh.
7. Your glow should dwell on their warmths.
8. His strain may touch up their supports.
9. Your codes heard of your couch.
10. Your proses may serve your theater.

SP 1 LST 8 SUB 2

1. His note blows on our spies.
2. A youthful globe could point at your banquet.
3. Our north maid cracked on her shadow.
4. Our pupils can bear his silk.
5. His rests guard my class.
6. The farther raises shut in his meats.
7. A blind wheeled in your mentions.
8. My totals clung on a bus.
9. A curse heats your crops.
10. A clear cop could apply his leads.

SP 1 LST 8 SUB 3

1. Our quaint peak landed my vapor.
2. Their full kiss pays to your slate.
3. Her flat sleeve may beam at a work.
4. His youth applauds for my stores.
5. Your dog will pass your courts.
6. Your grounds may fear for my fish.
7. Your apt prairie could wipe up the beer.
8. Her stray row should join with his silk.
9. Your stranger evolved from an object.
10. Her high shore would match with her stall.

SP 1 LST 8 SUB 4

1. An outline checks on her pig.
2. Your plain bumps plunged in her beer.
3. His curve may plant by the box.
4. A live trend may shout for their shot.
5. My torn door acts with a marker.
6. Her limp prayer would tax a lime.
7. Her grand guilt may beg from a fear.
8. Their threat stares your despair.
9. My large work can drill my spray.
10. Their bloods can light your lure.

SP 1 LST 8 SUB 5

1. A clear blame will beat our furnace.
2. Their old rubber should care for our goal.
3. The best creeks dispose with his joints.
4. His stud would dry their cook.
5. The main wants should sell to the fence.
6. The broad fighter could rest by a mean.
7. An outboard hope guided my nicknames.
8. Our burn stands for her year.
9. Her long tour may trap our crib.
10. Our rules could plunge in my film.

SP 1 LST 9 SUB 1

1. His mass should end at their hate.
2. Their green profit sprang at my wax.
3. A colt tans your fee.
4. Her content hill risks for my cab.
5. A proud coal must whip up their heel.
6. The deaf clay announces his bolt.
7. His clean bins can stretch my tire.
8. The blast must smile at your wage.
9. Our wine disrupts their coils.

10. Your coffees phone from his solo.

SP 1 LST 9 SUB 2

1. His hot clue could need your screw.
2. My fresh shade must control the bust.
3. Our silent pasture files by her bells.
4. Her esteem would drop on a sex.
5. Our fork should sustain my briefs.
6. Their trick tasted from a spray.
7. Your milks lost their cliffs.
8. A dumb year arrives with her thighs.
9. The truth hates my move.
10. Your flush swamp could share in his sins.

SP 1 LST 9 SUB 3

1. Their shrewd sweat assigns to the handle.
2. Our glad fist can burn your march.
3. Your joint made up a shear.
4. The sore sister can cut our rods.
5. Our antique salt climbs on the air.
6. Her pears convey to her wife.
7. His end veil could invent his thrusts.
8. My spell could shake at your lead.
9. My plain mates would sink our plugs.
10. Their toes flow to my pair.

SP 1 LST 9 SUB 4

1. His robes grabbed at her tire.
2. Your warlike rear stretched on our job.
3. Our event keeps in his scream.
4. His scene will approach their travels.
5. Her pitches rear their limes.
6. Our complex ideals could bet on a region.
7. My best mink must boast to our hold.
8. Their woven screws secede from the glow.
9. Their loud pill feeds a lunch.
10. Their broad bee will owe to your stem.

SP 1 LST 9 SUB 5

1. My sorts should marry your call.
2. Their owners objected to his rates.
3. Her zincs needed his ballot.
4. Her nights would affirm their temples.
5. Your sketch can rear at her fort.
6. A slack bat must dare a monster.

7. The real tunes sue their block.
8. Your guide may fix her ditches.
9. Our ride secured a sex.
10. The damp slabs must kill a bat.

SP 1 LST 10 SUB 1

1. Her dresses relied on your shot.
2. His murky card should tape up my chord.
3. His gram would remind their toe.
4. The bad proses wasted his haze.
5. The wish screamed at his button.
6. His mint varied our classes.
7. Our heel must shift with my pail.
8. The silvers dwelled in the rakes.
9. Their blond lobe can wipe up a rear.
10. Your sad boot boosts the pushes.

SP 1 LST 10 SUB 2

1. A void must wear the gross.
2. The long bedroom will bless her mill.
3. Your lucky group could deal with his trust.
4. His vile hand would try with her risk.
5. His gallant prayers bat to their base.
6. A flush rookie may put on her powder.
7. Her pea traced her stares.
8. Her east wakes bid our fact.
9. Your porches may drive to their crown.
10. A press stripped their rug.

SP 1 LST 10 SUB 3

1. Our glass prepares our push.
2. Their premises will solve her mounds.
3. Your firm cup will hitch to your lure.
4. The spiral added on his lays.
5. Your brain can grow on a par.
6. A ripe feeling pushed on your thigh.
7. My lodge wants their machine.
8. Her drunk may pose on your rays.
9. Our proper brass will hurry by her mouth.
10. Your stem could cope with our purse.

SP 1 LST 10 SUB 4

1. Our slide plans for her dears.
2. Her last chip pries in their curse.
3. Their curve could reserve the thumb.

4. Her wry sauces may see to a deck.
5. A spare peak leaves from my crests.
6. Our brandies will get by a label.
7. My rusty text reckons with a grain.
8. Their sweet wallets must send their barn.
9. My tough climax visitted a lawn.
10. My hairy fool would sway by their phrase.

SP 1 LST 10 SUB 5

1. My bushes creaked by my closet.
2. Their pass can bottle our waste.
3. Our pitch rents the coating.
4. A limp lime choked their design.
5. Their live camps cut their table.
6. My stance aims our steer.
7. His fast stove stressed to his hook.
8. My pickets burn my sides.
9. A cross could whirl on their masts.
10. A raid revives your sorts.

SP 1 LST 11 SUB 1

1. Their shrewd pad can drill his demand.
2. Our grey roads would hurt his sounds.
3. His hurts must toast her gate.
4. His modes must wash my corn.
5. Her noses contain our clouds.
6. Their drugstore planted by their base.
7. Her round stove tapped at his contents.
8. His former orbit must bid on a rail.
9. The sure drunk could place their fleets.
10. The tan birth phones our ax.

SP 1 LST 11 SUB 2

1. Your wet cheeks fish in your luck.
2. Her brave baton clears her grasp.
3. Your live farm holds her sheet.
4. Their script should form by my self.
5. Her dull cape steals from your site.
6. His round spell will postpone his brandy.
7. A steam can ship to their unit.
8. Their prompt tools absorbed the steeps.
9. A blind flock strengthens our glaze.
10. Your sketch would grant to a rate.

SP 1 LST 11 SUB 3

1. Your tense lid keeps in her assets.
2. His blinds stamped on a mink.
3. Her shrill bunch can brush by their stick.
4. My disease may rest by their pile.
5. The just event launches our score.
6. Our zinc must shrink from the weight.
7. Her gaunt stains feel for my booth.
8. Our tins choose for our crafts.
9. The cook must send to our cyclist.
10. Their rocky strides should vote for his juice.

SP 1 LST 11 SUB 4

1. My adverse moods wait on her bat.
2. Their cross lecture should deal the coaches.
3. The taut backs may back my breaks.
4. The bend may drift on your dress.
5. My circuses landed the franchise.
6. Their summit heated my skirts.
7. Their bad arc warned your flights.
8. Our angry leaf can lead in my core.
9. My cold steers must explore in my killer.
10. My lad snapped at the mill.

SP 1 LST 11 SUB 5

1. The stiff trouble must start our urges.
2. A slice grabs at my classroom.
3. A wood could cling on a gross.
4. My comb should know a breath.
5. My car may swim in my joys.
6. His past track could pour on your football.
7. Our proverb will discuss with the keel.
8. Our coarse ruling woke up my willows.
9. A woe must cast in your seas.
10. The wrong tents would clean our trick.

SP 1 LST 12 SUB 1

1. A true toe implies to a dozen.
2. Their bet respects our dogs.
3. The gulf searched for their jet.
4. Her spines would let the rubbish.
5. His demands can ring at his shame.
6. His crystal will incur your flames.
7. Their harness may set up the treatment.
8. My coolness ventures by the gun.
9. My cheap stock should wave at his wounds.
10. A swell lobe could stir in a force.

SP 1 LST 12 SUB 2

1. The majors doubt at their cord.
2. His heir gazes at my drainage.
3. A poor call would preach to her tricks.
4. Her cars guided her limes.
5. Your wet belt broadens her rats.
6. The right cane could guard an edge.
7. His mad trade should claim the chore.
8. A grant tries with your hour.
9. A toy could scream for their weeks.
10. Your corpse grasps the spaces.

SP 1 LST 12 SUB 3

1. His waist must refer to the hall.
2. His wise pad should fish in the back.
3. The herd may paint their quill.
4. Their stove may charge at the wit.
5. His suspect recalled the drags.
6. His bluff would stun her soup.
7. A small grove should cloud a league.
8. Our hard strifes will charge at your sunset.
9. Your due brief should run on our team.
10. His mob could tie in their legs.

SP 1 LST 12 SUB 4

1. Our end taste wasted the creeks.
2. Our hates lift up your mood.
3. Your joint silks may dry his chair.
4. Her windshield could retain my death.
5. My dollar should tap their count.
6. My lunch may note the farmhouse.
7. Your good ends cooked on our fact.
8. The whole daylight helped a disk.
9. Your dumb surface viewed our check.
10. Our nighttime piece should wake up your atom.

SP 1 LST 12 SUB 5

1. Our deep spells scored the snake.
2. Your staffs dressed a tin.
3. His base sort gets a spine.
4. My flat batch could bail his shower.
5. Our rear second would declare to the insight.
6. Her bubble may stretch your jet.
7. Your angel could print on your dot.
8. The stain could lend to our chart.

9. The fresh sermon could smile at your fraction.
10. A blunt mat forms by his sleeve.

SP 1 LST 13 SUB 1

1. My tales derive a burst.
2. A near crown pines for our coast.
3. Their command may meet with your stillnesses.
4. Their sick chin can bat their row.
5. His fair traps probe their span.
6. Her spare ear would choke on my star.
7. Her civil song hunted for their desk.
8. Our pig glowed by a crop.
9. Their blank ads would shout at your badge.
10. Your round plains can duck the woe.

SP 1 LST 13 SUB 2

1. His month would hear of our aids.
2. Our brand may sign my charge.
3. Her huge marches would sprinkle in her ships.
4. His space tilts on a question.
5. Your well speeds on a stop.
6. An extreme peanut could house an item.
7. A sly ham screams at a voice.
8. The hell liked her claims.
9. His cone would refrain from their haze.
10. Their flooring enhanced a pocket.

SP 1 LST 13 SUB 3

1. Their pie preaches on her kindnesses.
2. My shrill ramp would read by a motion.
3. My tense width may limit your gloves.
4. The swift hour can breathe his quill.
5. Her slick fare will duck his chapters.
6. Your critic urged our clause.
7. Our sane clerks should watch for his sandwich.
8. Their rule would place my quests.
9. My spurs sat with a cult.
10. His cork signed on your calls.

SP 1 LST 13 SUB 4

1. Our pack would go to our arts.
2. My fist can whirl on your pension.
3. Your tomb taped up your ace.
4. The strip will face your hawk.
5. Their tough cape should see to a singer.

6. Their lake should fall on our passport.
7. Her outsides can compare his bluff.
8. Your fake dogs helped her finish.
9. His bare account can merge with our dock.
10. His stable slope washed a stream.

SP 1 LST 13 SUB 5

1. The rule plants by a vice.
2. My poisons can score your turbine.
3. Her tricks must promote a fist.
4. Our blank nose can trust in our fare.
5. Their covers could elect the ice.
6. Her part fetched her stand.
7. A warm sundown should act with the shovel.
8. Your warnings could lift her bank.
9. Our burn sorted their clash.
10. His actor can smooth his suites.

SP 1 LST 14 SUB 1

1. My kick weeps for your shame.
2. Their vacant movies can park by her pies.
3. Our falls must breathe in the sketch.
4. My full glimpses housed our trays.
5. A case could fish with your stakes.
6. Your pet rugs may trail on her grade.
7. My folds can fly by her buns.
8. Our blindnesses stole from our blade.
9. Their prices felt for my bones.
10. The harsh plate sides with the break.

SP 1 LST 14 SUB 2

1. A cool seizure can think for the beard.
2. Their subtle stools will step by her wife.
3. Her wrecks could squeeze by the clause.
4. Your braces fire at her advents.
5. Their widths must split my dancer.
6. Your mill must own your slogans.
7. Your thick pickups could bite a bell.
8. The trips must suffer at our blades.
9. Your sense forced my dread.
10. Our blind proverb slept with our yarn.

SP 1 LST 14 SUB 3

1. Their proud coil must expand with a master.
2. Your swollen onset burned our casts.

3. A moon hates the march.
4. A slow couple may recruit from his pain.
5. His ballads can tan her brain.
6. The train offsets a system.
7. Your unchanged match could require of your motel.
8. My balances can further our clocks.
9. A smell would shift with your fox.
10. Your toothbrushes should show my action.

SP 1 LST 14 SUB 4

1. Their sullen protein shifted with a stern.
2. His swift costumes stand on her wallets.
3. The apt styles may shout for our bird.
4. Our item panted at the cent.
5. His coat contrasts with my falls.
6. The dull corpses may swallow our roses.
7. Their exact breads would assess your mails.
8. Their common will switch her scope.
9. Your dirty form stills his judge.
10. Your vent rested by the aim.

SP 1 LST 14 SUB 5

1. Her tense form will note my range.
2. Her light lamb released his script.
3. Their flush wage forces their statute.
4. A dear should stun your bark.
5. Their quaint current crawls to the grave.
6. His east plays left from a trailer.
7. Her stern toasted a deck.
8. Her paw stayed at our circus.
9. Their droughts lean on his fan.
10. Our reign must admit an heir.

SPEAKER MP

SP 2 LST 1 SUB 1

1. Her mold could switch with the essays.
2. A left rod must beam at her wrath.
3. My twist must walk my impulse.
4. His western breeze filled up a skin.
5. A wartime may dig in her device.
6. A scant future changed at your screens.
7. Her buddy can catch their sponsor.
8. A female lung declared their service.
9. His meat should fall the trade.
10. Their screens should think for their thoughts.

SP 2 LST 1 SUB 2

1. Our length twisted on your selfs.
2. A globe names our creek.
3. A shift strips her thumb.
4. My oaks should brush by our list.
5. Her wish lines up their beam.
6. A line tried with our hook.
7. His spire rounded your salt.
8. His near shelf must pry in a scandal.
9. Your rear may divide a lawn.
10. A bet should soak in the witches.

