Subjective Ratings of Sentences in Clear and Conversational Speech

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To determine the feasibility of using subjective ratings of clarity to identify perceptual differences between clear and conversational speech and among different talkers, sentences produced by 8 talkers selected from the Ferguson Clear Speech Database (Ferguson, 2004) were presented to listeners with normal hearing. Listeners rated the clarity of each sentence on a scale of 1 to 7 (1 = *lowest possible clarity;* 7 = *highest possible clarity*). Clarity ratings were significantly higher for clear than conversational speech and differed significantly among the talkers. Rated clarity was significantly correlated with vowel intelligibility and vowel space measures, but not with speaking rate. The results suggest that subjective clarity ratings are a useful and valid measure of perceptual differences between speaking styles and among talkers.

It is by now well-established that "clear speech," a manner of speaking that talkers adopt when they are told that their communication partner has a hearing loss or speaks a different native language, is often more intelligible than everyday conversational speech (e.g., Helfer, 1998; Picheny, Durlach, & Braida, 1985; Smiljanic & Bradlow, 2005). While the size of the clear speech intelligibility benefit varies among talkers (Ferguson, 2004), most studies have found that both listeners with hearing loss and listeners with normal hearing listening in noise benefit from clear speech (Payton, Uchanski, & Braida, 1994; Uchanski, Choi, Braida, & Durlach, 1996; but see Ferguson & Kewley-Port, 2002, for contrasting data). Clear and conversational speech also differ along a wide range of acoustic

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dimensions. For example, clear speech is produced with a higher voice intensity, a higher and more variable voice fundamental frequency, a slower speaking rate, longer phoneme durations, greater consonant power, and a larger vowel space than conversational speech (Bradlow, Kraus, & Hayes, 2003; Ferguson & Kewley-Port, 2002, 2007; Picheny, Durlach, & Braida, 1986; Smiljanic & Bradlow, 2005). However, it remains to be determined precisely which acoustic differences are actually responsible for the improved intelligibility of clear speech. It may even be that the acoustic differences that benefit one listener group, such as listeners with normal hearing listening in noise, may differ from those that benefit other groups, such as listeners with hearing loss (Ferguson & Kewley-Port, 2002).

The task of establishing the acoustic characteristics that underlie the clear speech intelligibility benefit for different listener groups is complicated by a conflict between the methodological requirements of acoustic and perceptual analyses of speech. For acoustic analyses, it is desirable to have the talker(s) produce identical materials in clear and conversational speech. This approach eliminates differences in phonetic context as a confounding source of between-style differences. For perceptual analyses, however, the use of identical materials in the two speaking styles is problematic. If the materials are meaningful, differences between clear and conversational speech may be confounded by learning effects. Sentence materials, which are attractive for their similarity to everyday speech, are particularly vulnerable to such learning effects. As Davis and Silverman note in their classic text, ". . . the same sentence cannot be used twice with one listener. His memory makes it much easier for him to recognize a sentence again even from a single keyword" (1978, p. 215).

Perhaps because of this methodological conflict, relatively few investigators have performed both acoustic and perceptual analyses of clear and conversational speech, and the methodological details of their studies have varied. For example, in their seminal paper on the intelligibility of clear and conversational speech, Picheny et al. (1985) used the same set of nonsense sentences in the two speaking styles. All materials were presented to the same group of 5 listeners, and learning effects were avoided by presenting the speaking styles 1 month apart and by using a different list of nonsense sentences for each talker and listening condition. In contrast, their subsequent acoustic paper (Picheny et al., 1986) analyzed identical sentences in each speaking style for all three talkers. Thus none of the materials that were analyzed acoustically had been used in the intelligibility study, although they had been recorded at the same time as the materials used in that study. More recently, Bradlow et al. (2003) recorded clear and conversational sentence materials from two talkers. In contrast with Picheny et al. (1985), the listeners in Bradlow et al. heard different lists of sentences in each speaking style, while different listener groups heard the materials from each talker. To foster comparisons between acoustic and intelligibility data, the acoustic analyses were performed on the same materials used for intelligibility testing. Thus a different set of sentences was analyzed in each style, although care was taken to select words for analysis that were common to the clear and conversational lists.

