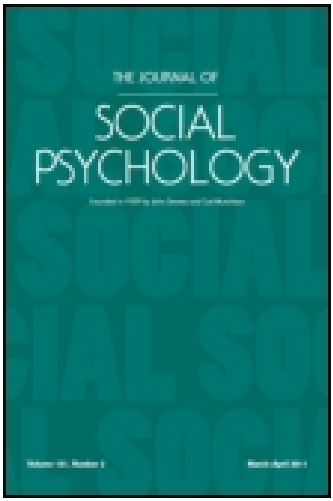

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Gender and Speech Rate in the Perception of Competence and Social Attractiveness

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Gender and Speech Rate in the Perception of Competence and Social Attractiveness

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ABSTRACT. The authors' hypotheses were that (a) listeners regard speakers whose global speech rates they judge to be similar to their own as more competent and more socially attractive than speakers whose rates are different from their own and (b) gender influences those perceptions. Participants were 17 male and 28 female listeners; they judged each of 3 male and 3 female speakers in terms of 10 unipolar adjective scales. The authors used 8 of the scales to derive 2 scores describing the extent to which the listener viewed a speaker as *competent* and *socially attractive*. The 2 scores were related by trend analyses (a) to the listeners' perceptions of the speakers' speech rates as compared with their own and (b) to comparisons of the actual speech rates of the speakers and listeners. The authors examined trend components of the data by split-plot multiple regression analyses. In general, the results supported both hypotheses. The participants judged speakers with speech rates similar to their own as more competent and socially attractive than speakers with speech rates slower or faster than their own. However, the ratings of competence were significantly influenced by the gender of the listeners, and those of social attractiveness were influenced by the gender of the listeners and the speakers.

Key words: gender, person perception, self-evaluation, speech rate

THE PURPOSE OF THE PRESENT EXPERIMENT was to examine person perception as a function of the perceived speech rates, actual speech rates, and gender of speakers and listeners. Specifically, the authors investigated the possibility that the perception of a speaker is influenced by (a) listeners' estimates of speakers' speech rates, (b) the actual speech rates of the listeners and speakers, and (c) the

gender of speakers and listeners. The underlying rationale of the experiment, based on the theoretical constructs and empirical findings of both social–psychological and communication literature, was that individuals are likely to evaluate the behavior of others by comparing it with their own behavior. On the one hand, the notion is an implication of the basic hypothesis, derived from the similarity–attraction literature (e.g., Bishop, 1979; Byrne, 1971; Tedeschi, 1974), that people tend to like others who are similar to themselves in attitudes, personality characteristics, and other attributes. On the other hand, the idea derives from social comparison theory (Festinger, 1950), which suggests that individuals turn to others, particularly those they perceive to be similar to themselves, for comparison information that helps them to assess their own opinions and abilities. Finally, the rationale was derived, in part, from speech accommodation theorists (Galois & Giles, 1998; Giles, Mulac, Bradac, & Johnson, 1987), who found (a) that important aspects of the speech of two individuals talking to each other tended to become similar and (b) that the motivation underlying that convergence on the part of each speaker was to gain approval. The implication is that the more similar their speech is, the more the speakers think well of each other. The general hypothesis of the present experiment, then, was that listeners judge as more competent and more socially attractive those speakers whose global speech rates are perceived to be, or actually are, similar to their own. Specific hypotheses follow a discussion of previous research.