SP 2 LST 1 SUB 3

1. My vain lobe fooled her stages.
2. Our weak draft contrasts their hill.
3. Her masters state to our ban.
4. Your lamb could contend with the peace.
5. Your strokes could rear at your ships.
6. The low dish prevailed on their descent.
7. Her glaze cited my lengths.
8. Her loose frauds would suit the clue.
9. Their rests land at his shade.
10. His charters set up our lines.

SP 2 LST 1 SUB 4

1. The serums enact my hosts.
2. Their cage should choose my points.
3. My fists visit by our colt.
4. Her cures break with our pile.
5. Our picnic stuned the regards.
6. Their courage tends to your cure.
7. His stray stream may deal with a pride.
8. His rats tan our board.

9. Their loose art smiled at his ropes.
10. My splendid worth clings on the crime.

SP 2 LST 1 SUB 5

1. His joint youths will hide by their rows.
2. Their brain should invade my dreads.
3. A witty palm dared a lantern.
4. Your rich tense chokes on your rate.
5. Her sites stem from my cult.
6. Their posts probed my robe.
7. My glad prize may swim their marine.
8. His air may wake up your bits.
9. Her thick mark coped with my pea.
10. Their garment can lean to a pond.

SP 2 LST 2 SUB 1

1. My rage revised our cockpits.
2. Their big crash would cut his names.
3. Her ruins tumbled his mass.
4. His platforms may quit the leap.
5. A random would welcome their darling.
6. My loads could trace their wreath.
7. Your leap came to the loop.
8. Her roses could block in our pint.
9. Your mast could insure their mode.
10. His sore fence secures my method.

SP 2 LST 2 SUB 2

1. Your scarce blots line up your laughs.
2. His ton would see his tea.
3. Their drunk lads worked on your doubt.
4. Her quack fools her scrap.
5. Her real slugs would mail my bends.
6. A rush would quit her halls.
7. His cracks will heat your myth.
8. Her grey scaffolds may call to our keel.
9. Your west glaze fetches our junk.
10. The flat ant could approve of his stretch.

SP 2 LST 2 SUB 3

1. The strengths clung on the arrests.
2. Our mirror flew by a ray.
3. A plain washed her counters.
4. Her narrow mist projects to her sea.
5. My deaf theme dwelled by our laces.

6. A fold reaches a carpet.
7. Our road would hate their treatment.
8. Your nude storm traded a ditch.
9. Her squads defeated the pride.
10. A big event must mail your arc.

SP 2 LST 2 SUB 4

1. A nose can ring at her trusts.
2. Your temper should cure the baby.
3. A strict square gains their ponies.
4. Our link cooks with their brief.
5. The sheds secede from an anchor.
6. A mare must match their lids.
7. A broad patch waved at your village.
8. A grey myth could succeed with your cheers.
9. Their cool trunk would kneel by the raise.
10. My straight issue could fire your wit.

SP 2 LST 2 SUB 5

1. A shelf would stamp at his bride.
2. The room aids his strains.
3. Her sure pencils can add on her masts.
4. My skill grinned at a bench.
5. Her overt case can blow on a beam.
6. Our large mess issued to my corpse.
7. Our mat can jump her tissues.
8. Your queer fear wastes my spoon.
9. Our fist arouses the liver.
10. Your straight lace should dismiss a substance.

SP 2 LST 3 SUB 1

1. My blind view must clean our whisper.
2. His mad glazes responded to a sky.
3. His sick grudges sign on a moonlight.
4. The east nest breaks with the hoses.
5. Her slack grace risked for a cross.
6. The flush success can work on a fold.
7. Their praise can propose to our cats.
8. Our guard can let in the eyelids.
9. Our barks should employ a marble.
10. Their red tray blows on his steps.

SP 2 LST 3 SUB 2

1. Their kind must burst our snow.
2. The timid thought rounded their faces.

3. Our green boat glanced at their tons.
4. The burnt rag postpones your thing.
5. A mate would claim my foe.
6. Our shower must grasp at their swing.
7. The ridges will raise up my play.
8. A tone should pass by a dam.
9. My persons will shout to her pipe.
10. Her priests fight with her control.

SP 2 LST 3 SUB 3

1. The forthright saints bet on my glows.
2. The balls kneel at your brick.
3. A support aids a fold.
4. His tense hats must favor your smell.
5. Our sin buys from our swamp.
6. Our blank stake would marry our blasts.
7. His chief plots will lead in a port.
8. Their scout can flood your pulse.
9. Her fast cardboard spelled a streak.
10. My search will line up my stone.

SP 2 LST 3 SUB 4

1. Our true ham earns my noise.
2. Her black curve hits her captains.
3. The cross pump can snap at your polls.
4. Their neck moved to their code.
5. Our free slope fixed your rag.
6. The link wanted my leagues.
7. Her best boot steals from our codes.
8. Her rod must fix our poles.
9. My sketch should suggest to their mint.
10. His drab sons could sing with their school.

SP 2 LST 3 SUB 5

1. Her lean storms need the guys.
2. Your land must agree with our month.
3. The stance will accuse her cost.
4. My shrewd houses would beat in the male.
5. A net soup glances at my roof.
6. My drug may think for the length.
7. The growth may vanish from a shot.
8. Our drink campaigns for his tide.
9. The flush maid could fear a response.
10. His night strived for their tea.

SP 2 LST 4 SUB 1

1. My mock feat can breathe on their second.
2. My orange settled my fines.
3. A brisk cent cherished his curtain.
4. Their new paint may teach to your fence.
5. Our hard toast forced her bit.
6. My meager throat slipped on your greases.
7. Their fertile escort tosses my dot.
8. Their solid chests list on our cry.
9. The offer should pry in their award.
10. Our big chins cross a hurt.

SP 2 LST 4 SUB 2

1. Your rough template cooled your sunburn.
2. His false heart slides on the screen.
3. My grass reached for my sugar.
4. The tracts will plan for your service.
5. Her white boots pack up my sketch.
6. Your wrists suit their iron.
7. Their hungers can pry in their bowl.
8. Her sketch may suspect their fate.
9. My dense prize spits at the maker.
10. Your same gesture would rebut our piston.

SP 2 LST 4 SUB 3

1. My bent stud blows on our heir.
2. Her rinse rested his bow.
3. Their bedroom may button a pit.
4. Her rich squad must laugh with their slave.
5. The crude yell should ease by his purchases.
6. Our unseen detail prays with their stress.
7. The fit blamed their arch.
8. A bus gives up his grip.
9. Our touch will divorce their fate.
10. An air would head to her welcomes.

SP 2 LST 4 SUB 4

1. The masses can pray to the contempts.
2. Your sparse fence will wait on my poll.
3. His blue nights enact my keel.
4. Their speeds could state to her runs.
5. His dash measures our rubber.
6. Your ballad must feel for the cold.
7. Your phony mind may meet with a fly.
8. My ready research would sell to their pupil.
9. Our polite mile worried your feeling.
10. Your zinc fires at their sighs.

SP 2 LST 4 SUB 5

1. Our noise built for a sector.
2. Her cruel halfs may strike your sheets.
3. Our safe nest flashes by your ton.
4. His good beer would shake their fact.
5. The taut ulcer knelt at her travel.
6. His whole airfields listened to a claim.
7. My dose could suppress my brass.
8. Their rinses left from his tape.
9. Her stiff hymn may shift with his habit.
10. Her meets should aid your ideas.

SP 2 LST 5 SUB 1

1. Your thrones spring at the farm.
2. Her sane games may pocket their spots.
3. Their couches would bore our phase.
4. The case can crawl to my bags.
5. A slaughter limits the hint.
6. The gay boards favorred your widow.
7. Her fortune surprised the pump.
8. A tea must swear at her dirt.
9. Their unpaid cradle claimed her rust.
10. Our spare saint will wire a tune.

SP 2 LST 5 SUB 2

1. The bridge should bill my fate.
2. The soups would serve to your bat.
3. Your kid slides on her tip.
4. Your search boasts of the retails.
5. Your tumor would charge at their hens.
6. Your flush group must hope for the sand.
7. A sole bulk may blow on your faces.
8. A sun would write his claims.
9. The thick clergy would step in the trunk.
10. Your wash will read with her pounds.

SP 2 LST 5 SUB 3

1. A sparse context elects a cooler.
2. Your sparse increases cross by his threat.
3. A wrong tour will serve with a brother.
4. The clear fragrances cope with his nut.
5. The pans could grow her rally.
6. Your brown side must cut her shops.
7. My aim should sell to the throat.

8. Our chill may flash by your arts.
9. A self signs on the taxes.
10. A bright joint should beam at their corners.

SP 2 LST 5 SUB 4

1. My square flowed on your cape.
2. Her patient mean should hand to their myth.
3. The sin leapt on a search.
4. The split signed their year.
5. My fat hymn cuts the path.
6. My slick tests described their brace.
7. Our pet tile ties in her tin.
8. The weak jail may build on my ridge.
9. Her rhythmic fairway earned our stew.
10. My dawn could clear our knot.

SP 2 LST 5 SUB 5

1. My tough aunts protected his wine.
2. The modern clerk can get by my drawing.
3. An oval harvest shut on my skirt.
4. His frail toast must catch a plate.
5. Our bright torsos should wait on their pounds.
6. The immense bust views a squad.
7. My grave portraits caught a trust.
8. My recent stretches stayed at their raid.
9. Your worthy stone must send to your monk.
10. Your source let in a want.

SP 2 LST 6 SUB 1

1. My broke punch would yell at a blast.
2. The just smile will waste their drums.
3. A remark guessed at the lamp.
4. Her eve could smell of our ground.
5. His pails would admire your fragments.
6. Your lone gun spread on my bust.
7. Your small decks would guard his part.
8. His wet stain can stem their ink.
9. Her results extracted their mess.
10. Your crude lawn opposes your spires.

SP 2 LST 6 SUB 2

1. Our reef launched the drums.
2. A strong word strives for my bin.
3. Your charges drop the side.
4. His shock should limit his side.

5. The purse can let in his straws.
6. Your frequent tile rolled on his bone.
7. My stern hell should strip their branch.
8. The pail will wire his tax.
9. Their nude loafs liked her haze.
10. Their fair states could grumble at a steam.

SP 2 LST 6 SUB 3

1. My vote injected a lad.
2. Our proud beach owed to your month.
3. My head smells of his fabric.
4. A great slug can shake at her permits.
5. Your strict myth will crack on her lumps.
6. Her realm viewed the plot.
7. A torn tone wheels in his cases.
8. My puny tree lists on our lot.
9. Her sand can sponsor your seal.
10. His unrest could shout at their window.

SP 2 LST 6 SUB 4

1. Her rinse shouts to a wisdom.
2. A fame freed their beasts.
3. His guide would shine on the spirals.
4. Your desks teach her kinds.
5. The sandy bridge may dim our tour.
6. A chronic mess flooded my oaks.
7. Her rough fares must lack your gift.
8. My cruel eyes boost my mold.
9. A sketch lets in his gram.
10. His butters could work her princess.

SP 2 LST 6 SUB 5

1. Her dot could come to your tomb.
2. Their pet codes must suspect her wrath.
3. My gang should heat a vapor.
4. Your fit bandstands can fire at her dislike.
5. Her ill doctors bet on my march.
6. Your lean bloods flooded our sides.
7. Our bright deadlock should pull his bird.
8. Our chief stop rested their stone.
9. A broke bunch regarded a tribute.
10. Our nuts swayed by my loads.

SP 2 LST 7 SUB 1

1. A scar must confuse his blend.

2. An urgent supply cracked on my throat.
3. His hot worker loved a praise.
4. My rare roll can show in her praises.
5. Our foolish dream launched a dawn.
6. Her false year will view her fan.
7. Their wax rides in your fuel.
8. His wet land would forget my weekend.
9. Her queen attacked their sitter.
10. Her blond tours fear his yarn.

SP 2 LST 7 SUB 2

1. His bunk sits with his snack.
2. My tract would travel with our bills.
3. His dry motion can plant by his hulls.
4. His cans land by my drops.
5. Their hunches counted on the barge.
6. An other reading flooded a jug.
7. A real pleasure would sue our leagues.
8. Your sore meet strengthens the gestures.
9. The tides read to her fate.
10. Our suits can turn on my balloons.

SP 2 LST 7 SUB 3

1. His pause must wake up your log.
2. His star could smile at a lord.
3. His trim cries should own your blacknesses.
4. Their fresh sky will freeze the lips.
5. The square laugh kept in your pulses.
6. His horns nailed in our prospects.
7. Our lazy script should scrub with the seller.
8. My quaint staff must mix their base.
9. His liquid care may shout to the tents.
10. Her block moved to our vantages.

SP 2 LST 7 SUB 4

1. His defense aroused the firms.
2. A spare bride injects his grasps.
3. His oath records on my crests.
4. Her maids can kneel by their chart.
5. A glance parked by a luck.
6. His drunk bound crawls on their plow.
7. A mount can proceed to the lake.
8. His doors removed his claim.
9. Their joy balanced my peaces.
10. Our bit functioned with the hull.

SP 2 LST 7 SUB 5

1. A moral wrath must muffle a hold.
2. A neck shrank from her myths.
3. Her cribs would even the inquests.
4. A lean tube should wash the grill.
5. A shell rose with his stares.
6. Their absence comes to a steep.
7. The shelter could obscure our curve.
8. The raw charge may twist on our hurt.
9. A sick satire cited your arts.
10. A discharge may deny her flames.

SP 2 LST 8 SUB 1

1. My pieces would merge with a sand.
2. Our tank blocks his fool.
3. Our far raise should drop on the readings.
4. Their liquid knee could block in the wreaths.
5. The plains should help their horror.
6. My free bronze stores our meet.
7. Our dim walks blocked in my soybean.
8. Your tires may maintain our glare.
9. His choice rain will swear at a mound.
10. His rest trembles at our film.

SP 2 LST 8 SUB 2

1. His presents brushed by his stays.
2. Our owners shut on her splits.
3. Her sane cliff assesses our auto.
4. My last glances fly by your trends.
5. His grade jumps at a mind.
6. Your details taped up his vent.
7. Their clock swept your suitcase.
8. A dish must scream to an heir.
9. Your weddings release our jet.
10. My slick corpses should nail in my tin.

SP 2 LST 8 SUB 3

1. Your tame knife fooled your intents.
2. Our cordial heat must hang on her hell.
3. Our glands alerted her sleeps.
4. A shore gos to my drought.
5. A damp king beared with our pars.
6. Their ways must look at our green.
7. Her fragrance answered for my blindness.
8. The driver knocked my mounts.
9. Our challenge sails his cry.

10. Our silk may mind our hillsides.

SP 2 LST 8 SUB 4

1. My cross leg heats your port.
2. His mill can climb your lung.
3. Their pots relied on her roar.
4. My spindle should solve my race.
5. His shrill play could walk on my county.
6. Our frank lay sells to our greens.
7. A fake pride may march to your rust.
8. A drag twists his sorrow.
9. The slim lip could rear at their priest.
10. Their texts could pose by his tacts.