By examining vowels in clear and conversational speech, Ferguson (2004) and Ferguson and Kewley-Port (2002, 2007) avoided the methodological difficulties associated with meaningful materials. However, their motivation for using a single phoneme class in a single phonetic context was theoretical rather than methodological: they wished to limit the number of dimensions over which clear and conversational speech would vary. Ferguson and Kewley-Port (2007) took advantage of the variability among the 41 talkers in the Ferguson Clear Speech Database by comparing talkers who varied in the size of the clear speech intelligibility benefit enjoyed by listeners with normal hearing in Ferguson (2004). Their analyses revealed that for this listener group, greater vowel space expansion in clear speech is associated with greater improvements in vowel intelligibility.

While studies of vowels in clear speech are ongoing, the Ferguson database also includes meaningful sentences. Different lists of sentences were recorded in each speaking style, and so as in Bradlow et al. (2003), future perceptual studies using these materials could present clear and conversational materials to the same listeners. However, all 41 talkers recorded the same materials. If the approach used in Bradlow et al. (2003), presenting each talker to a different listener group, were applied to the Ferguson database, 41 different listener groups would be needed. Based on the previous literature (Bradlow & Bent, 2002; Bradlow et al., 2003), we have estimated a clear speech effect size (Cohen's *d*) of 2 for listeners with normal hearing. Power analyses suggested that to achieve a power of 8, 10 listeners would be needed for each talker ($n = 410$), which is large but achievable in a university setting. Ultimately, however, this research must include the population for whom clear speech is intended: listeners with hearing loss. A large proportion of individuals with hearing loss are older adults, who typically show much greater variance in speech identification abilities than younger adults. This increased variance increases the number of listeners needed for each talker, yielding prohibitively high recruitment targets.

An alternative solution for obtaining perceptual data on identical materials produced by multiple talkers and/or in multiple speaking styles is to have listeners subjectively rate the materials rather than identify them. Such subjective ratings of speech intelligibility, quality, or clarity have been used to assess hearing aids (e.g., Preminger & Van Tasell, 1995; Rosengard, Payton, & Braida, 2005), disordered speech (e.g., Dagenais, Brown, & Moore, 2006; Ng, Kwok, & Chow, 1997), speech transmission in public spaces (Morimoto, Sato, & Kobayashi, 2004), and differences among talkers who vary in their objectively-measured speech intelligibility (Hazan & Markham, 2004) or in native language background (e.g., Derwing & Munro, 1997; Munro & Derwing, 1995). Subjective ratings of intelligibility, in which listeners estimate how much of the signal they understood, offer several clinical advantages, in that they can be measured rapidly and allow for the use of speech materials (e.g., connected discourse) that more closely resemble natural speech (Cienkowski & Speaks, 2000; Cox, Alexander, & Rivera, 1991). Measured differences between objective measures and subjective judgments of speech understanding have also been shown to be clinically useful (Saunders & Cienkowski, 2002). For the purposes of clear speech research, subjective ratings may offer a means by which identical materials produced in different speaking styles and/or multiple talkers can be presented to the same listeners.

The current study explored the feasibility of using subjective ratings of clarity, in which listeners indicate how clear or distinct speech sounds to them, to differentiate between clear and conversational speech as well as among talkers. Eisenberg, Dirks, Takayanagi, and Martinez (1998) showed that in filtered-speech conditions in which predicted intelligibility was maximized, clarity varied among certain conditions even when subjectively rated intelligibility did not. Preminger and Van Tasell (1995) found similar results when listeners rated pleasantness, listening effort, loudness, and overall impression of quality for various hearing aid frequency response conditions. For listeners with normal hearing listening in quiet, both conversational and clear speech are expected to be highly intelligible, especially after all sentences have been heard once. Thus clarity ratings were deemed more appropriate than subjective estimates of intelligibility for the present research. Their feasibility for clear speech research was determined by comparing rated clarity for conversational versus clear sentences as well as among a group of eight talkers selected from the Ferguson database. In addition, the relationship between clarity ratings and other perceptual and acoustic data available for these talkers was examined.