Gender

Concern with gender effects in the investigation of social behavior (e.g., Eagly, 1983) highlights the fact that none of the published studies of the effect of speech rate on person perception have included female speakers. Moreover, even though the listeners have been both male and female, none of those reports identify that gender was used as a variable in statistical analyses. Even Buller, LePoire, Aune, and Eloy (1992), whose study involved 257 listeners and one male speaker, did not indicate how many of the listeners were male and how many were female. Indeed, Street and Brady (1982) pointed out in a footnote that "male voices were employed because the vast majority of speech rate studies have done so and assumed generalizability to female voices as well" (p. 298), despite the finding in an unpublished study (cited in the same footnote) that female voices resulted in a finding "inconsistent with earlier research" (p. 298). In an earlier report (Feldstein, Dohm, & Crown, 1993), we described two experiments concerned with the influence of gender on perceived rates of speech. The first experiment, which involved male and

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female listeners but only female speakers, yielded an interaction between the speech rates and gender of the listeners: a positive relation between the speech rates of the female listeners and their perceptions of the speakers' rates but a negative relation between the speech rates of the male listeners and their perceptions of the speakers' rates. The second experiment provided evidence that the gender of the speakers and that of the listeners independently influenced perceptions of speech rate. Specifically, (a) the female listeners judged the rates of all the speakers to be faster than the male listeners did, and (b) all the listeners believed that the male speakers talked more rapidly than the female speakers (despite the fact that the average rate of the female speakers was somewhat higher than that of the male speakers). If the perception of speech rate influences person perception and is itself influenced by gender, then one clearly must consider gender as a variable in person perception.

There are theoretical and empirical bases (e.g., the gender differences in sensitivity to nonverbal behavior reviewed by Hall, 1985), as well as numerous anecdotal reports, on which to anticipate gender differences in person perception; however, the fact that such an important determinant of human behavior has not received attention in studies of speech rate and person attribution seems reason enough for investigation. Moreover, the results of our previous studies described earlier provide an even more compelling reason for examining gender differences in the present experiment.

Speech Rate

A host of researchers have examined the relationship between speech rate and interpersonal evaluation or perception. A few important examples provide the general tenor of the results and their limitations. Miller, Maruyama, Beaber, and Valone (1976) conducted two examinations of the relation of speech rate to persuasiveness. They found that fast speakers were perceived to be not only more persuasive than slower speakers but also more knowledgeable, intelligent, and objective. However, neither vocal intensity nor frequency was taken into account, and it may well be that the listeners responded to both of these aspects of speech as well as to rate.

Brown, Strong, and Rencher conducted three experiments (1972, 1973, 1974) in an effort to determine the effects of speech rate, fundamental frequency, and the variance of fundamental frequency (intonation) on the perception of personality attributes. According to their results, speech rate was the best predictor of the attribution ratings. To extend the generality of those findings, Smith, Brown, Strong, and Rencher (1975) conducted still another experiment in which they used nine rates of speech and more voices than had been used previously (Brown et al., 1972, 1973, 1974). Smith et al. found a curvilinear relation between speech rate and a factor that they labeled Benevolence as well as a strong linear relation between rate and another factor labeled Competence. The listeners perceived that the faster rates were indicative of greater competence than the slower rates were, but they also viewed

both the faster and slower rates as less benevolent than a "normal" rate. Brown and his associates controlled for vocal characteristics other than the ones that they manipulated by synthesizing their speech stimuli such that they varied only in the three characteristics of concern. However, Street and Brady (1982) and Street, Brady, and Putman (1983) suggested that the preceding results may, in part, have been a function of the fact that the fast and slow speech samples were synthesized.

Street and Brady (1982) also suggested that disfluencies and their increase as a function of speech compression may have accounted, in part, for the findings of Apple, Streeter, and Krauss (1979). Apple and his colleagues investigated, in three experiments, the influence of speech rate and average fundamental frequency on "speaker dispositions" and affect. The first experiment yielded no significant effects. In the second experiment, rate was significantly and monotonically related to an activity factor and to a potency factor. The faster rates were judged to be more active but less potent. Apple et al. found no relationship between rate and an evaluative factor. In the third experiment, they examined the influence of rate manipulations on judgments of persuasiveness, fluency, emphaticness, nervousness, and seriousness. With the exception of seriousness, all the preceding variables were curvilinearly related to rate: Although the slowest speakers received the lowest ratings on the variables, the speakers with the normal (unmanipulated) rates—not those with the fastest rates—received the highest ratings. Thus, the authors quite properly concluded that decreasing rate had a "deleterious effect on a speaker's perceived persuasiveness, fluency, and emphaticness" (p. 723). However, an increasing rate did not necessarily enhance the perception of these characteristics beyond what might be considered a moderate rate; thus, the results of Apple et al. did not fully support the findings of Miller et al. (1976).