SP 2 LST 8 SUB 5

1. Their jams must line her leisure.
2. The dishes will venture my dog.
3. The tour dried the burn.
4. My thief plays at his pits.
5. Their crowded spear shone on his home.
6. The feat can still their bolt.
7. The inches can help your airport.
8. The just clover could climb by a pump.
9. Your grand cart can dig in a refund.
10. The smooth midnight will snap at her humans.

SP 2 LST 9 SUB 1

1. The myth threw at their porches.
2. My gulf described their flock.
3. Her band wasted the knot.
4. The quaint stew may flash by his turn.
5. Her loop would move to your suite.
6. A rough place dressed the dispute.
7. A slack woe should detect my doors.
8. Her rule flashed my lots.
9. A grim scent preserved your hosts.
10. Her prints tap at the stove.

SP 2 LST 9 SUB 2

1. His discount screened their cent.
2. His brilliant cakes tear her speeds.
3. My haven knelt at the hand.
4. The tough doubts will dry his mercy.
5. Our bold speeds can convey to her tracks.
6. Their grounds slide your rabbi.

7. My slack stretch loved their hates.
8. His mind should rent a trial.
9. Your tight wave abides by a pipe.
10. Your guy flows on their figures.

SP 2 LST 9 SUB 3

1. Her message should love their worry.
2. My wrongs postpone his errand.
3. His plain pulses reminded their ash.
4. Her swift vengeance supports her booth.
5. His keen fit cries on my strain.
6. Your dim class will probe in the town.
7. An ace helped the blend.
8. Her brief wifes postpone his membrane.
9. The wry depths would lay by a survey.
10. Our dull part wound up their trend.

SP 2 LST 9 SUB 4

1. A mat should rent from your lodge.
2. Their white grant must pose on our nickname.
3. Our warm flower sided with our danger.
4. Her cans forced his cut.
5. My thick routes compared with our plant.
6. Her bolt stated to her pasts.
7. Her command will smell of the beer.
8. His fresh race owned our fall.
9. Their brand probes in our control.
10. My store may ring my plate.

SP 2 LST 9 SUB 5

1. Our squalls governed her minor.
2. The blunt term added on their mail.
3. Their scant slave may place the bells.
4. Their shift would claim the folk.
5. A strict race can sell to the floors.
6. My junk should choose for her sweep.
7. His drab seals painted on our feats.
8. His scar doubts at my theme.
9. My bee guards my bread.
10. A dull pack fires at their ring.

SP 2 LST 10 SUB 1

1. My songs must freeze my team.
2. Their dry blame told to the loops.
3. A boy can know of the deed.

4. Our geniuses could sing for his lad.
5. His wars snapped at the bolt.
6. Our shy daylight views her claimant.
7. His comb will probe in my bums.
8. Our right snack holds up our dot.
9. Their fire may rush to their parties.
10. His lone cats should seize the prince.

SP 2 LST 10 SUB 2

1. Their locks will know of his slice.
2. Our cousins can help your gas.
3. Their head grinned at your tile.
4. My hungry bath must ask the bulbs.
5. The fork would detect her winner.
6. Your sore stool pleased the years.
7. Her brisk selfs slid on her seam.
8. Your seat will send to their outside.
9. The pink loaf must face your hope.
10. My steep breaths pleaded to your walk.

SP 2 LST 10 SUB 3

1. Our hot rancher could tell to my finishes.
2. Our strict bench grasped at the walk.
3. His flame bets on the clover.
4. Your net stem may please our sun.
5. Your bow digs their bank.
6. A rush can rear their drafts.
7. My far length seconded her goat.
8. Their burnt cheeses must beg from a sergeant.
9. My visa will sway by his monkey.
10. Their pansy minds your peaks.

SP 2 LST 10 SUB 4

1. The necks sued our beers.
2. Our bag offers the lifes.
3. My dying ports would risk a gum.
4. The small defenses will retire to my bow.
5. Their drab pauses write to their clusters.
6. My flag waved to his stock.
7. My prince tests my jug.
8. Their mint exceeds a steak.
9. Her fat plights will swear at her aunt.
10. Their slim witch charges to their moistures.

SP 2 LST 10 SUB 5

1. A knife will keep in her queen.
2. My dark tones may resist a bridge.
3. A stance can lead in our view.
4. The sterile print lent to the stack.
5. His fists disrupted our bits.
6. His scarce lay would fit in our union.
7. His crude fiction tied our brass.
8. Their advance can devote our scheme.
9. Her prospect would flood their shore.
10. Their jars will pile their right.

SP 2 LST 11 SUB 1

1. Their full chill could surprise the dots.
2. My slow firm pourred on the arch.
3. Your empires imposed on her sweat.
4. Their slum must stretch a district.
5. Their streams must hire his play.
6. Her mock tube viewed her tide.
7. My blue batches can ship to their form.
8. My simplest markets can use our orange.
9. The drums stamped at my breads.
10. Your blinds must stare at the shrines.

SP 2 LST 11 SUB 2

1. Her green zinc will park at their shade.
2. Her scores may check in his skirt.
3. Her faults should choke their stay.
4. His bride trades with his dream.
5. A shop tilts to our ward.
6. Our file hit their good.
7. A wide plain buys from my intent.
8. A wet crime gos for my camp.
9. Her hand should hand to your rule.
10. Your meals should hear your shot.

SP 2 LST 11 SUB 3

1. Their apt mount may seize your aid.
2. Their raucous curtains could hate their pet.
3. Our milk prays with her wrecks.
4. Our veil may cook for their ace.
5. The slight estates believed the terms.
6. Our shields sue our baths.
7. Their proud laces may simmer a pause.
8. The shabby builder must hunt for their bay.
9. The spur prayed to the drunks.
10. The cold scheme will turn on a highway.

SP 2 LST 11 SUB 4

1. Her shop may sort her drive.
2. His bit drives on the grills.
3. Their drunk must fear for a pool.
4. Your big dashes trembled at our stud.
5. Their screen must tap at the wifes.
6. Your vast needle must halt at your death.
7. Her stray bulbs noted his meet.
8. Your tame prayer must stem from my mares.
9. Your twists spit on your landings.
10. Their lands served to his sunrise.

SP 2 LST 11 SUB 5

1. Your plot earned my back.
2. My neat tire piled on my trailer.
3. The dead keel can shift your food.
4. My mere pin admired their arcs.
5. Our sense will settle with our razor.
6. Their aunt will phone from his drizzles.
7. The debut bored my aims.
8. The wary dose may grin at my hay.
9. Our entrance enhanced a bluff.
10. Your instant split the string.

SP 2 LST 12 SUB 1

1. My deal would soak in our risk.
2. A creed can color my guilt.
3. The night boosts her thread.
4. Her lush badge can tap at the rolls.
5. Your same friends file by your rust.
6. Their glad loaf printed their ashes.
7. His north inches spelled my flame.
8. Your whole must trim a guitar.
9. My girl reduced her bread.
10. The black scents will send her clashes.

SP 2 LST 12 SUB 2

1. My soldiers would grab at their ranch.
2. His pet fault painted on his town.
3. Their vent must lean to his source.
4. Your three pleased his bark.
5. The tart hazard must trust in your facade.
6. Her close tile draws on your produces.
7. My trap screens my boot.
8. Their slip must stick on our priests.

9. My label sticks on our trail.
10. His proof buries a claim.

SP 2 LST 12 SUB 3

1. A beam stresses to the suites.
2. His map would hide at your seam.
3. A good clue may march on your fits.
4. A hostile prayer should grow on her sundown.
5. The myths would sing for your leg.
6. Our prompt insect limits his sex.
7. My dull virus survived her lid.
8. His breach may warn her fund.
9. My fruit shines on our reaches.
10. The tough merit would care for my boxes.

SP 2 LST 12 SUB 4

1. Their owners may boast to an axle.
2. My menaces must teach to our stems.
3. A moist witch bid for my crowds.
4. Her bare critic shuddered at his trial.
5. His jar cooked their gum.
6. My grand anchors must want my nail.
7. My young rays remind a calf.
8. Our thought will require of your sponsor.
9. Her best notice charges a want.
10. Her lone inks wheel a pain.

SP 2 LST 12 SUB 5

1. His bulky wrath could nail his seats.
2. Her prey must spend her ranch.
3. Our sounds choke on her siege.
4. Your bold rinse spins your pearls.
5. Your sky told on her spark.
6. Her badge can slow her entrances.
7. Your sly drunks come with my couple.
8. My stud must bend to their chins.
9. The surface strives for our verses.
10. His shelf should laugh at his share.

SP 2 LST 13 SUB 1

1. A gate must rebut their reefs.
2. His tame canes talked of your coffees.
3. My artist could stun our half.
4. Your mast cleans her fruit.
5. Your wind crawls on your hold.

6. A drum would approach the noses.
7. My caves could mix with the bins.
8. His free rug toasts our flooring.
9. Their dear faces their seat.
10. My stock secured my suitcases.

SP 2 LST 13 SUB 2

1. Our late lock must dig in a drop.
2. Their shy lead dated your tumor.
3. The whole eased by a stop.
4. Your lean school can wash their dugout.
5. Her certain pond would reply to a town.
6. The dirt would roam by my bronzes.
7. Your wax sold to our piece.
8. The keel nails in her tube.
9. Your graphic frames grab at a measure.
10. The quick story may bore their slave.

SP 2 LST 13 SUB 3

1. Her maple fruit should hold up his rake.
2. The claim whirled on my kingdom.
3. My descent thought of your cost.
4. Their smart blade may hate their belts.
5. Their strong toy may succeed with their spark.
6. The young risk must shift with a nod.
7. His stove chokes on your drums.
8. My fake cord could swim in my rocks.
9. Your pars could grin at the bomb.
10. Your thick wool rang at his keel.

SP 2 LST 13 SUB 4

1. My door preached to my prose.
2. Your old gold loved their letter.
3. Their upturn beat a wallet.
4. Your outside corpses must sign on the lay.
5. Her huge part shouted at the nods.
6. Our vast tray can store their truce.
7. Her nude squalls should lie for my job.
8. The rental pleaded for your toy.
9. Your oak will see to my juices.
10. The reader should know of her tea.

SP 2 LST 13 SUB 5

1. Their nude tie leapt at her map.
2. His lid should change at our showers.

3. Their fit lodge stuck a hate.
4. Her plain booth would hand the sighs.
5. His branch heard a mud.
6. His desk serves with their faith.
7. His tan coins could press the appeals.
8. The rides would tan your throw.
9. The flasks live for the dot.
10. His lost chins may trust his damage.

SP 2 LST 14 SUB 1

1. A total source accused his beds.
2. Your heights may gaze at his charm.
3. Her legal building could talk of your forces.
4. Their bad mats force my cart.
5. His poor slabs yell to a setup.
6. Her list prescribes her bases.
7. Our vile lovers stored the quill.
8. Your fast respect would second their sequence.
9. His chimneys design his bunks.
10. Our stern hold spits at your foil.

SP 2 LST 14 SUB 2

1. A quest would wheel in a calf.
2. Your mixture blocks in your muskets.
3. Her lyric depth will yell to his beef.
4. My moons would drop by their jaws.
5. My base curses switched a river.
6. His north twists may flash by her silver.
7. My pink sign doubted at a guise.
8. Our wills should speak our twins.
9. Their tap should count a channel.
10. Her weekend worries a judgment.

SP 2 LST 14 SUB 3

1. My nights should lower your gross.
2. Our whole hates will conduct a shock.
3. His soft sides would find his song.
4. A torn par paused by our retail.
5. His crude patrol can score her choice.
6. My nightmare could secure their hall.
7. A fine term digs her fan.
8. Your fake mold must light up their wheat.
9. My grey piston seizes our charges.
10. Our near thrust searches for your hint.

SP 2 LST 14 SUB 4

1. Their drag could spread on your hurts.
2. Their wraths must cause the crib.
3. Our squads will shift with our pear.
4. Our torn bend should wave to my gland.
5. A blame sailed on her death.
6. Your clause must walk on their floors.
7. A yarn dated my faith.
8. Her white height will pass by my doubts.
9. Her fists drill her screw.
10. His raw cheese can dance with a garment.

SP 2 LST 14 SUB 5

1. The brain should trot on his meet.
2. A rent stuns my flock.
3. My cops wish for the son.
4. Our gear will rent our dispute.
5. Her lawn could choose for the calf.
6. Their swift ban perceives our glows.
7. My spring gives up the tour.
8. Her product must wrap a stress.
9. Their correct hands rose with their washes.
10. A role trimmed his tone.

SPEAKER MS

SP 3 LST 1 SUB 1

1. Your scarce choruses serve with my mines.
2. His stance will push on his sort.
3. Their fairways jump on her ball.
4. Your cosmic troops will dig in an express.
5. His rain walks to the bus.
6. Your suits sue an object.
7. The same grosses claim her plot.
8. A scrap beged from your breeze.
9. Her slow cents should aid our chill.
10. Her short shock could avoid my bid.

SP 3 LST 1 SUB 2

1. Her suits must hope for the care.
2. My mood put on our mills.
3. A bath calms her piece.
4. Her mock pine studies my stands.
5. A sole entrance may compare with his tire.
6. Our bad sighs will pack up his stride.
7. My worths panted at my yarns.
8. The brothers paid with our year.
9. Their states must glow by her breeds.
10. His grave strike carried a comb.

SP 3 LST 1 SUB 3

1. My huge team could treat a checkbook.
2. Their speed tilts to their moons.
3. Your rusty rains spread the stain.
4. His approach should set her fringes.
5. Your mind launches your screens.
6. His ears sank our inks.
7. A light cold bursts by the seat.
8. Your foolish roles defended the growths.
9. Our act strengthens my cage.
10. A deaf heir bats to his ovens.

SP 3 LST 1 SUB 4

1. A game pours on his culture.
2. Our strong tires wasted our lords.
3. Your shape tapped at his deed.
4. His viewpoints hide at a mode.
5. His right lengths would tap your camps.
6. Our wide hit can name our shift.
7. His spear would answer for her studs.
8. Their taut sheds can merge their cent.

9. A young viewpoint twisted on the ruling.
10. My card should finish their drought.

SP 3 LST 1 SUB 5

1. His mild cry can treat our spell.
2. A brain packs in his mess.
3. My frank couplers choked on her excerpt.
4. Our drag will dress a stew.
5. The full bullets must jump a twist.
6. A green stack looks to your slip.
7. Her bloods clean his nerve.
8. My prone beef furnishes a seam.
9. My end letters may cut the sheet.
10. Your small graces may lean on our worth.

SP 3 LST 2 SUB 1

1. His blood could guard the tip.
2. The gloves spit on the cut.
3. Your sixteen gas drills the lease.
4. Her short notch gives up our wheel.
5. Our sane meat could plead to our horse.
6. Their woven rod can speak to the plans.
7. Our school will lie for my hay.
8. Her tail may compete with his cult.
9. My grim custom may toss at his coach.
10. A rose could hitch to our tile.