METHOD

Materials

Test stimuli consisted of sentences extracted from the Ferguson Clear Speech Database (Ferguson, 2004). The database consists of 160 sentences consisting of neutral sentence frames containing monosyllabic keywords and 28 sentences selected from the Central Institute for the Deaf (CID) Everyday Sentences Test (Davis & Silverman, 1978) produced in conversational and clear speech by 41 talkers. A separate set of 14 CID sentences was recorded in each speaking style, and all talkers recorded the same set of sentences in each style. Sentences recorded in conversational and clear speech are listed in Appendices A and B, respectively. Conversational and clear speech were recorded in separate sessions. For conversational speech, which was always recorded first, talkers were instructed to read the lists of sentences speaking as they would in everyday, normal conversation. For clear speech, which was recorded at least 1 day later, talkers were instructed to speak as though their communication partner had a hearing loss.

CID Everyday Sentences produced by eight talkers were selected from the Ferguson database for the present experiment. The four male and four female talkers were selected, somewhat arbitrarily, on the basis of an acoustic measure made for an earlier experiment (Ferguson, Poore, & Shrivastav, 2007). The measure used was the pitch change between a sentence keyword and the article preceding it. For example, in the sentence "Vera put the bed next to the table," pitch change was calculated as the difference between the minimum fundamental frequency of *the* and the peak fundamental frequency during the vowel of *bed*. Pitch change was measured for three sentences for each talker in each speaking style. To select talkers for the present study, pitch change was averaged across the three sentences for each talker in each style, and the talkers were ranked by the size of the pitch change difference between clear and conversational speech. Two male and two female talkers were then selected from each end of this talker distribution. Table 1 shows the eight talkers and their pitch change data. Because the materials measured and the rationale for the measurements differ from those of the present study, these data will not be considered further here.

Three other measures shown in Table 1 were examined in terms of their relationship with rated clarity. The first, vowel intelligibility, was measured by Ferguson (2004) for young listeners with normal hearing identifying vowels in noise at a signal-to-noise ratio of -10 dB. These are the only objective intelligibility data currently available for these talkers for listeners with normal hearing. The second, speaking rate for the CID sentences, was measured for the clear speech strategies study (Ferguson et al., 2007) but is considered a potential correlate of speech clarity. Since the CID sentences in each style were recorded as a single list of 14 sentences, speaking rate was determined by dividing the total duration of the sentence list (including pauses between the sentences) by the number of words in each list (72 for conversational and 73 for clear). The third, vowel space perimeter, was measured as part of an ongoing acoustic study of the Ferguson database. Perimeter was calculated by summing Euclidean distances between the vowels /i/ and /æ/, /æ/ and /a/, /a/ and /u/, and /u/ and /i/ in a space depicting steady-state first and second formant frequencies (F1 and F2) in Barks (Traunmüller, 1990). F1 and F2 values were extracted from linear predictive coding formant tracks generated for each vowel token (two per talker in each style for each vowel) generated using Wavesurfer. As in previous studies (Ferguson & Kewley-Port, 2002, 2007), steady state was defined as a point 30 ms beyond the point located at 20% of the vowel duration. Values for each vowel in each style were determined for each talker by averaging over the two tokens.

For each talker, the 14 sentences in each speaking style were excised from the raw digital recordings using a waveform editor (Cool Edit 2000). Sentences were

Table 1

Talker Information

Talker	Pitch change, semitones			Vowel intelligibility, %			Speaking rate, wpm			Vowel space perimeter, Barks		
	CL	CON	DIFF	CL	CON	DIFF	CL	CON	DIFF	CL	CON	DIFF
F02	-0.32	1.40	-1.72	83.10	78.33	4.77	110.11	180.00	69.89	14.84	13.60	1.24
F05	8.69	-1.07	9.76	76.19	59.76	16.43	82.55	183.44	100.89	15.01	13.30	1.71
F09	2.41	-1.20	3.61	87.86	72.38	15.48	138.74	164.76	26.02	14.23	16.00	-1.76
F13	-0.38	2.11	-2.50	75.24	50.48	24.76	138.62	181.13	42.51	14.38	12.93	1.45
M02	0.53	2.46	-1.93	79.05	60.95	18.10	140.12	148.97	8.85	12.81	11.21	1.60
M09	3.19	4.71	-1.52	68.57	60.48	8.09	129.55	163.08	33.53	14.74	12.31	2.44
M10	3.88	0.43	3.45	65.71	62.14	3.57	134.07	134.00	-0.07	11.37	12.15	-0.78
M19	7.68	1.98	5.69	75.00	70.95	4.05	106.13	132.76	26.63	11.98	11.35	0.63

Note. wpm = words per minute. CL = clear speech. CON = conversational speech. DIFF = value in clear speech minus value in conversational speech.

then scaled to the same average RMS amplitude using Cool Edit's Analyze and Transform functions. Finally, the sentence files were resampled from 22050 Hz to 24414 Hz for presentation through Tucker-Davis Technologies (TDT) System 3 hardware.