In the two studies most closely related to the present one, the researchers investigated the effect of speech-rate similarity on listener evaluations of speakers (Street & Brady, 1982; Street et al., 1983). Although those authors derived their rationale from a different body of literature (of which they provided an excellent review), they were broadly concerned with similar issues and questions. Indeed, the two dependent variables (competence and social attractiveness) in the present experiment were used in both of the former studies, although some of the scales that defined the variables were different. In general, Street and his associates (1982, 1983) found linear and quadratic relationships between the actual speech rates and both the perceived competence and the perceived social attractiveness of the speaker. Thus, although increases in perceptions of competence and social attractiveness were related to increases in the actual speech rate of the speaker, they reached an asymptote at the higher rates. More relevant to the present study was the finding of a linear relationship between the competence scores and the listeners' perceptions of the speaker's rate relative to their own rate. The listeners who perceived the speaker's rate as faster than their own viewed him (the speaker was male) as more competent, whereas those who perceived his rate to be slower than their own viewed him as less competent. In addition, the listeners who judged the speaker's

rate to be faster than or similar to their own considered him to be more socially attractive than did those who perceived his rate to be slower than their own. Social attractiveness did not appear to be related to comparison of the actual speech rates of the speaker and listeners, and contextual differences in the judgment of competence and social attractiveness occurred in only one of the studies (Street & Brady, 1982). Buller and Aune (1988) and Buller and Burgoon (1986) also found that the similarity of speaker's and listener's speech rates was associated with perceptions of social attractiveness. In a later study, Buller et al. (1992) used intimacy, sociability–character, and immediacy as three scales to measure social attractiveness; they found that increased similarity of actual speech rate was significantly related to perceptions of greater intimacy and sociability–character but not to immediacy. Actual speech-rate similarity was not related to competence, but perceived speech rate similarity was modestly related to competence. Moreover, listeners' competence evaluations increased to a certain extent as speech-rate similarity increased.

The perception of personal attributes, then, may be mediated by the perception of speech rate and, to some extent, by the similarity between the rates (both actual and perceived) of speakers and listeners. Moreover, the relationship seems to be both linear and curvilinear, although the generality of that conclusion is limited by some of the characteristics of the previous studies. For example, in the two studies that tested the relationship most directly, the researchers (Street & Brady, 1982; Street et al., 1983) used as their stimuli speech samples from 1 speaker, although Apple et al. (1979) used 27 speakers. Brown and his colleagues (1972, 1973, 1974) synthesized 54 voices from the speech of 2 speakers, although Smith et al. (1975) used 6 speakers to generate 54 voices. It is fair to ask whether the relationships thus obtained can be generalized to other speakers.

It also seems reasonable to wonder whether the range of speech rates in the previous studies played a role in the relation between rate and attributions. In one of the studies (Smith et al., 1975), for instance, the researchers decreased and increased the normal rate of each of six speakers by 12.5%, 25%, 37.5%, and 50%. For a normal moderate rate of speech of 150 words per minute (wpm; Allen, Anderson, & Hough, 1968), the rate would range from 75 wpm (unusually slow) in 12.5% steps to 225 wpm (unusually fast). Street and Brady (1982) used five rates calculated in syllables per minute (spm): 140, 197, 253, 324, and 376. For their next study (Street et al., 1983), they selected only the samples with 140 spm, 253 spm, and 376 spm as their slow, moderate, and fast rates. Again, the slow and fast rates are very slow and exceedingly fast.[1] The fast and slow rates generated by Apple and his colleagues (1979) were, respectively, 143% and 77% of their

[1]There is no simple method for converting from wpm to spm (or vice versa) unless the passages are available for counting. Conversion of the two passages of Street and his colleagues (1982, p. 297; 1983, p. 44) by counting indicated that the number of syllables was approximately 20% higher than the number of words. Use of that estimate to convert the 140 spm and 376 spm to words yields a slow rate of about 112 wpm and a fast rate of about 301 wpm.

unmanipulated rates. Thus, a moderate rate of 150 wpm would yield fast and slow rates of about 215 wpm and 116 wpm, respectively. Might the curvilinear relationships in the foregoing studies have been a function of the broad range of rates?