SP 3 LST 2 SUB 2

1. Her end globe jumped our evil.
2. Our good could check on our cross.
3. Their strict strife will break our par.
4. A real cat may kick at my fever.
5. Their shield may crash on the mud.
6. His quacks pant at her tale.
7. Their lawn killed their princes.
8. Your gorgeous queen could form by their mound.
9. My signs will bail our mind.
10. The streams live for a stance.

SP 3 LST 2 SUB 3

1. His coast dreamt of her capes.
2. Our tones ensure a curve.
3. His weak thrusts hitched to your queen.
4. His mistress may toss to the wool.
5. Their harmless boot withdrawwed from a visit.
6. The square cheek rises with his sterns.

7. Their rest must glance at his space.
8. His coarse instance would involve their yard.
9. Our wry tip stilled a wardrobe.
10. Their ceiling would stress to their deck.

SP 3 LST 2 SUB 4

1. Your camps must pick at their cake.
2. The strengths challenge your tire.
3. The frequent scar will doubt at her bump.
4. Their taut trip inquires of the tones.
5. His knife choked on our judge.
6. His thread casts their male.
7. His beast observed your unit.
8. His surprise would duck your graces.
9. Our stern urge should leave from our glares.
10. Your tides reduced their leg.

SP 3 LST 2 SUB 5

1. Their threads rented from their fight.
2. The damp chips should merge with our dawn.
3. The tasks will vote for a text.
4. Their wage touched up her planes.
5. Your pure shelfs boost your ant.
6. Our scars could fix our taste.
7. Their acid must announce his hands.
8. Their text cries on a wine.
9. Their stock would bid on a clue.
10. My meat will tilt on his lobe.

SP 3 LST 3 SUB 1

1. My stark chance breaks with my luck.
2. Our real salt drills her cooler.
3. Your net fits in her wrist.
4. My shy ropes will belong to a coast.
5. Your lucky talks may rip your score.
6. His graveyard killed his pie.
7. The convicts could lead his deed.
8. His chests would measure our ash.
9. A gold buys from her use.
10. Your fast cape must blame their blame.

SP 3 LST 3 SUB 2

1. Her best cousins may sleep at your drag.
2. Their humble absence endorsed an edge.
3. Your nurse could eat at his lantern.

4. Her pets adopt the pit.
5. Her tenors can claim my club.
6. His zest would blame my pig.
7. My slow strains would bear with our coin.
8. Her deck should brush by our lip.
9. His prayer will squeeze by their chart.
10. My hat trimmed her stop.

SP 3 LST 3 SUB 3

1. The glad glove would march on their wings.
2. Our prompt hint will invent their strikes.
3. Our penny pants at her exit.
4. Her flush loans can train with our card.
5. A phrase marks up our flag.
6. Her stiff hat wastes his reign.
7. Their back will kneel at your quest.
8. A crowd will fear for the bay.
9. A pet target hires her code.
10. Your sinks dwelled in his proverb.

SP 3 LST 3 SUB 4

1. Your fresh dentists could win at your rail.
2. Your rages could tell to a lobe.
3. The humble roll earned a boot.
4. Our watch springs at a rope.
5. Their meadow may shop in the beauty.
6. The glow may warn your dreads.
7. A glow should soak in our ramp.
8. Her safe pot trots on his stockade.
9. A spine must spring at the brass.
10. Her thick railroad would ask a tag.

SP 3 LST 3 SUB 5

1. Their bin can crawl by our work.
2. A show can go for your cows.
3. Our zest may grow a fork.
4. Their main sketch piles up my monk.
5. His scarce hunger froze a steel.
6. Their cruel doses plant by his queens.
7. The lock could point their costume.
8. Our bold bases shaped your tune.
9. My terrains could sing for a file.
10. Her thought states to my dear.

SP 3 LST 4 SUB 1

1. Your remark commits the tour.
2. His lock should breathe in her cage.
3. Her wide scar must step by her task.
4. Her sly grave should pour his lambs.
5. The hard week should regard your tales.
6. Our ad will dance with a fly.
7. Your job guards her snake.
8. The bedside tied in their curb.
9. Their wry burn fears for your yells.
10. Their bell will crash on a guise.

SP 3 LST 4 SUB 2

1. Her stern roof yielded our shoes.
2. My kingdoms will sign our cries.
3. My clever poll signed the country.
4. Your brown bronzes play the steer.
5. Their pars fulfill her collars.
6. A wise cheek settled with a contest.
7. Their lay tosses a sweep.
8. Your dogs will kick at our whip.
9. Our burnt concerts converted our bowl.
10. The sheer roll will enrich our sentry.

SP 3 LST 4 SUB 3

1. A low troop will enforce the navies.
2. My pockets pant at her tunes.
3. The plain distance grabbed the stocks.
4. The even charm buys the stockings.
5. Your loose lights pine for her coast.
6. A dollar heated our arch.
7. The plea strikes at his wire.
8. A sum should please his scouts.
9. The trip should pack in my seizure.
10. His cocktail may fear for his breed.

SP 3 LST 4 SUB 4

1. A clear thigh sped by the courts.
2. His fatal work knew of his basin.
3. A pretty cook can serve to our brace.
4. A light welcome should tap our loss.
5. A bunch twisted on your nurse.
6. Our counties piled their bank.
7. Our plans flash by their cures.
8. The palm should unload the guard.
9. The shirt straightened her cape.
10. A trade should pull in their wholes.

SP 3 LST 4 SUB 5

1. Our free brushes fear for her force.
2. Your faint pint must fight the statue.
3. My bulb could move to the slab.
4. My large gallon leaves from my seed.
5. The glad stone could learn of our slopes.
6. Our shield calmed his songs.
7. A dark grasp can divorce a wrong.
8. Their fragment missed our approach.
9. Our full blame can give to your toilet.
10. Their rifles informed on their jug.

SP 3 LST 5 SUB 1

1. His left rushes looked at my coasts.
2. The comments would catch their widths.
3. Their fight hurt our tensions.
4. My lush comb retired to the mouth.
5. Our raw skirts can rule for his necks.
6. His stars brought in their tenor.
7. Your battle would rush to our span.
8. Her dense shows must force my sentence.
9. Their wake exerts their unit.
10. Your broad dam should cling on a thread.

SP 3 LST 5 SUB 2

1. Their sparse hold blows on the toe.
2. The deaf stone hitches the seam.
3. A past should receive your boss.
4. Our crude pole will brush by my tracts.
5. My side bosses halt at our refund.
6. His quacks may drag to our dishes.
7. My loud bulb can serve to my fruit.
8. Their flash fears for a tense.
9. Her tight cry must complete our stoves.
10. Our throats held in her zinc.

SP 3 LST 5 SUB 3

1. A vast wire repeled my bear.
2. My local fee dares our throne.
3. Their quest paid to your smells.
4. Their exhaust would seek for my answer.
5. Your normal zeal may pant at a ledge.
6. A dim length scrubed with the bureaus.
7. Your fiery rubber will spring at his reading.
8. My myth may house your starts.

9. Her gaunt grains bat to his lagoons.
10. Her breaks gaze at my dangers.

SP 3 LST 5 SUB 4

1. Your crib will shape their suite.
2. Her beach may hurry to his abuses.
3. A pole must clean his point.
4. Your joint guides list on the bag.
5. My dome would save our garment.
6. Our smooth wishes would pour on a curve.
7. The stray waist spells your lad.
8. Your glad wall should keep in his damage.
9. The cardboard dwelled by a tract.
10. The green can drift on your gain.

SP 3 LST 5 SUB 5

1. His sack bit my midnights.
2. Their will can correct his birds.
3. Your gross thought seizes our neck.
4. My blue knee should speed on your biscuit.
5. My crucial swing must imply to my blast.
6. Her brass spots tested her call.
7. Their prayers must cherish their tires.
8. Your wants should hear of the coils.
9. Her role caused an expanse.
10. The prompt lifts would heat his staffs.

SP 3 LST 6 SUB 1

1. Your southern fine seeked her chill.
2. His wise pine roamed your school.
3. A wry lace hated the ball.
4. Her food should rear at my blonde.
5. Her young note may blame your flies.
6. My country stopped at their suns.
7. Their bedroom can whirl on her flame.
8. Our pilot picked at your reign.
9. My lucks may grasp at our brush.
10. A skilled fine refused your assets.

SP 3 LST 6 SUB 2

1. Your working link suffers at our dear.
2. Our garden prays to their bridge.
3. The thin woodwork must return from our stool.
4. A lagoon collapsed by your nightmares.
5. Their brief could mix with your sticks.

6. Your eye succeeds at our windshield.
7. A sure steak must plant by their wines.
8. A ride should reach for a money.
9. Their nice fragrances can round my game.
10. Our grey breed should gain a beard.

SP 3 LST 6 SUB 3

1. The birth would expect a gang.
2. Her slim tube wept for your egg.
3. A garbage spared a hunch.
4. The dairy squeezed by your texture.
5. Their boots parked by the tons.
6. A lock would smile at my message.
7. His cents will lay on her grin.
8. Their dim goats cast in his drive.
9. A lethal judge weeps for your lawn.
10. A null spread learned from their pitch.

SP 3 LST 6 SUB 4

1. Their wide princes count up my sex.
2. A limp cheer extracts my house.
3. Her loud rocket cooked your ventures.
4. Their shifts should plead to a despair.
5. My moving plank should pause by a corpse.
6. Their bolts may duck my crime.
7. Their thought extended my step.
8. Our view can secure her piece.
9. Your steep plane may cross by our dock.
10. My glad grams step in her pound.

SP 3 LST 6 SUB 5

1. Their scream incured a stick.
2. The drug prayed to his taste.
3. Their pure crafts can knock our hut.
4. Their run printed a war.
5. Your bit backed her bluff.
6. A cow should sell a radish.
7. Their tones should hand to our lung.
8. Your tie sleeps at their eves.
9. Our logs should nail in their deck.
10. Your tight lifts must hurt our rage.

SP 3 LST 7 SUB 1

1. Your dear canyons would feed on their cell.
2. Our blunt weight doubled her burst.

3. Our phase can send their yarns.
4. My skinny hens could shift with a cabin.
5. My tame sigh slipped on your drops.
6. Their satires plead for the slug.
7. His quaint maze touches up her post.
8. My monthly traffic can eat with our rotor.
9. My old trail should charge at her minks.
10. Their mean screens could doubt at a link.

SP 3 LST 7 SUB 2

1. Our daily capes laughed with her cliff.
2. The smart blames freed a bench.
3. Your thin player wants their boys.
4. The surge should trail on his greens.
5. My backs should feed on her wrong.
6. Their nice meet could vanish from their counter.
7. His crime claimed the nails.
8. Our tons must pack your chair.
9. The strict speeds will curl our plug.
10. Their price brushes by the widths.

SP 3 LST 7 SUB 3

1. Her green appeal ducked our cliff.
2. The thumb could bear with their knight.
3. My firm kid appealed to their mind.
4. Your casts rebut your bets.
5. A swift shotgun would treat her tenant.
6. Her sundry cloths would launch your slots.
7. The tools open up your load.
8. His knight may drag to her ash.
9. His zeals choked on your daylight.
10. Your ranks set up a harm.

SP 3 LST 7 SUB 4

1. The sale would love their poll.
2. My truce will name her plaster.
3. Their shrill boats can divide my speeds.
4. His obscure half wept for our troop.
5. His reserve steps in her charge.
6. Her illness could crack on the thrones.
7. Your tails trimmed her folks.
8. Your mortal screen must send to a crash.
9. Her sad spell may dress our truth.
10. A choice year will date my steams.

SP 3 LST 7 SUB 5

1. The will keeps in their offer.
2. Your woes would exert their follies.
3. My sly veil gave the desk.
4. Their stress will drag to a cloud.
5. Her ledges may buy from his banquet.
6. My strange joint would know of our times.
7. My coat pried in a campaign.
8. A sense dimmed his stand.
9. A hormone would tumble on our bans.
10. The glad town charged at a blindness.

SP 3 LST 8 SUB 1

1. Her wool throws at a toy.
2. Their awake lane plants by your board.
3. My ton will place an ant.
4. My rise looked at their love.
5. My brass rate may kneel by his minks.
6. His scandals may glow by my curve.
7. The kids eat with her steels.
8. My shrewd slip sustains our searches.
9. Our glad speed could cancel a length.
10. Her dance must rip their glass.

SP 3 LST 8 SUB 2

1. My pass killed her pole.
2. A merit feared for my grants.
3. His slugs should mix with her verse.
4. My fan may march to our trails.
5. My myth should combine with her scores.
6. Their fatty churchyards should strengthen my squall.
7. Our wry youth could dwell by her nod.
8. Our sweet wind should review his pit.
9. My queer rockets secure his craft.
10. Our stealth searched for your instances.

SP 3 LST 8 SUB 3

1. My shift should spread on the guides.
2. Their live reaches should await her show.
3. The dome should bet a male.
4. A sure team must tax a lens.
5. Our deaf premieres settle with the mail.
6. A hard jump must offer to a grave.
7. Your smart yell can heat my tube.
8. My mill would focus his monk.
9. The raw shore will dwell in his phone.
10. My funds would crowd your inquest.

SP 3 LST 8 SUB 4

1. His odd mount senses her guards.
2. Their cores must warn their task.
3. The gaps screen our cart.
4. His petty hooks must care for the deeds.
5. Your taste can plant their cop.
6. Our best gang must view his hands.
7. Your cliffs yell at our checkbook.
8. Your motive needed my presses.
9. His coal should split from her huts.
10. A drab thrust may rest by their clusters.

SP 3 LST 8 SUB 5

1. My role disclosed her width.
2. A burnt line should head for a chapel.
3. The unseen rain glanced at our plan.
4. Your fierce infield would strike at his tip.
5. Her right stops may steal a cent.
6. Our sharp gum saved up her stroke.
7. Her reef may delay her route.
8. Her glares can cause my captain.
9. The southern blast must review the couch.
10. A trend should draw with my cats.

SP 3 LST 9 SUB 1

1. His presses indulged in a fool.
2. His wrath could achieve a strip.
3. The cute bit must shoot to my mountains.
4. Their odd length can crash on the mats.
5. The sharp futures will crowd their premise.
6. My thiefs burn his ear.
7. A novel cheek coached their plight.
8. His bazaar climbs on his handfuls.
9. My far paste will seek for the want.
10. Their sore passports should blame his legs.

SP 3 LST 9 SUB 2

1. Our cheap sphere may count up the stove.
2. His true ball may adapt to your haze.
3. The sound soils must go for my screams.
4. His mad knee copes with my talk.
5. Your bright horror cut their empire.
6. A test cools a sack.
7. Your angry bases share in his age.

8. Your nest will split from my show.
9. A theme tapped at their pins.
10. The maid should shine on your car.

SP 3 LST 9 SUB 3

1. Your lip counted on my fame.
2. Her coal could beam at his zero.
3. Her contract shopped for my cream.
4. The slug stuns your flower.
5. Their squall gazes at her tune.
6. Your shield let in her counts.
7. The boxcar pursued our site.
8. My untouched routine jumps at our ranges.
9. Her fruitful slave can wish for the spot.
10. Our fake presses should sense my hip.