Listeners

A total of 41 listeners were tested. While age and gender data were not gathered, the listeners were overwhelmingly females between the ages of 19 and 26. Most were enrolled in either an undergraduate speech acoustics course or a graduate speech perception course and received extra credit for their participation. Data from 3 listeners could not be used, either because the listener was a non-native speaker of English ($n = 2$) or because the listener failed a pure-tone hearing screening. The remaining 38 listeners were native speakers of American English and passed the hearing screening, which was conducted at 20 dB HL re: American National Standards Institute (ANSI; 2004) for 250-8000 Hz.

Procedures

Listeners were tested individually in a double-wall sound treated booth, seated in front of a computer monitor, mouse, and keyboard. On each trial, a test sentence was played from a TDT RP2 real-time processor and attenuated by a programmable attenuator (TDT PA-5) to achieve an overall level of 70 dB SPL. The signal was then routed to a mixer (TDT SM5), to a headphone buffer (TDT HB-7), and finally to a supraaural earphone (TDH-39P) for monaural presentation. After hearing the sentence, the listener rated the clarity of the sentence by clicking on one of seven response categories. The category labels, which were adapted from those used by Eisenberg et al. (1998), are shown in Table 2. Clarity was defined for the listeners as "how clear the sentence sounds to you."

The 224 test sentences (8 talkers × 14 sentences × 2 speaking styles) were divided into two test blocks containing 112 items apiece. Each test block contained both clear and conversational materials produced by two male and two female

Table 2

Category Labels Used in Rating Task

Category	Label
1	Minimum (lowest possible clarity)
2	Very unclear
3	Somewhat unclear
4	Midway
5	Somewhat clear
6	Very clear
7	Maximum (highest possible clarity)

talkers. There were 18 possible combinations of talkers for the two test blocks. Combinations were assigned to listeners in a counterbalanced fashion, such that each combination was presented to at least 2 but no more than 3 listeners. The order of the test blocks within each combination was also counterbalanced. The order of stimulus items within each test block was randomized at the time of presentation.

To reduce any potential effects that intelligibility of or familiarity with the sentences would have on clarity ratings, listeners spent 5 min reviewing the full list of 28 sentences prior to testing. Sentences were arranged in alphabetical order on the study list, so that sentences produced in the two speaking styles were intermixed. The experiment took approximately 45 min to complete, including consent procedures and hearing screening.

RESULTS

To assess the effects of speaking style and talker on subjective ratings of clarity, two repeated-measures ANOVAs were carried out. Talker and speaking style were within-subjects factors in both analyses. In the first, listener-based ANOVA, input data consisted of average ratings for each listener in each speaking style, determined by averaging across ratings for the 14 sentences in each style. In the second, sentence-based ANOVA, input data consisted of average ratings for each sentence, which were obtained by averaging data across the listeners. This two-analysis strategy was adopted to prevent spurious results arising from idiosyncrasies either among the sentences in a given style or among individual listeners' use of the rating scale (Piske, Flege, MacKay, & Meador, 2002). Effects were required to be significant in both analyses to be considered truly significant.

The two ANOVAs yielded essentially identical results, and so only the statistics from the listener-based ANOVA are reported here. The main effects of speaking style and talker were both significant, $F(1, 37) = 131.4$, $p < .001$, $\eta^2 = .78$ and $F(7, 32) = 36.5$, $p < .001$, $\eta^2 = .89$, respectively, as was the style × talker interaction, $F(7, 32) = 14.2$, $p < .001$, $\eta^2 = .76$. These results are evident in Figure 1. Clarity ratings were significantly higher in clear speech (5.75) than in conversational speech (5.06) and varied significantly among the eight talkers. While the magnitude of the speaking style effect varied among the talkers, an examination of estimated marginal means suggested that clarity was higher for clear sentences than for conversational sentences for all eight talkers.