Street and his associates (1983) suggested that the results of earlier studies may have been partially a function of the artificiality of rates generated by synthesis and compression–expansion processes as well as of the effect of such strategies on disfluencies in the speech samples. Those authors claimed that their own stimuli were more natural because their rates were not machine generated and were "relatively fluent with few internal pauses" (p. 43). Street et al. generated their stimuli by having their speaker and listeners "say" (read) prepared passages. One might argue, however, that spontaneously produced speech has a fairly constant and predictable rate that includes both pauses and disfluencies (Mahl, 1956).

In contrast, not all researchers have found that faster speech rates are more persuasive. Some theorists (e.g., O'Connell, Kowal, Bartels, Mundt, & van de Water, 1989) cited politicians' speech as a circumstance in which more deliberate, slower speech may be more persuasive. In addition, some researchers have found that rapid speech detracted from interest in its message (e.g., Woodall & Burgoon, 1983). Still others (e.g., Schlinger, Alwitt, McCarthy, & Green, 1983) have concluded that listeners are apt to judge rapid speakers as condescending. Moreover, the perceptions of speech rate and speakers may depend on the context in which the speakers are heard as well as on the topics of the speeches. Interviewers' impressions of interviewees, for example, were unrelated to speech rate when the topic of the speech was intimate (Siegman & Reynolds, 1983). It seems likely that the nature of the topic and the degree to which it arouses listener interest influences impressions of the speakers.

In summary, the issues of whether and how the perception of speech rate mediates the attribution of personal characteristics clearly warrant further clarification. Theorists of interpersonal attraction and accommodation (e.g., Bishop, 1979; Giles et al., 1987) have suggested that listeners assign higher competence and social attractiveness scores to speakers whose actual and perceived speech rates are similar to their own rates than to those whose rates are faster or slower than their own (i.e., there is a quadratic relationship between speech rate and attribution scores). Previous researchers (Street & Brady, 1982; Street et al., 1983) have also suggested that there may be a linear relationship between the listeners' perceptions of competence and their perceptions of the speakers' rates. According to both theory and research, those expectations may be moderated by the gender of the speakers and listeners. Therefore, on the basis of the foregoing research, we formulated the following hypotheses:

Hypothesis 1: Listeners regard speakers with speech rates perceived to be similar to their own as more competent and more socially attractive than they regard speakers with speech rates perceived to be different from their own.

Hypothesis 2: Listeners' gender influences listeners' perceptions of the speakers.

Hypothesis 3: Speakers' gender influences listeners' perceptions of the speakers.

Method

Stimuli

Global rate of speech, often measured in terms of words or syllables per minute, seldom remains constant over the course of a conversation (Goldman-Eisler, 1968).[2] It appears to change considerably with such variables as the situation in which the speech occurs, the emotional state of the speaker, and the type of material being discussed. We controlled for such variations in the present experiment. To that end, we excised a 1-min speech sample from the responses of each of 5 male and 5 female undergraduates (obtained in another experiment; Feldstein & Sloan, 1984) to the same cards from the Thematic Apperception Test (TAT; Murray, 1943).[3] The cards vary in the degree of positive and negative emotionality that they evoke; a panel of three judges rated the cards used in the present study and chose the ones that would not elicit strongly positive or negative feelings.