SP 3 LST 9 SUB 4

1. The wool must exist with their slide.
2. His hazy grudge could present to their degree.
3. The bases would require of his sheet.
4. My spell should grumble to their log.
5. Our sound shakes at the garage.
6. Your pain switches with his goat.
7. Your stall forces his maids.
8. His aim borrows their booth.
9. My base cloth plunges in her photos.
10. A minor moon would wake the promises.

SP 3 LST 9 SUB 5

1. Their clauses lacked their cups.
2. Our class can get by her eye.
3. His resource can score a soybean.
4. His package cracks on the viewpoint.
5. Their sums missed her break.
6. A cute folk should rip the dashes.
7. My swell nation will plan on our tents.
8. A main stud rallies to her progress.
9. My blind cones beat in your wheats.
10. Our hope may creep to your key.

SP 3 LST 10 SUB 1

1. Our swamps will achieve your hotel.
2. Her nest will dry your craft.
3. A plank must muffle our charges.
4. His grudge would compete for his safe.

5. His rooms pray to their swamp.
6. Her grip calmed the depths.
7. Our hormones relieved his cone.
8. The good tea should list on his safes.
9. My side cell loved your maze.
10. The post could merge their clauses.

SP 3 LST 10 SUB 2

1. The field curled their kid.
2. Her blades should scrub with your theft.
3. Their quaint ride may light up her sandwich.
4. Your far signals may test the axes.
5. His constants showed in our ramps.
6. My slack corpse will sink in their league.
7. Your shrewd hams will hand the gaze.
8. Your dish thinks of his charm.
9. My tires may calm their joy.
10. Their capes would sail on our whiskeys.

SP 3 LST 10 SUB 3

1. My correct process equalled the blast.
2. His formal vapor must fear his thighs.
3. My cheerful heat may stretch on a worth.
4. A warm tale would leave the hurts.
5. My tunnels can guard his tooths.
6. The wheels cling on her pain.
7. Your long wounds should thank a quarter.
8. A false phrase could scrub with my rope.
9. Their gold wings file her mean.
10. Your tacts would tilt on his slug.

SP 3 LST 10 SUB 4

1. Their turtle may help our grams.
2. Their weird taxes will lie to her uncles.
3. His coast fears for his rope.
4. Her sparse mound digs my spirals.
5. Our ink would pour on the rule.
6. A house must bear with her hips.
7. The witty tanks could steal from their pit.
8. His end stern obtains from a knee.
9. A lane served with his wedding.
10. My nails hand her seam.

SP 3 LST 10 SUB 5

1. My walk wore their cast.

2. Their taste scrubed with our bargain.
3. Her brief excluded the rock.
4. Their hands cloud their matters.
5. My clear pie built on your route.
6. Your splits drank to the part.
7. Our zests granted to the draft.
8. Your tan lung should enlarge the press.
9. The wrong height will argue at the part.
10. Our lunar guise will squeeze by your wait.

SP 3 LST 11 SUB 1

1. Their end provinces could welcome her voices.
2. My fresh ghosts stand on your phone.
3. Her right trap orders my spreads.
4. His side tract may elect my range.
5. His mere fear contends with her taxi.
6. Our odd span holds up a bow.
7. Their tooth could guide their use.
8. Their menu can pace on a team.
9. Their plants phone her tariffs.
10. His prompt effect extended his pine.

SP 3 LST 11 SUB 2

1. The fake scent calls to their charges.
2. The garbage danced with your worlds.
3. A shy reign crouches on their fiction.
4. Our long gift will let in my aims.
5. His beam paced on their myth.
6. Your threat may tell the bluff.
7. A swift asset bets her chance.
8. Our sleeve freezes their thought.
9. The log could pause by our neck.
10. Their left cheer would catch the ruin.

SP 3 LST 11 SUB 3

1. The apt kid talked of his acts.
2. Her sound spy merges with her arm.
3. The rents creep to your schedule.
4. The gold string should break with my snow.
5. His moist star spreads on her lacks.
6. Their curbs bail his folly.
7. The frozen saint parks at my soap.
8. His cats should build her spoon.
9. Your flashes hate your crest.
10. Our sore fraud revised her plant.

SP 3 LST 11 SUB 4

1. Our plants would reverse our ropes.
2. Our strict program could direct my brass.
3. Our bulky kick matches with the date.
4. His grand sweaters must speak of a bedroom.
5. A gallant bride could urge my reach.
6. Our ghost pined for our walks.
7. Our snow would tie in a disease.
8. A deep yell would stick to my streetcars.
9. My cautious attires would repel his cuts.
10. Her scarce clay may miss the trust.

SP 3 LST 11 SUB 5

1. The sorrows can pack in my touches.
2. My chief can commend his vices.
3. Our ration stood on his shifts.
4. My breeds insured our cover.
5. His sundown endorsed the steel.
6. My sad chins will tie in their claims.
7. Their real trust taped up his ground.
8. A verse could count on their world.
9. My cartridge can laugh at the pursuits.
10. Her fit forks greeted their fissions.

SP 3 LST 12 SUB 1

1. Their slight squalls must smell your fold.
2. Your entire void will go to a prose.
3. Our low rage will see to his money.
4. My sum strikes at his slump.
5. Your paw spends on his drains.
6. My unfair paintings would cause our sister.
7. Her tan pairs can learn of your trays.
8. A waiting dot should focus at the fund.
9. The wrong tomb taught to our trifle.
10. Your steep pursuits wasted their par.

SP 3 LST 12 SUB 2

1. Their railroad asked for your lid.
2. A callous truck can keep the garbages.
3. His lone wine sued their whip.
4. The languages crashed on a sign.
5. The move prevented her cargo.
6. Their journey backed their folk.
7. A knot could smell of our scratches.
8. A front leg may free the bees.
9. Your right zeal complied with her mentions.

10. The locks must want my widths.

SP 3 LST 12 SUB 3

1. The gaps march to your points.
2. Your strange seller could coach her pears.
3. Her dread can blow on our reign.
4. His gaunt speed must touch my plots.
5. Their lot stems my shutter.
6. A mast could warn our hostess.
7. Her fancy bills will bless my need.
8. Our schemes would look to her grades.
9. The sadnesses fill in a cap.
10. The transport visits at her shotgun.

SP 3 LST 12 SUB 4

1. His sheer spear would maintain our bus.
2. His tone furnished your soil.
3. Your great lover sits on your ban.
4. The swollen uncles dated your ankles.
5. My strict pass conforms to your zeros.
6. My obscure three plans for our drill.
7. Their corpse scores her safe.
8. Your plow stands for her rust.
9. Her tough wines knock at my marine.
10. His rich book would let in the fans.

SP 3 LST 12 SUB 5

1. Their tag learned of his clip.
2. My even slope would find your rain.
3. The cheap produce can meet with their cheese.
4. Your minute rabbit should fit in their lanterns.
5. Their gaunt vein may clean your standard.
6. The blunt slab may whip up our drunk.
7. Her sole hat will portray their quests.
8. Our blond eye delayed a stack.
9. My spear trots on your mat.
10. Our guilts could sort her item.

SP 3 LST 13 SUB 1

1. His round ledge strived for their cook.
2. Our lush drum twisted on a chip.
3. The cure will toss their curses.
4. Your proof could block in a slate.
5. Their aware searches freed their corn.
6. Their kind ship regards her dread.

7. Her tame bell started from my writers.
8. Their needless pies could trust in her priests.
9. My hoses should tap at his bedside.
10. His jar should suggest to his consents.

SP 3 LST 13 SUB 2

1. The fresh title may tie in the wife.
2. My tricks pointed at your lobby.
3. Your quick tile may compute their sort.
4. The huge barge mastered his forces.
5. His pools commented to your hen.
6. The trees could invite our caution.
7. Our black slot will grow your tense.
8. Her mouths would side with the harbors.
9. Our tough glance would enlist in her barges.
10. His lie could fit your depths.

SP 3 LST 13 SUB 3

1. Her league may set up a tire.
2. A high tile will mail his waxes.
3. Their fast bath must change by the campus.
4. His pack lifted up their kitchen.
5. Your plight uses the section.
6. The neat mob should guess at your safe.
7. The sane thumb traced my notes.
8. My blend files by the beer.
9. Her ice passes in his glow.
10. The knife crashed on the states.

SP 3 LST 13 SUB 4

1. Their bus must focus your pail.
2. His hard noise rents from our safe.
3. Their junior could build on my creek.
4. My grave stage could tar a nature.
5. His torsos should speed by the profit.
6. Your worthwhile speech will fear for her builder.
7. Her wages smelled of his chances.
8. Our cry paints on your slate.
9. A steep fort commands an ax.
10. Your local could smell of your push.

SP 3 LST 13 SUB 5

1. Her shortage may yell at the cloth.
2. Your new preys should run on our friends.
3. Your art should choose for your thrust.

4. Their dots will cook for your ads.
5. Our pulp rang at a range.
6. Their costly stockings should lift up a bet.
7. A speech should approve of your skirt.
8. Her cries must practice with your gain.
9. Her bonds will stretch on his jar.
10. Your cute crosses proclaim to the amounts.

SP 3 LST 14 SUB 1

1. Her mile could smile at our bone.
2. His spark throws at his gross.
3. A swell accent built for his fist.
4. My pearl sweeps our roast.
5. His green ink rushes to their scrap.
6. An aunt knocked your appeal.
7. A pin shines on their camp.
8. A bus would dare their clue.
9. My sure stalls canceled her cliff.
10. Their young drafts shine on his branch.

SP 3 LST 14 SUB 2

1. A wild lure should win at their glow.
2. Their wry victims would compose our stealth.
3. The sport may score their notch.
4. The rare tunes could run on their youth.
5. Their walking harm will flash by our sons.
6. My wards wheel in your crime.
7. My witch wakes my male.
8. Our fertile nurse wears our hearings.
9. Their coasts seized their wine.
10. His north courts told the ditches.

SP 3 LST 14 SUB 3

1. A gang buries their hearts.
2. Our fare scrubs your breakdown.
3. Their pea measures her speech.
4. The blind balloon suffers at her margins.
5. Your cave traps your dress.
6. Their blunt hat touches up his keel.
7. Her queer counts should come to her camps.
8. Their rages spring at the rag.
9. His sheer site boils their spy.
10. His tangle clung on my uptake.

SP 3 LST 14 SUB 4

1. The main supports will cut our streak.
2. The quest must share in their sand.
3. His pace must bill my slugs.
4. The calf will spell your thread.
5. Her vice detected her bolt.
6. His lid may speed by a meet.
7. An extreme lease fished in her blend.
8. My green lids excluded their forest.
9. Your splits would show his beam.
10. A flush bell searches for a salt.

SP 3 LST 14 SUB 5

1. Our large shrine can crawl to our sphere.
2. A fort splits from their sketches.
3. The long bridge must leave our membrane.
4. His sweat waits for your radish.
5. Her mild tub could jump at my brain.
6. My farms strive for a train.
7. My hot stride may look at her shade.
8. The extent can submit my easel.
9. Their outright coach owed to your circuses.
10. Your side heart may issue to his trend.

APPENDIX C

Description of Hearing-Impaired Listeners

MF Female Age 53

MF suffered from a moderate to severe progressive bilateral hearing impairment for approximately 10 years. She wears a hearing aid in her right ear which aids her in communicating, but still has substantial difficulty in anything but a one-on-one communication situation in a quiet environment. She uses her left ear when speaking on the telephone (an amplifier is attached to the telephone), and seems to prefer that ear though she wears the hearing aid in her right ear. She experiences no dizziness or tinnitus, and her impairment has been stable over approximately the last three years.

VF Female Age 51

VF has suffered from a moderate progressive bilateral hearing impairment for approximately 10 years. She wears a hearing aid in her right ear which seems to aid her in communicating in most quiet conversational situations. She experiences no dizziness or tinnitus, and her impairment has been stable for several years.

GC Male Age 63

GC has suffered from a bilateral hearing loss that is apparently profound for frequencies above 1 KHz, but essentially normal below this frequency. GC seems to have incurred this loss when serving in an artillery brigade in World War II. He does not wear a hearing aid, but does not seem to have any difficulty communicating with people in most situations. He prefers listening to speech at relatively low levels, and seems to have some tolerance problem at high levels, complaining that "blockage" of his ears occurs. He does not experience any dizziness or tinnitus, and his loss has been stable for many years.

HS Male Age 53

HS has suffered from a unilateral sloping hearing loss in his left ear for many years. At first it was assumed that his loss was congenital in origin, but HS remembers that when young, a firecracker exploded near his left ear, perhaps the actual cause of the impairment. HS was the only "experienced" listener in these experiments, having participated in a major study on amplitude compression approximately four years ago. Since then, a very mild flat hearing loss has slightly worsened, and his ability to tolerate loud sounds in general has decreased. He does not wear a hearing aid and has no difficulty communicating in normal situations. He experiences no dizziness or tinnitus.

LF Female Age 24

LF has a moderate bilateral hearing impairment that is congenital in origin. She may have also suffered from a mild case of cerebral palsy, that seems to be in remission. She has a slight speech impediment, but seems to have well-developed language abilities. She prefers speech to be presented at very high levels. She wears a binuaral aid that permits her to communicate adequately in a one-on-one situation. She does not suffer from dizziness, but would occasionally complain of tinnitus in the right ear. Her impairment was essentially stable, though it was difficult to obtain consistent thresholds.

APPENDIX D

Analysis of Variance of Learning Effects at MCL

Sum of Squares	Square	DF	F	(%)	Factor
.8091	.4045	2	91.9*	6.2	SP
.3613	.3614	1	82.1*	2.8	SY
.0617	.0308	2	7.0*	.4	SYxSP
5.9478	1.9826	3	450.6*	46.3	LI
.0626	.0105	6	2.4	.3	LIxSP
.6447	.2149	3	48.8*	4.9	LIxSY
.1439	.0240	6	5.5*	.9	LIxSYxSP
3.3854	3.3854	1	769.4*	26.4	MO
.4886	.2445	2	55.5*	3.8	MOxSP
.0002	.0002	1	--	--	MOxSY
.0036	.0018	2	.4	--	MOxSYxSP
.1359	.0453	3	10.3*	1.0	MOxLI
.0625	.0104	6	2.4	.3	MOxLIxSP
.0177	.0059	3	1.3	--	MOxLIxSY
.0191	.0032	6	.7	--	MOxLIxSYxSP
.1446	.1446	1	32.9*	1.1	TR
.0446	.0223	2	5.1*	.3	TRxSP
.0037	.0037	1	.8	--	TRxSY
.0198	.0099	2	2.2	.1	TRxSYxSP
.1211	.0404	3	9.2*	.8	TRxLI
.0413	.0069	6	1.6	.1	TRxLIxSP
.1024	.0341	3	7.8*	.7	TRxLIxSY
.0646	.0108	6	2.5	.3	TRxLIxSYxSP
.0010	.0010	1	.2	--	TRxMO
.0162	.0081	2	1.8	.1	TRxMOxSP
.0013	.0013	1	.3	--	TRxMOxSY
.0092	.0046	2	1.0	--	TRxMOxSYxSP
.0059	.0020	3	.5	.1	TRxMOxLI
.0492	.0082	6	1.9	.2	TRxMOxLIxSP
.0094	.0031	3	.7	--	TRxMOxLIxSY
.0267	.0044	6	1.0	--	TRxMOxLIxSYxSP (Error Term)
12.8053	.1348	95			Total

SP=Speaker, SY=System, LI=Listener, MO=Mode, TR=Trial

* Indicates statistical significance at the .95 level.