Next, correlational analyses were performed to assess the relationship between rated clarity and three other measures available for these talkers: vowel intelligibility, speaking rate, and vowel space perimeter. For each measure, the correlation between difference scores was assessed first – that is, the difference between clear and conversational speech. The presumption was that large clear speech effects on one measure would be associated with large clear speech effects on an-

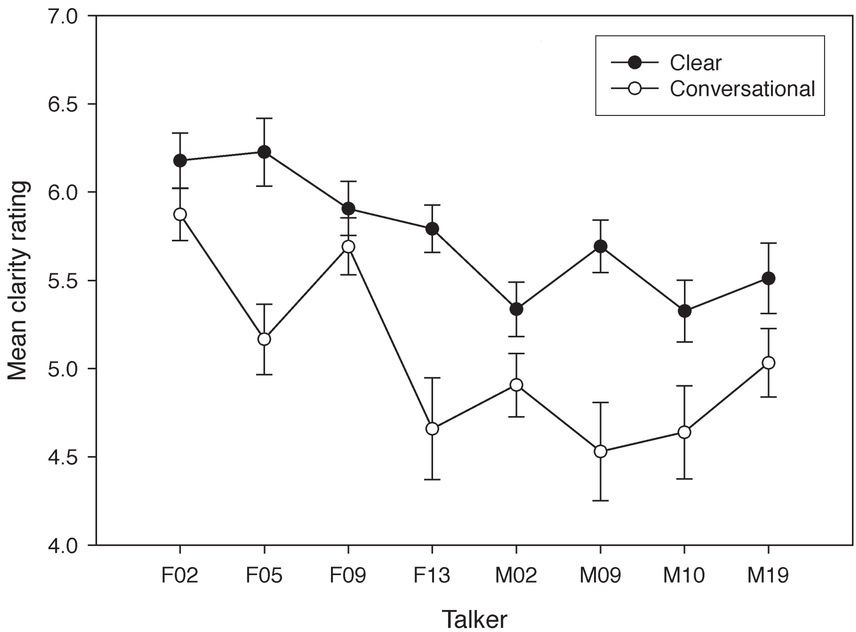

Figure 1. Average clarity ratings for each talker in each speaking style. Talkers are ordered alphabetically by identification number.

other measure. However, the clear speech clarity effect was not significantly correlated with either the clear speech vowel intelligibility effect, $r(8) = .2$, $p = .63$; the clear speech speaking rate effect, $r(8) = .3$, $p = .47$; or the clear speech vowel space perimeter effect, $r(8) = -.06$, $p = .89$. Correlations were then examined across the two speaking styles, using both the conversational and clear values for each metric for each talker. These correlations are illustrated in Figures 2 (vowel intelligibility), 3 (speaking rate), and 4 (vowel space). While vowel intelligibility and clarity were strongly and significantly correlated, $r(16) = .8$, $p < .001$, the correlations between speaking rate and clarity and between speaking rate and vowel space perimeter just missed significance, $r(16) = -.48$ and .47, respectively, both $p = .06$. However, examination of Figure 4 indicates an outlier corresponding to the conversational vowel space perimeter value for Talker F09. In Ferguson and Kewley-Port (2007), F09 was described as *atypical* because in contrast to other talkers with similarly large clear speech vowel intelligibility effects, who had larger vowel spaces in clear speech than conversational speech, she had a much larger vowel space in *conversational* speech than in clear speech (see also Table 1). When the correlation between clarity and vowel space perimeter was assessed with Talker F09's conversational data excluded the two measures were found to be strongly and significantly correlated, $r(15) = .81$, $p < .001$.

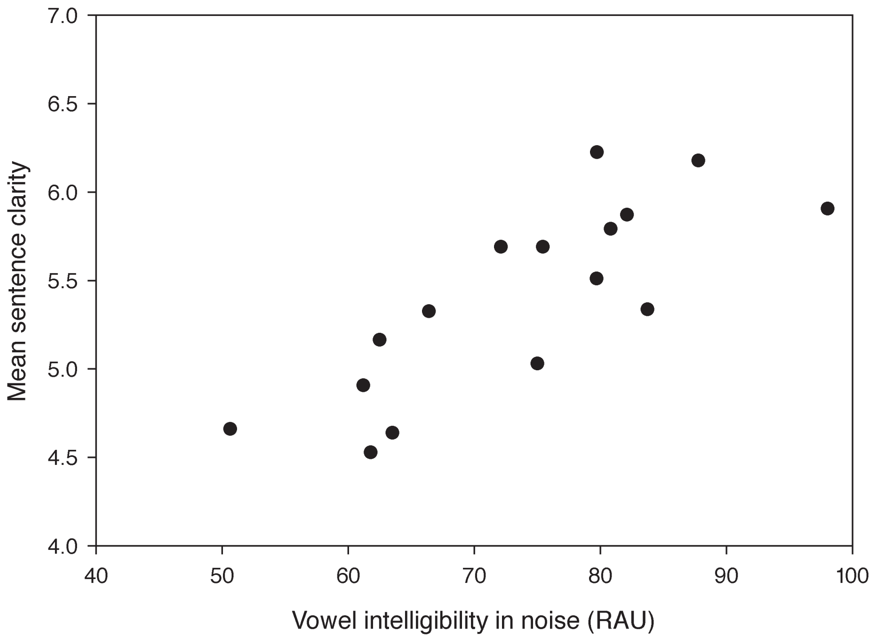

Figure 2. Average sentence clarity ratings for each talker in each speaking style as a function of vowel intelligibility in noise for each talker in each speaking style. RAU = rationalized arcsine units (Studebaker, 1985).

DISCUSSION

The results indicate that subjective ratings are an effective means of assessing perceptual differences between speaking styles and among talkers for meaningful speech materials. Clarity ratings were significantly higher for clear speech than conversational speech and differed significantly among the eight talkers. Note that clarity ratings were generally quite high, with the lowest average rating (for Talker M09 in conversational speech) being 4.5, halfway between the ratings *midway* and *somewhat clear.* This result is not surprising, given that the sentence materials were presented in quiet to listeners with normal hearing. These high ratings also demonstrate that there is nothing inherently wrong with conversational speech: under favorable conditions, this typical everyday speech is acceptably clear and understandable. This characterization is supported by data from Uchanski et al. (1996), who observed an intelligibility score for conversational speech of 92% in a control condition involving listeners with normal hearing in quiet. Hazan and Markham (2004) found similarly high ratings on a 7-point "mumbly-precise" scale when listeners rated monosyllabic words (presented in sets of three words) produced in a single, laboratory speaking style by talkers

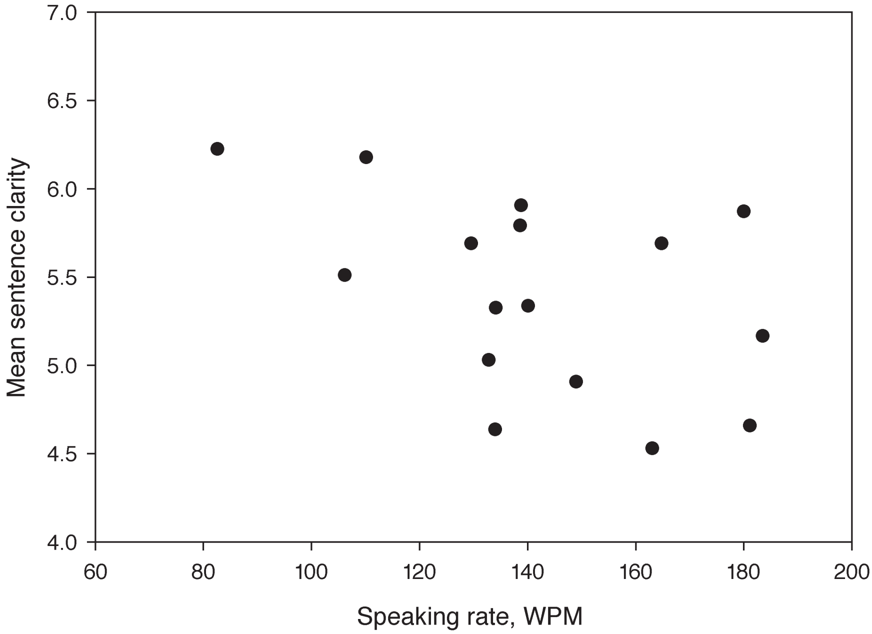

Figure 3. Average sentence clarity ratings for each talker in each speaking style as a function of speaking rate for each talker in each speaking style. WPM = words per minute.