APPENDIX E

Word Level Intelligibility of Type 1 Sentences

Listener MF

TEST LIST	NOUN	CONV-ORTH VERB	NOUN
MM 2	24	29	10
MM 4	33	24	43
MP 4	50	41	41
MP 5	36	32	23
MS 3	31	21	14
MS 4	50	35	15
		CLEAR-ORTH	
MM 2	57	62	43
MM 4	48	52	62
MP 4	32	45	64
MP 5	55	45	45
MS 3	55	59	31
MS 4	46	58	35
		CONV-OMCL	
MM 6	44	32	28
MM 8	27	27	68
MP 1	73	64	52
MP 8	60	73	30
MS 7	24	40	24
MS 8	19	31	27
		CLEAR-OMCL	
MM 6	80	72	80
MM 8	59	55	68
MP 1	64	73	67
MP 8	87	80	67
MS 7	48	84	44
MS 8	35	69	46

Listener VF

TEST LIST	NOUN	CONV-ORTH VERB	NOUN
MM 2	86	71	71
MM 4	57	52	67
MP 4	86	86	87
MP 5	78	61	87
MS 3	77	69	65
MS 4	71	71	71
		CLEAR-ORTH	
MM 2	95	100	95
MM 4	76	90	90
MP 4	82	95	77
MP 5	87	91	78
MS 3	96	85	69
MS 4	86	93	86
		CONV-OMCL	
MM 6	76	76	68
MM 8	79	62	57
MP 1	91	82	73
MP 8	86	73	57
MS 7	52	56	56
MS 8	62	62	50
		CLEAR-OMCL	
MM 6	100	92	88
MM 8	95	90	95
MP 1	70	94	64
MP 8	87	90	80
MS 7	80	84	80
MS 8	65	81	62

Listener GC

TEST LIST	NOUN	CONV-ORTH VERB	NOUN
MM 2	62	38	34
MM 4	38	10	12
MP 4	59	59	21
MP 5	59	45	30
MS 3	40	37	22
MS 4	46	46	36
		CLEAR-ORTH	
MM 2	50	50	55
MM 4	81	76	76
MP 4	43	67	81
MP 5	86	67	71
MS 3	72	76	59
MS 4	69	58	58
		CONV-OMCL	
MM 6	68	36	60
MM 8	55	23	68
MP 1	61	48	70
MP 8	70	50	60
MS 7	40	32	56
MS 8	33	44	44
		CLEAR-OMCL	
MM 6	84	60	76
MM 8	73	64	64
MP 1	58	64	55
MP 8	77	73	60
MS 7	64	64	60
MS 8	46	81	77

Listener HS

TEST LIST	NOUN	CONV-ORTH VERB	NOUN
MM 2	57	38	67
MM 4	55	40	65
MP 4	50	73	68
MP 5	60	45	55
MS 3	38	41	69
MS 4	50	62	42
		CLEAR-ORTH	
MM 2	79	58	79
MM 4	90	86	76
MP 4	75	80	70
MP 5	82	77	64
MS 3	86	76	66
MS 4	59	63	70
		CONV-OMCL	
MM 6	72	68	68
MM 8	68	68	73
MP 1	82	76	85
MP 8	81	71	81
MS 7	40	72	80
MS 8	52	72	68
		CLEAR-OMCL	
MM 6	88	80	92
MM 8	82	91	95
MP 1	81	84	88
MP 8	93	87	87
MS 7	88	88	88
MS 8	85	88	88

Listener LF

TEST LIST	NOUN	CONV-ORTH VERB	NOUN
MM 2	57	57	67
MM 4	70	60	75
MP 4	86	82	91
MP 5	90	55	90
MS 3	69	69	62
MS 4	77	77	88

		CLEAR-ORTH	
MM 2	68	63	79
MM 4	100	90	76
MP 4	70	95	95
MP 5	95	82	91
MS 3	86	86	72
MS 4	93	93	81

APPENDIX F

Analysis of Variance of Word Level Errors in Type 1 Sentences

Sum of Squares	Mean Square	DF	F	(%)	Factor
.0766	.018	2	.8	--	WT
.1084	.108	1	2.1	.1	TR
.0069	.003	2	.1	.2	TRxWT
2.2991	1.150	2	22.9*	3.8	SP
1.1434	.286	4	5.7*	1.6	SPxWT
.0125	.006	2	.1	.2	SPxTR
.8549	.214	4	4.3*	1.1	SPxTRxWT
12.1502	12.150	1	241.7*	21.1	MO
.5880	.294	2	5.8*	.8	MOxWT
.1638	.164	1	3.3	.2	MOxTR
.0090	.004	2	.1	.2	MOxTRxWT
1.6272	.814	2	16.2*	2.7	MOxSP
.0707	.018	4	.4	.2	MOxSPxWT
.5828	.291	2	5.8*	.8	MOxSPxTR
.6556	.164	4	3.3*	.8	MOxSPxTRxWT
1.3439	1.344	1	26.7*	2.3	SY
.0454	.023	2	.5	.1	SYxWT
.0014	.001	1	.0	.1	SYxTR
.0596	.030	2	.6	.1	SYxTRxWT
.3878	.194	2	3.9*	.5	SYxSP
.8447	.211	4	4.2*	1.1	SYxSPxWT
.1172	.059	2	1.2	--	SYxSPxTR
.0456	.011	4	.2	.3	SYxSPxTRxWT
.0016	.002	1	.0	.1	SYxMO
.0302	.015	2	.3	.1	SYxMOxWT
.0229	.023	1	.5	.1	SYxMOxTR
.0013	.001	2	.0	.2	SYxMOxTRxWT
.0508	.025	2	.5	.1	SYxMOxSP
.1122	.028	4	.6	.2	SYxMOxSPxWT
.1625	.081	2	1.6	.1	SYxMOxSPxTR
.1616	.040	4	.8	.1	SYxMOxSPxTRxWT
21.1647	7.055	3	140.3*	36.6	LI
1.2254	.204	6	4.1*	1.6	LIxWT
.1891	.063	3	1.3	.1	LIxTR
.2956	.049	6	1.0	--	LIxTRxWT
.4659	.078	6	1.6	.3	LIxSP
.4434	.037	12	.7	.3	LIxSPxWT
.3500	.058	6	1.2	.1	LIxSPxTR
.5440	.045	12	.9	.1	LIxSPxTRxWT
.0901	.030	3	.6	.1	LIxMO
.5059	.084	6	1.7	.4	LIxMOxWT
.3021	.101	3	2.0	.3	LIxMOxTR
.1383	.023	6	.5	.3	LIxMOxTRxWT
.2428	.040	6	.8	.1	LIxMOxSP
.5252	.044	12	.9	.1	LIxMOxSPxWT
.4227	.070	6	1.4	.2	LIxMOxSPxTR

.2636	.022	12	.4	.6	LIxMOxSPxTRxWT
2.5018	.834	3	16.6*	4.1	LIxSY
.2256	.038	6	.8	.1	LIxSYxWT
.1009	.034	3	.7	.1	LIxSYxTR
.2880	.048	6	1.0	--	LIxSYxTRxWT
.6450	.107	6	2.1	.6	LIxSYxSP
.6112	.051	12	1.0	--	LIxSYxSPxWT
.3377	.056	3	1.1	.1	LIxSYxSPxTR
.1846	.015	6	.3	.8	LIxSYxSPxTRxWT
.0713	.024	3	.5	.1	LIxSYxMO
.2262	.038	6	.8	.1	LIxSYxMOxWT
.0990	.033	3	.7	.1	LIxSYxMOxTR
.1409	.023	6	.5	.3	LIxSYxMOxTRxWT
.0400	.007	6	.1	.5	LIxSYxMOxSP
.3096	.026	12	.5	.5	LIxSYxMOxSPxWT
.3947	.066	6	1.3	.2	LIxSYxMOxSPxTR
.2217	.018	12	.4	.7	LIxSYxMOxSPxTRxWT
7.2389	.050	144			Error Term
57.3049	.200	287			Total

WT=Word Position, TR=Trial, SP=Speaker, MO=Mode, SY=System, LI=Listener

* Indicates statistical significance at the .95 level.

APPENDIX G

Word Level Intelligibility of Type 2 Sentences

Listener MF

TEST LIST	ADJ	NOUN	VERB	NOUN
CONV-ORTH				
MM 2	55	24	38	14
MM 4	45	34	28	14
MP 4	43	25	43	25
MP 5	46	29	46	14
MS 3	43	0	10	24
MS 4	38	0	13	8
CLEAR-ORTH				
MM 2	83	45	66	48
MM 4	79	66	59	69
MP 4	39	39	46	54
MP 5	71	50	57	36
MS 3	48	29	43	38
MS 4	63	33	50	38
CONV-OMCL				
MM 6	40	16	16	8
MM 8	61	32	25	36
MP 1	82	53	65	59
MP 8	80	35	55	25
MS 7	60	20	40	16
MS 8	54	29	50	29
CLEAR-OMCL				
MM 6	72	60	84	60
MM 8	79	57	71	50
MP 1	82	71	71	71
MP 8	55	50	80	50
MS 7	88	52	68	52
MS 8	83	46	58	42

Listener VF

CONV-ORTH

TEST LIST	ADJ	NOUN	VERB	NOUN
MM 2	83	69	62	66
MM 4	90	72	76	69
MP 4	93	82	75	96
MP 5	70	81	70	81
MS 3	83	50	50	63
MS 4	86	68	77	68

CLEAR-ORTH

MM 2	93	86	93	69
MM 4	100	83	86	85
MP 4	96	86	82	86
MP 5	96	93	85	81
MS 3	96	75	92	63
MS 4	86	91	77	50

CONV-OMCL

MM 6	88	44	76	44
MM 8	83	55	55	62
MP 1	94	71	71	82
MP 8	80	70	70	60
MS 7	64	36	52	44
MS 8	79	67	67	67

CLEAR-OMCL

MM 6	100	100	88	84
MM 8	86	83	90	76
MP 1	100	65	88	71
MP 8	85	85	85	75
MS 7	92	64	72	52
MS 8	79	54	71	63

Listener GC

CONV-ORTH

TEST LIST	ADJ	NOUN	VERB	NOUN
MM 2	55	69	34	55
MM 4	33	34	28	41
MP 4	61	57	25	64
MP 5	57	36	29	64
MS 3	60	25	15	44
MS 4	46	25	17	29

CLEAR-ORTH

MM 2	67	70	43	53
MM 4	76	69	52	69
MP 4	59	41	31	55
MP 5	59	72	41	72
MS 3	52	24	57	67
MS 4	71	71	62	62

CONV-OMCL

MM 6	48	40	32	40
MM 8	61	50	46	43
MP 1	65	59	47	59
MP 8	65	50	50	50
MS 7	32	4	36	48
MS 8	57	39	35	35

CLEAR-OMCL

MM 6	80	72	40	48
MM 8	86	54	54	46
MP 1	71	41	53	59
MP 8	80	50	60	70
MS 7	68	36	48	60
MS 8	67	62	58	67

Listener HS

CONV-ORTH

TEST LIST	ADJ	NOUN	VERB	NOUN
MM 2	76	59	52	48
MM 4	43	53	60	53
MP 4	68	57	46	50
MP 5	80	63	70	67
MS 3	38	14	19	57
MS 4	67	42	29	50

CLEAR-ORTH

MM 2	97	87	77	58
MM 4	83	83	90	66
MP 4	77	77	63	77
MP 5	75	68	79	68
MS 3	81	52	86	86
MS 4	57	35	70	57

CONV-OMCL

MM 6	76	72	76	56
MM 8	68	64	50	64
MP 1	88	59	100	71
MP 8	74	63	68	63
MS 7	64	48	76	56
MS 8	56	40	68	64

CLEAR-OMCL

MM 6	80	84	80	80
MM 8	89	75	90	79
MP 1	94	83	89	78
MP 8	80	70	75	90
MS 7	85	65	88	77
MS 8	75	88	67	83

Listener LF

CONV-ORTH

TEST LIST	ADJ	NOUN	VERB	NOUN
MM 2	90	59	69	55
MM 4	63	63	57	63
MP 4	82	71	75	75
MP 5	87	77	90	87
MS 3	76	43	43	52
MS 4	75	46	50	75

CLEAR-ORTH

MM 2	97	77	87	81
MM 4	90	76	69	72
MP 4	77	80	90	83
MP 5	86	71	89	68
MS 3	86	76	48	71
MS 4	87	70	91	74

APPENDIX H

Analysis of Variance of Word Level Errors in Type 2 Sentences

Sum of Squares	Mean Square	DF	F	(%)	Factor
8.7970	2.932	3	48.1*	9.4	WT
.0002	.000	1	.0	.1	TR
.2358	.079	3	1.3	.1	TRxWT
5.0347	2.517	2	41.3*	5.3	SP
1.4048	.234	6	3.8*	1.1	SPxWT
.2560	.128	2	2.1	.2	SPxTR
.6723	.112	6	1.8	.3	SPxTRxWT
15.0393	15.039	1	246.9*	16.2	MO
.2569	.086	3	1.4	.1	MOxWT
.0003	.000	1	.0	.1	MOxTR
.0222	.007	3	.1	.2	MOxTRxWT
2.1094	1.055	2	17.3*	2.2	MOxSP
.2133	.036	6	.6	.2	MOxSPxWT
.4490	.225	2	3.7*	.4	MOxSPxTR
.2139	.036	6	.6	.2	MOxSPxTRxWT
1.2519	1.252	1	20.6*	1.3	SY
.4714	.157	3	2.6	.3	SYxWT
.0707	.071	1	1.2	--	SYxTR
.1718	.057	3	.9	___	SYxTRxWT
.4882	.244	2	4.0*	.4	SYxSP
.3931	.066	6	1.1	--	SYxSPxWT
.3856	.193	2	3.2*	.3	SYxSPxTR
.2359	.039	6	.6	.1	SYxSPxTRxWT
.0306	.031	1	.5	--	SYxMO
.1661	.055	3	.9	--	SYxMOxWT
.1705	.170	1	2.8	.1	SYxMOxTR
.3549	.118	3	1.9	.2	SYxMOxTRxWT
.0933	.047	2	.8	--	SYxMOxSP
.6800	.113	6	1.9	.3	SYxMOxSPxWT
.2144	.107	2	1.8	.1	SYxMOxSPxTR
.2710	.045	6	.7	.1	SYxMOxSPxTRxWT
29.8116	9.937	3	163.2*	32.2	LI
3.3370	.371	9	6.1*	3.0	LIxWT
.2863	.095	3	1.6	.1	LIxTR
.3292	.037	9	.6	.2	LIxTRxWT
.1727	.029	6	.5	.2	LIxSP
.9321	.052	18	.9	.2	LIxSPxWT
.3689	.061	6	1.0	--	LIxSPxTR
1.2185	.068	18	1.1	.1	LIxSPxTRxWT
.7593	.253	3	4.2*	.6	LIxMO
.5758	.064	9	1.1	--	LIxMOxWT
.5105	.170	3	2.8*	.4	LIxMOxTR
.2146	.024	9	.4	.4	LIxMOxTRxWT
.6251	.104	6	1.7	.3	LIxMOxSP
.8741	.049	18	.8	.2	LIxMOxSPxWT
.5709	.095	6	1.6	.2	LIxMOxSPxTR

.3389	.019	18	.3	.8	LIxMOxSPxTRxWT
3.0029	1.001	3	16.4*	3.1	LIxSY
.3458	.038	9	.6	.2	LIxSYxWT
.2099	.070	3	1.1	--	LIxSYxTR
.5659	.063	9	1.0	--	LIxSYxTRxWT
1.0474	.175	6	2.9*	.7	LIxSYxSP
.7437	.041	18	.7	.4	LIxSYxSPxWT
.5394	.090	6	1.5	.2	LIxSYxSPxTR
.5876	.033	18	.5	.6	LIxSYxSPxTRxWT
.1209	.040	3	.7	.1	LIxSYxMO
.5105	.057	9	.9	--	LIxSYxMOxWT
1.0826	.361	3	5.9*	1.0	LIxSYxMOxTR
.2884	.032	9	.5	.3	LIxSYxMOxTRxWT
.1602	.027	6	.4	.2	LIxSYxMOxSP
.9600	.053	18	.9	.2	LIxSYxMOxSPxWT
.1122	.019	6	.3	.3	LIxSYxMOxSPxTR
.7490	.042	18	1.7	.4	LIxSYxMOxSPxTRxWT
11.6973	.061	192			Error Term
92.1063	.240	383			Total

WT=Word Position, TR=Trial, SP=Speaker, MO=Mode, SY=System, LI=Listener

* Indicates statistical significance at the .95 level.

APPENDIX I

Two-Syllable Word Errors

CONV-ORTH LISTENER

TEST LIST	MF	VF	GC	HS	LF
MM CO 2	55	88	69	77	81
MM CO 4	29	71	29	62	68
MP CO 5	47	79	44	88	91
MP CO 4	51	71	71	62	82
MS CO 3	21	64	54	29	50
MS CO 4	21	69	38	51	72

CLEAR-ORTH

MM CL 2	69	92	54	96	92
MM CL 4	71	74	79	79	79
MP CL 5	65	79	65	88	85
MP CL 4	53	96	71	91	98
MS CL 2	54	86	50	86	75
MS CL 4	54	74	62	64	79

CONV-OMCL

MM CO 6	46	62	51	81
MM CO 8	52	74	58	71
MP CO 1	73	90	73	93
MP CO 8	67	73	67	83
MS CO 7	44	66	25	75
MS CO 8	40	77	33	73

CLEAR-OMCL

MM CL 6	85	98	73	93
MM CL 8	74	84	61	84
MP CL 1	83	79	76	93
MP CL 8	73	85	85	94
MS CL 7	72	75	53	88
MS CL 8	57	73	73	83

APPENDIX J

Phoneme Level Intelligibility Scores

Listener MF

TEST LIST	FRIC	PLOS	SEMI	NASAL	VOWEL
CONV-ORTH					
MM 2	62	52	64	64	69
MM 4	50	45	56	67	71
MP 4	57	60	59	54	78
MP 5	53	61	65	68	72
MS 3	42	40	49	53	66
MS 4	42	43	44	62	55
CLEAR-ORTH					
MM 2	80	78	80	80	94
MM 4	80	84	80	94	93
MP 4	42	77	68	81	85
MP 5	83	81	84	77	85
MS 3	57	53	68	78	78
MS 4	63	65	70	62	79
CONV-OMCL					
MM 6	61	54	55	60	71
MM 8	75	62	60	67	67
MP 1	78	78	74	84	88
MP 8	71	79	72	73	82
MS 7	58	58	53	63	67
MS 8	57	58	60	70	71
CLEAR-OMCL					
MM 6	88	90	84	90	94
MM 8	78	76	72	85	90
MP 1	80	90	80	92	91
MP 8	71	92	83	92	94
MS 7	70	85	77	90	88
MS 8	69	76	72	73	76

Listener VF

TEST LIST	FRIC	PLOS	SEMI	NASAL	VOWEL
		CONV-ORTH			
MM 2	90	83	93	77	93
MM 4	86	84	92	93	91
MP 4	88	90	97	84	92
MP 5	92	92	98	96	96
MS 3	81	81	91	98	90
MS 4	82	81	84	89	89
		CLEAR-ORTH			
MM 2	92	97	99	88	97
MM 4	89	93	97	100	98
MP 4	91	94	97	93	98
MP 5	89	95	95	93	100
MS 3	86	89	95	95	96
MS 4	85	87	96	95	98
		CONV-OMCL			
MM 6	82	84	89	88	89
MM 8	82	79	85	80	93
MP 1	86	90	96	94	97
MP 8	76	84	94	89	92
MS 7	78	72	88	86	91
MS 8	59	67	78	83	82
		CLEAR-OMCL			
MM 6	96	98	99	98	100
MM 8	96	95	94	93	97
MP 1	73	90	98	95	94
MP 8	82	98	97	97	98
MS 7	74	77	97	84	93
MS 8	67	81	92	96	97

APPENDIX K

Analysis of Variance of Phoneme Level Errors

Sum of Squares	Mean Square	DF	F	(%)	Factor
3.6773	.919	4	45.0*	9.9	PH
5.5588	5.559	1	272.5*	15.2	MO
.3407	.085	4	4.2*	.7	MOxPH
2.5068	1.253	2	61.4*	6.8	SP
.6705	.084	8	4.1*	1.4	SPxPH
,7945	.397	2	19.5*	2.1	SPxMO
.1698	.021	8	1.0	--	SPxMOxPH
.1634	.163	1	8.0*	.4	SY
.0539	.013	4	.6	.1	SYxPH
.0099	.010	1	.5	--	SYxMO
.0188	.005	4	.2	.2	SYxMOxPH
.1699	.085	2	4.2*	.4	SYxSP
.1409	.018	8	.9	.1	SYxSPxPH
.0051	.003	2	.1	.1	SYxSPxMO
.0525	.007	8	.3	.3	SYxSPxMOxPH
15.8441	15.844	1	776.7*	43.6	LI
.5629	.141	4	6.9*	1.3	LIxPH
.3744	.374	1	18.3*	1.0	LIxMO
.0176	.004	4	.2	.2	LIxMOxPH
.0219	.011	2	.5	.1	LIxSP
.1513	.019	8	.9	--	LIxSPxPH
.0039	.002	2	.1	.1	LIxSPxMO
.0886	.011	8	.5	.2	LIxSPxMOxPH
1.3888	1.389	1	68.1*	3.8	LIxSY
.2656	.066	4	3.2*	.5	LIxSYxPH
.0328	.033	1	1.6	--	LIxSYxMO
.0163	.004	4	.2	.2	LIxSYxMOxPH
.4660	.233	2	11.4*	1.2	LIxSYxSP
.1329	.017	8	.8	.1	LIxSYxSPxPH
.0282	.014	2	.7	--	LIxSYxSPxMO
.1176	.015	8	.7	.1	LIxSYxSPxMOxPH
.0217	.022	1	1.1	--	TR
.0668	.017	4	.8	--	TRxPH
.0084	.008	1	.4	--	TRxMO
.0179	.004	4	.2	.2	TRxMOxPH
.0728	.036	2	1.8	.1	TRxSP
.1432	.018	8	.9	.1	TRxSPxPH
.0861	.043	2	2.1	.1	TRxSPxMO
.0813	.010	8	.5	.2	TRxSPxMOxPH
.1636	.164	1	8.0*	.4	TRxSY
.0420	.010	4	.5	.1	TRxSYxPH
.0133	.013	1	.6	--	TRxSYxMO
.0287	.007	4	.3	.2	TRxSYxMOxPH
.0203	.010	2	.5	.1	TRxSYxSP
.2907	.036	8	1.8	.4	TRxSYxSPxPH
.2582	.129	2	6.3*	.6	TRxSYxSPxMO
.0620	.008	8	.4	.3	TRxSYxSPxMOxPH

.0002	.000	1	.0	.1	TRxLI
.1066	.027	4	1.3	.1	TRxLIxPH
.0572	.057	1	2.8	.1	TRxLIxMO
.0603	.015	4	.7	.1	TRxLIxMOxPH
.0105	.005	2	.2	.1	TRxLIxSP
.0427	.005	8	.2	.3	TRxLIxSPxPH
.0948	.047	2	2.3	.2	TRxLIxSPxMO
.1333	.017	8	.8	.1	TRxLIxSPxMOxPH
.0011	.001	1	.0	.1	TRxLIxSY
.0237	.006	4	.3	.2	TRxLIxSYxPH
.1841	.184	1	9.0*	.4	TRxLIxSYxMO
.0648	.016	4	.8	.1	TRxLIxSYxMOxPH
.0226	.011	2	.5	.1	TRxLIxSYxSP
.1647	.021	8	1.0	--	TRxLIxSYxSPxPH
.0010	.000	2	.0	.1	TRxLIxSYxSPxMO
.1032	.013	8	.6	.2	TRxLIxSYxSPxMOxPH
2.4478	.020	120			Error Term
36.2934	.152	239			Total

PH=Phoneme Class, MO=Mode, SP=Speaker, SY=System, LI=Listener, TR=Trial

* Indicates statistical significance at the .95 level.

APPENDIX L

Analysis of Variance of Percent Transmitted Information

Sum of Squares	Mean Square	DF	F	(%)	Factor
4.7339	1.578	3	297.7*	30.0	FE
1.8219	1.822	1	343.8*	11.6	MO
.1064	.036	3	6.7*	.6	MOxFE
5.8779	5.878	1	1109.0*	37.4	LI
.0691	.023	3	4.3	.3	LIxFE
.1463	.146	1	27.6*	.9	LIxMO
.0448	.015	3	2.8	.2	LIxMOxFE
.7402	.370	2	69.8*	4.6	SP
.1342	.022	6	4.2	.6	SPxFE
.3589	.179	2	33.9*	2.2	SPxMO
.0865	.014	6	2.7	.4	SPxMOxFE
.0083	.004	2	.8	--	SPxLI
.0386	.006	6	1.2	--	SPxLIxFE
.0207	.010	2	2.0	.1	SPxLIxMO
.1096	.018	6	3.5	.5	SPxLIxMOxFE
.0467	.047	1	8.8*	.3	SY
.0724	.024	3	4.5	.4	SYxFE
.0006	.001	1	.1	--	SYxMO
.0456	.015	3	2.9	.2	SYxMOxFE
.6353	.635	1	119.9*	4.0	SYxLI
.0126	.004	3	.8	--	SYxLIxFE
.0144	.014	1	2.7	.1	SYxLIxMO
.0027	.001	3	.2	.1	SYxLIxMOxFE
.1096	.055	2	10.3*	.6	SYxSP
.0718	.012	6	2.3	.3	SYxSPxFE
.0008	.001	2	.1	.1	SYxSPxMO
.0909	.015	6	2.9	.4	SYxSPxMOxFE
.1645	.082	2	15.5*	1.0	SYxSPxLI
.0718	.012	6	2.3	.3	SYxSPxLIxFE
.0107	.005	2	1.0	--	SYxSPxLIxMO
.0316	.005	6	1.0	--	SYxSPxLIxMOxFE (Error Term)
15.6797	.165	95			Total

FE=Feature, MO=Mode, LI=Listener, SP=Speaker, SY=System

* Indicates statatistical significance at the .95 level.

APPENDIX M

Percent Phoneme Deletions Relative to the Total Number of Phoneme Errors

Listener MF

Speaker	Plosive	Fricative	Nasal	Semivowel
CONV-ORTH				
MM	38	38	49	60
MP	28	38	35	31
MS	41	49	58	61
CLEAR-ORTH				
MM	33	29	18	21
MP	35	36	30	33
MS	27	26	49	39
CONV-OMCL				
MM	31	34	39	47
MP	33	26	34	37
MS	38	35	34	52
CLEAR-OMCL				
MM	17	22	46	35
MP	43	28	18	33
MS	28	26	42	52

Listener VF

CONV-ORTH

Speaker	Plosive	Fricative	Nasal	Semivowel
MM	33	18	39	56
MP	22	40	22	40
MS	42	39	43	56

CLEAR-ORTH

MM	31	12	17	50
MP	25	29	13	38
MS	28	8	0	22

CONV-OMCL

MM	29	14	41	55
MP	30	23	27	42
MS	37	35	29	54

CLEAR-OMCL

MM	23	14	20	38
MP	32	19	40	67
MS	25	27	38	23

APPENDIX N

Analysis of Variance of Phoneme Deletion Errors

Sum of Squares	Mean Square	DF	F	(%)	Factor
1.4643	.488	3	9.1*	16.4	CO
.9771	.977	1	18.1*	11.6	MO
.0901	.030	3	.6	.9	MOxCO
.3183	.318	1	5.9	3.3	LI
.4530	.151	3	2.8	3.7	LIxCO
.0235	.024	1	.4	.4	LIxMO
.0347	.012	3	.2	1.6	LIxMOxCO
.1070	.054	2	1.0	--	SP
.2254	.037	6	.7	1.2	SPxCO
.5742	.287	2	5.3*	5.9	SPxMO
.1195	.020	6	.4	2.6	SPxMOxCO
.1990	.100	2	1.8	1.2	SPxLI
.4762	.079	6	1.5	1.9	SPxLIxCO
.1805	.090	2	1.7	1.0	SPxLIxMO
.2122	.035	6	.7	1.4	SPxLIxMOxCO
.0005	.001	1	.0	.7	SY
.1500	.050	3	.9	.2	SYxCO
.3247	.325	1	6.0*	3.4	SYxMO
.2219	.074	3	1.4	.8	SYxMOxCO
.1384	.138	1	2.6	1.1	SYxLI
.1337	.045	3	.8	.4	SYxLIxCO
.0145	.014	1	.3	.5	SYxLIxMO
.0893	.030	3	.6	.9	SYxLIxMOxCO
.0528	.026	2	.5	.7	SYxSP
.2480	.041	6	.8	1.0	SYxSPxCO
.1239	.062	2	1.1	.2	SYxSPxMO
.1254	.021	6	.4	2.5	SYxSPxMOxCO
.0723	.036	2	.7	.4	SYxSPxLI
.2690	.045	6	.8	.7	SYxSPxLIxCO
.1520	.076	2	1.4	.6	SYxSPxLIxMO
.3232	.054	6	1.0	--	SYxSPxLIxMOxCO (Error Term)
7.8947	.083	95			Total

CO=Consonant, MO=Mode, LI=Listener, SP=Speaker, SY=System

* Indicates statistical significance at the .95 level.