varying in word intelligibility for listeners with normal hearing in quiet. The average mumbly-precise rating was 4.96 for the talkers with the highest word intelligibility (their “good” talkers) and 3.39 for the talkers with the poorest word intelligibility (their “poor” talkers).

The usefulness and validity of the clarity measures was further supported by the correlations between these measures and other data available for the same talkers. Indeed, the correlation between vowel intelligibility and rated clarity (r = .8) was surprisingly high, given the starkly different experimental conditions under which these two sets of data were collected. While the talkers were the same in the two experiments and both involved young adult listeners with normal hearing, the experiments differed in the materials (vowels in a /bVd/ context vs. meaningful sentences), the listening condition (in a background of 12-talker babble at a signal-to-noise ratio of -10 dB vs. in quiet), and the perceptual task (identifying the vowel from a set of 10 vs. rating clarity on a 7-point scale). However, the strength of the correlation agrees well with studies showing strong relationships between identification of phonemes in words, identification of words in isolation, and identification of words in sentences (e.g., Olsen, Van Tasell, & Speaks, 1997; Rabinowitz, Eddington, Delhorne, & Cuneo, 1992), which together support

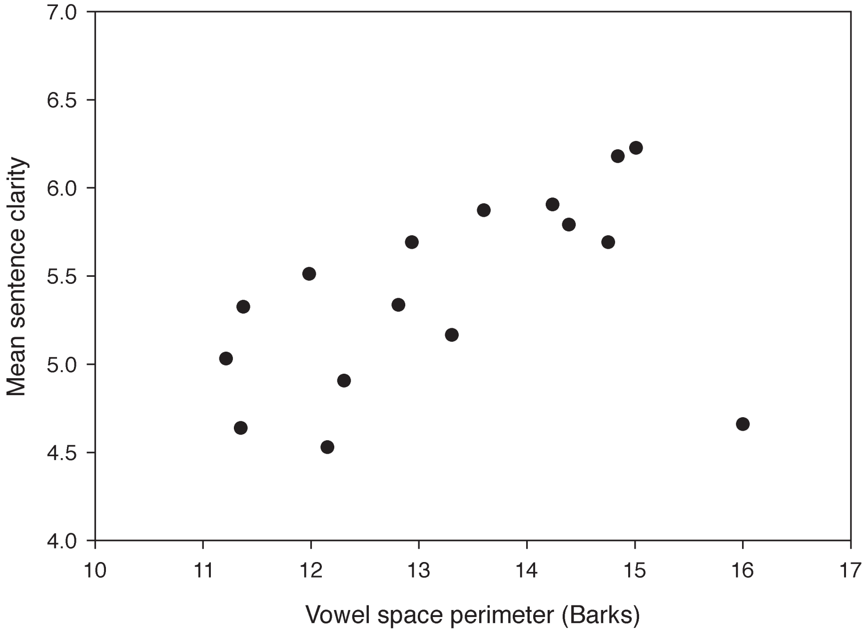

Figure 4. Average sentence clarity ratings for each talker in each speaking style as a function of vowel space perimeter for each talker in each speaking style.

Bilger's idea (1984) that speech recognition is a single construct. This correlation is also consistent with recent data from Kewley-Port and colleagues demonstrating the considerable importance of vowel information to sentence intelligibility (Fogerty & Kewley-Port, 2008; Kewley-Port, Burkle, & Lee, 2007; Lee & Kewley-Port, 2009).

The moderate negative correlation between speaking rate and clarity suggests that the more slowly a talker spoke, the more clear their speech was judged to be. The correlation, although moderate, was not statistically significant ($r = -.48$, $p = .06$). Data regarding the effects of reduced speaking rate on intelligibility have been mixed in the clear speech literature. Slowing is one of the most robust acoustic changes observed in clear speech, and has been reported in every study of clear speech acoustics. However, while some studies have found slowing to be an important contributor to the intelligibility benefit associated with clear speech (e.g., Bradlow et al., 2003; Ferguson & Kewley-Port, 2002), others have not (e.g., Picheny, Durlach, & Braida, 1989; Uchanski et al., 1996). In their analysis of 12 talkers from the Ferguson database, Ferguson and Kewley-Port (2007) found that greater vowel duration increases in clear speech were associated with greater vowel intelligibility improvements. They noted, however, that 3 of their talkers had made substantial vowel duration increases without actually improving their vowel intelligibility. Thus it is not entirely surprising that the relationship between speaking rate and clarity would be so non-definitive in the present study.

Finally, the strong, positive correlation between vowel space and clarity is consistent with a number of previous studies showing that larger vowel spaces are associated with greater intelligibility. In Ferguson and Kewley-Port (2007), talkers who showed large clear speech vowel intelligibility benefits showed greater vowel space expansion in clear speech than talkers who showed no clear speech benefit for vowels. Vowel space expansion has also been found to be associated with greater improvements in sentence intelligibility (Bradlow et al., 2003). Positive relationships between vowel space dimensions and intelligibility have also been observed within single speaking styles both for normal talkers (Bond & Moore, 1994; Bradlow, Torretta, & Pisoni, 1996) and among disordered speakers (e.g., Liu, Tsao, & Kuhl, 2005).

CONCLUSION

Subjective ratings of clarity were significantly higher for sentences produced under instructions to speak clearly than for sentences produced in a conversational manner. Rated clarity also varied significantly among the 8 talkers, as did the magnitude of the clarity difference between clear and conversational speech. These results as well as significant correlations between rated clarity and other perceptual and acoustic measures for the talkers used in the present study suggest that subjective clarity ratings yield useful, valid perceptual data. These ratings are therefore a good solution to the methodological conflict between perceptual and acoustic analyses of meaningful speech. In studies where identical speech materials have been produced in different speaking styles and/or by different talkers, subjective ratings offer a viable alternative to objective measures of sentence intelligibility. In future studies of the Ferguson database, for example, a single group of listeners could provide clarity ratings for sentences produced by all 41 talkers. An intelligibility study using these sentences, in contrast would require 41 different listener groups.

While the listeners in the present study were young adults with normal hearing, previous studies have demonstrated that listeners with hearing loss, including older adults with hearing loss, are able to make subjective ratings of intelligibility (Cienkowski & Speaks, 2000; Cox et al., 1991). Although Cox et al. found that the subjective intelligibility ratings of older adults with hearing loss were consistently lower than their objectively-measured speech understanding abilities, they noted that the difference between the scores was the same under all test conditions. Based on these studies, then, we would expect that older adults with hearing loss would be able to rate clarity of clear and conversational speech produced by different talkers. Thus, in the continuing effort to identify the acoustic characteristics responsible for the superior intelligibility and clarity of clear speech and the degree to which these characteristics vary for different listener groups, subjective clarity ratings represent an important and exciting new approach.

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APPENDIX A

CID EVERYDAY SENTENCES (DAVIS & SILVERMAN, 1978) RECORDED IN CONVERSATIONAL SPEECH

1. It's time to go.
2. Do you want to wash up?
3. The water's too cold for swimming.
4. It's no trouble at all.
5. Here are your shoes.
6. Have you been working hard lately?
7. How do you know?
8. Move out of the way.
9. Pass the bread and butter, please.
10. Weeds are spoiling the yard.
11. Breakfast is ready downstairs.
12. Let's get a cup of coffee.
13. I hate driving at night.
14. I'll carry the package for you.

APPENDIX B

CID EVERYDAY SENTENCES (DAVIS & SILVERMAN, 1978) RECORDED IN CLEAR SPEECH

1. You'll get fat eating candy.
2. I'll see you right after lunch.
3. There's a good ballgame this afternoon.
4. Music always cheers me up.
5. How do you spell your name?
6. What are you hiding under your coat?
7. The phone call's for you.
8. Come here when I call you.
9. I'll think it over.
10. Walking's my favorite exercise.
11. Where are you going?
12. Wait just a minute!
13. I'll catch up with you later.
14. Call me a little later.