APPENDIX O

Third Octave Cumulative Levels in Conversational and Clear Speech

MM Conversational Speech

OVERALL RMS = 22 dB below 3v rms

CUMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	25	10	5	1	MAX	RMS
1	77	73	67	62	55	45	42	40	39	38	37	36	34	31	40
2	77	73	69	66	59	44	40	37	34	32	31	30	26	19	35
3	77	69	65	62	56	42	37	34	30	27	25	23	19	12	29
4	79	71	67	65	60	50	44	37	31	27	25	23	19	15	30
5	84	78	74	72	67	59	53	47	38	33	31	27	23	20	35
6	81	73	69	67	63	55	50	44	36	30	27	23	19	13	31
7	81	73	70	67	63	57	52	46	38	31	28	24	18	12	31
8	81	72	68	66	61	55	51	46	37	31	28	24	19	15	31
9	83	73	68	65	60	55	51	47	40	35	32	28	23	18	36
10	82	74	69	66	62	56	52	48	42	37	34	30	25	18	37
11	80	72	67	64	59	53	50	46	39	34	30	27	22	17	34
12	81	74	68	64	59	53	50	46	40	35	32	28	23	17	36
13	91	82	77	73	67	60	56	52	47	43	40	37	32	25	44
14	89	83	80	77	72	67	63	59	53	47	44	40	35	24	47
15	87	82	80	77	73	67	63	60	53	48	45	40	34	23	47
16	100	93	90	87	83	79	75	72	64	58	54	48	39	30	53

MM Clear Speech

OVERALL RMS = 22 dB Below 3v rms

CUMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	15	10	5	1	MAX	RMS
1	78	75	72	69	62	48	44	42	40	38	37	36	33	29	41
2	78	70	66	63	58	47	41	38	35	33	31	29	26	21	35
3	77	66	62	59	54	47	42	38	33	29	27	24	19	12	30
4	79	68	64	62	57	52	48	43	35	31	28	24	20	14	32
5	83	73	70	67	63	59	55	51	42	36	33	30	25	18	37
6	81	69	65	63	59	55	51	47	38	32	28	23	18	14	31
7	82	70	65	63	59	55	52	48	40	33	29	25	19	13	32
8	82	70	65	63	59	55	51	48	41	34	30	25	19	13	32
9	84	74	68	64	59	54	51	48	43	37	34	29	24	18	37
10	84	75	68	64	59	53	50	47	42	37	33	29	24	18	37
11	83	72	65	61	56	50	47	44	38	34	31	27	22	16	34
12	83	73	67	62	56	50	47	44	38	34	31	27	21	16	34
13	95	83	76	71	64	57	54	50	45	41	38	35	29	23	41
14	91	84	79	75	69	62	58	54	47	42	40	36	28	20	41
15	88	82	77	73	67	60	56	52	45	39	35	31	26	18	38
16	102	95	90	86	80	73	68	63	54	45	41	37	31	24	44

MP Conversational Speech

OVERALL RMS = 22 dB below 3v rms

CUMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	25	10	5	1	MAX	RMS
1	77	70	66	62	53	44	42	40	38	37	36	35	32	28	40
2	77	71	68	65	56	40	36	34	31	30	28	27	24	18	32
3	76	69	65	61	54	41	36	33	28	25	23	21	17	12	27
4	78	71	67	64	57	47	42	38	32	28	26	23	19	15	30
5	83	76	72	69	64	56	52	47	38	31	28	26	22	16	33
6	80	74	70	68	64	57	52	47	39	33	29	26	22	15	34
7	79	70	66	64	60	54	50	46	39	32	28	23	18	13	31
8	80	71	67	64	60	55	52	48	41	35	31	26	20	12	33
9	82	74	70	67	63	58	55	51	44	39	35	30	25	19	38
10	82	75	70	67	62	58	55	51	44	39	35	31	26	18	30
11	82	74	69	66	62	57	54	50	43	38	34	30	25	17	38
12	83	75	70	66	62	57	54	51	46	41	38	34	28	19	40
13	91	81	75	71	65	59	55	52	47	43	40	36	30	20	42
14	89	83	80	78	73	67	62	58	51	44	40	37	31	22	44
15	87	82	80	77	73	67	64	60	53	42	38	35	30	23	42
16	99	92	87	84	80	74	70	66	58	49	43	38	33	21	46

MP Clear Speech

OVERALL RMS = 23 dB below 3v rms

CUMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	15	10	5	1	MAX	RMS
1	77	76	74	71	59	48	45	43	41	39	38	37	33	27	42
2	78	74	71	67	58	45	40	38	35	32	31	29	26	22	35
3	80	71	66	62	56	45	41	37	31	27	25	21	16	10	28
4	79	72	67	64	59	50	45	40	34	29	27	23	19	14	30
5	82	74	70	67	63	57	53	47	38	32	29	26	22	17	34
6	81	73	70	68	64	58	54	49	40	33	29	26	22	17	34
7	82	72	68	65	61	55	52	48	41	34	30	26	20	11	33
8	83	73	68	65	61	57	54	51	44	37	33	27	21	15	34
9	84	77	72	68	64	59	56	53	47	40	36	30	24	19	38
10	85	78	73	69	64	59	56	52	45	39	35	30	25	20	38
11	84	77	72	68	64	59	55	52	44	38	35	31	26	20	39
12	84	76	70	67	62	57	53	50	44	40	37	33	27	19	40
13	94	81	74	69	64	58	55	51	44	39	36	32	27	20	39
14	91	84	80	76	70	62	58	55	50	46	44	38	26	17	40
15	88	83	79	74	68	82	58	55	49	45	42	38	30	21	44
16	100	92	86	82	75	69	65	61	53	47	44	40	35	27	47

MS Conversational Speech

OVERALL RMS = 22 dB below 3v rms

CUMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	15	10	5	1	MAX	RMS
1	76	69	63	58	50	41	39	37	35	34	33	32	30	27	37
2	78	73	69	65	55	40	37	35	32	30	29	28	25	22	33
3	77	71	66	62	54	39	34	31	27	24	22	20	16	13	27
4	80	73	69	65	57	46	42	37	32	29	27	24	19	12	31
5	84	78	74	71	66	58	52	46	37	32	29	26	22	18	34
6	81	74	71	68	64	57	52	46	38	33	29	25	19	15	32
7	81	74	70	67	63	57	52	47	39	34	31	27	21	15	34
8	80	74	70	67	63	57	53	48	40	33	29	25	20	14	32
9	82	76	72	69	65	60	56	52	45	39	36	33	28	21	40
10	81	76	72	69	64	58	54	50	44	40	37	33	26	18	39
11	81	75	72	69	64	59	55	51	44	40	37	33	28	21	40
12	81	76	72	69	65	59	56	52	46	42	39	36	31	19	43
13	90	82	77	74	68	62	59	56	52	48	46	42	36	27	48
14	88	83	81	79	76	72	70	67	60	54	49	44	37	25	50
15	86	82	80	79	76	73	70	67	62	55	50	45	38	26	51
16	99	93	90	87	84	81	79	77	72	64	59	54	47	35	60

MS Clear Speech

OVERALL RMS = 22 dB below 3v rms

CYMULATIVE PERCENTAGE POINTS (dB below 3v rms)

CHAN	99	95	90	85	75	60	50	40	25	15	10	5	1	MAX	RMS
1	78	76	73	69	57	43	40	39	37	35	35	33	31	26	38
2	80	76	72	69	59	42	38	36	34	32	30	28	26	23	34
3	79	73	68	64	56	43	38	35	31	28	25	23	19	14	30
4	81	74	70	66	59	49	44	39	32	28	26	23	18	15	30
5	85	79	75	72	66	58	53	48	38	34	31	29	25	19	36
6	86	75	71	68	64	58	52	47	38	32	28	24	20	16	32
7	83	74	70	67	63	57	53	48	39	32	28	24	19	13	32
8	83	75	71	68	63	58	53	49	40	33	28	24	18	12	31
9	85	78	73	70	65	60	56	52	45	39	35	31	25	18	38
10	84	78	74	70	65	59	56	51	45	40	36	31	24	18	38
11	83	77	72	69	64	58	55	50	43	37	34	30	24	18	37
12	84	77	72	69	64	59	56	52	45	39	36	32	26	19	39
13	95	86	79	75	69	63	60	57	52	47	44	40	34	27	47
14	92	86	83	80	76	70	67	64	56	50	46	41	34	27	48
15	89	84	81	79	75	70	66	62	55	49	45	41	35	38	48
16	102	97	93	90	86	81	78	75	68	60	56	50	43	33	57

APPENDIX P

Percent Correct Scores for Plosives in Word-Initial and Non-Word-Initial Position

Listener MF

ORTH

TEST	LIST	INITIAL CONV	INITIAL CLEAR	NON-WORD-INITIAL CONV	NON-WORD-INITIAL CLEAR
MM	2	42	80	59	77
MM	4	43	80	46	87
MP	4	64	92	59	73
MP	5	53	85	64	73
MS	3	47	61	35	47
MS	4	40	63	46	46

OMCL

MM	6	48	90	58	98
MM	8	56	78	66	75
MP	1	82	88	76	91
MP	8	80	92	78	92
MS	7	53	87	62	84
MS	8	61	79	56	74

Listener VF

ORTH

TEST	LIST	INITIAL CONV	INITIAL CLEAR	NON-WORD-INITIAL CONV	NON-WORD-INITIAL CLEAR
MM	2	82	96	84	98
MM	4	82	94	85	92
MP	5	95	96	87	93
MP	4	89	97	94	94
MS	3	87	97	76	83
MS	4	95	94	71	77

OMCL

MM	6	79	100	87	97
MM	8	80	95	78	95
MP	1	93	97	88	86
MP	8	89	98	81	98
MS	7	69	89	66	75
MS	8	79	87	68	71

APPENDIX Q

Analysis of Variance of Percent Correct Scores for Plosives in Word-Initial and Non-Word-Initial Position

Sum of Squares	Mean Square	DF	F	(%)	Factor
4.0447	4.045	1	163.1*	24.3	MO
.1926	.193	1	7.8*	1.0	PO
.0758	.076	1	3.1	.3	POxMO
2.2587	1.129	2	45.5*	13.4	SP
.4358	.218	2	8.8*	2.3	SPxMO
.3621	.181	2	7.3*	1.9	SPxPO
.0006	.000	2	.0	.3	SPxPOxMO
5.4462	5.446	1	219.6*	32.8	LI
.2683	.268	1	10.8*	1.5	LIxMO
.1882	.188	1	7.6*	1.0	LIxPO
.0001	.000	1	.0	.2	LIxPOxMO
.0719	.036	2	1.5	.1	LIxSP
.0013	.001	2	.0	.3	LIxSPxMO
.0784	.039	2	1.6	.2	LIxSPxPO
.0080	.004	2	.2	.2	LIxSPxPOxMO
.2788	.279	1	11.2*	1.5	SY
.0249	.025	1	1.0	--	SYxMO
.0121	.012	1	.5	.1	SYxPO
.0026	.003	1	.1	.1	SYxPOxMO
.0271	.014	2	.5	.1	SYxSP
.0155	.008	2	.3	.2	SYxSPxMO
.0271	.014	2	.5	.1	SYxSPxPO
.0718	.036	2	1.4	.1	SYxSPxPOxMO
.9610	.961	1	38.8*	5.7	SYxLI
.0294	.029	1	1.2	--	SYxLIxMO
.0078	.008	1	.3	.1	SYxLIxPO
.0368	.037	1	1.5	.1	SYxLIxPOxMO
.2796	.140	2	5.6*	1.4	SYxLIxSP
.0370	.018	2	.7	.1	SYxLIxSPxMO
.0493	.025	2	1.0	--	SYxLIxSPxPO
.0118	.006	2	.2	.2	SYxLIxSPxPOxMO
.0272	.027	1	1.1	--	TR
.0289	.029	1	1.2	--	TRxMO
.0042	.004	1	.2	.1	TRxPO
.0102	.010	1	.4	.1	TRxPOxMO
.0832	.042	2	1.7	.2	TRxSP
.1245	.062	2	2.5	.4	TRxSPxMO
.0643	.032	2	1.3	.1	TRxSPxPO
.0207	.010	2	.4	.2	TRxSPxPOxMO
.0000	.000	1	.0	.2	TRxLI
.0009	.001	1	.0	.1	TRxLIxMO
.0017	.002	1	.1	.1	TRxLIxPO
.0080	.008	1	.3	.1	TRxLIxPOxMO
.0126	.006	2	.3	.2	TRxLIxSP
.0425	.021	2	.9	--	TRxLIxSPxMO
.0380	.019	2	.8	.1	TRxLIxSPxPO
.0000	.000	2	.0	.3	TRxLIxSPxPOxMO

.0178	.018	1	.7	--	TRxSY
.0265	.027	1	1.1	--	TRxSYxMO
.0283	.028	1	1.1	--	TRxSYxPO
.0056	.006	1	.2	.1	TRxSYxPOxMO
.0550	.028	2	1.1	--	TRxSYxSP
.1385	.069	2	2.8	.5	TRxSYxSPxMO
.0082	.004	2	.2	.2	TRxSYxSPxPO
.0183	.009	2	.4	.2	TRxSYxSPxPOxMO
.0142	.014	1	.6	.1	TRxSYxLI
.1232	.123	1	5.0*	.6	TRxSYxLIxMO
.0579	.058	1	2.3	.2	TRxSYxLIxPO
.0586	.059	1	2.4	.2	TRxSYxLIxPOxMO
.0403	.020	2	.8	.1	TRxSYxLIxSP
.0360	.018	2	.7	.1	TRxSYxLIxSPxMO
.0102	.005	2	.2	.2	TRxSYxLIxSPxPO
.0861	.043	2	1.7	.2	TRxSYxLIxSPxPOxMO
1.1918	.025	48			Error Term
16.4968	.174	95			Total

MO=Mode, PO=Position, SP=Speaker, LI=Listener, SY=System, TR=Trial

* Indicates statistical significance at the .95 level.

BIOGRAPHICAL NOTE

Michael A. Picheny was born in New York City on July 2, 1954. He was raised in the Bronx and attented P.S. 31, J.H.S. 117, and the Bronx High School of Science. His undergraduate work was performed at MIT and his major was in Electrical Engineering and Computer Science. His thesis work was on the measurement of charge in polyelectrolyte membranes.

His graduate work was also performed at MIT, in the general area of aids for the hearing-impaired. His Master's thesis was entitled "The Effects of Fequency Lowering on Vowel Perception." He is currently working at the IBM Thomas J. Watson Research Center on speech recognition.

Dr. Picheny is very happily married to Barbara J. Bolshon, a senior marketing analyst at Merrill Lynch Pierce Fenner and Smith, Inc. They both enjoy going to theater, concerts, and opera in their spare time.