Of the 10 speech samples, however, we selected only those of 3 male and 3 female undergraduates, to obtain male and female stimuli with relatively comparable average wpm. Thus, the wpm of the 3 male samples were 125, 147, and 152; those of the three female samples were 130, 148, and 154. We recorded all 6 speech samples in random order on a single cassette tape with 20 s of silence between successive samples. We made the decision to use only one stimulus order because the use of even one additional order would have necessitated almost doubling the number of listeners to maintain the same level of power. However, it seemed unlikely that fatigue would affect the results because the entire experimental procedure lasted approximately 15 min. Furthermore, if the order had an effect on the results, one would expect a relationship between the number of the stimulus (i.e., the sequence) and the dependent variables. But a comparison of stimulus number with perceived competence and with perceived social attractiveness yielded *t*s of $-.560$ ($p = .58$) and -1.402 ($p = .16$), respectively.

[2]One may argue that global rate of speech is a gross measure, although it is what people ordinarily hear when they listen to others. Listeners do not deliberately attend to the durations of the sounds and silences that make up the speech stream unless those durations are unusually long or short.

[3]The TAT (Murray, 1943) is a projective instrument consisting of a set of 31 pictures that researchers use to elicit stories presumed to aid in the assessment of personality characteristics and conflicts. Thus, the stories most often contain the behavior, thoughts, and feelings of the characters shown in the pictures.

Although the average vocal intensity of the 6 samples was controlled and rendered similar by the recording procedure, the vocal frequency of the men was obviously different from that of the women, and the listeners reported no difficulty in distinguishing between the male and female voices. These rates ranged from slow moderate to moderate (Allen et al., 1968). We selected them because, in extemporaneous speech, different speech rates involve a variety of different supersegmental patterns, acoustic cues, and vocal time patterns. In addition, the speech of different individuals involves the same types of differences (Grant, Ardell, Kuhl, & Sparks, 1985). We controlled such differences to some extent by narrowing the range of speech rates, by controlling the type of material discussed, and by controlling the level of vocal intensity. In addition, although the content varied from speaker to speaker, the general content was the same for all speakers inasmuch as it represented a response to the same three TAT cards. The speech could have been rendered unintelligible in a number of ways (Scherer, Feldstein, Bond, & Rosenthal, 1985), but the fact that it varied over speakers offered some control and seemed to make for greater ecological validity.

Person Perception Scales

We used 10 unipolar adjective scales (likable, good, competent, ambitious, intelligent, kind, confident, sincere, pleasant, and effective communicator) to assess the listeners' perceptions of the 6 speakers. Each of the 10-point Likert-type scales ranged from 0 (*not at all*) to 9 (*extremely*).

Participants and Procedure

We conducted the study in a language laboratory designed such that an entire group of listeners could hear the same audiotaped material simultaneously at individual listening stations equipped with earphones and microphones. The input to the listening stations was controlled from a central master control station in the laboratory.

The participants (listeners) in the study were 17 male and 28 female university undergraduate volunteers. Two of the men and 7 of the women were African American; the rest were Caucasian. They came to the laboratory in groups of 2 to 9. Before rating the speech samples, they listened to prerecorded instructions and completed one practice rating. After hearing each of the speech samples by the six speakers, the listeners judged the speech rate of each sample on a 10-point Likert-type scale (1 = *very slow*, 10 = *very fast*). On a comparable scale, they then judged how the rate of their own speech compared with that of the speaker. Our intention in having the listeners judge the speech rate of each sample before rating their own speech in comparison with that of the speaker was to focus the listeners on the simpler assessment of the speaker's rate without immediately priming them to the more complex issue of comparative speech rates. In that way, we first obtained the

listener's assessment of how quickly or slowly each speaker spoke and then an assessment of the speaker's rate relative to the listener's rate. Finally, the listeners rated the speaker on the set of 10 unipolar adjective scales listed earlier. After hearing and rating all 6 speech samples, each listener recorded a 2-min sample of his or her own speech. To limit the range of topics, we asked the listeners to talk about their university experiences. Thus, the listeners' monologues were extemporaneous, as were those of the speakers. We computed the average wpm directly from the recordings and provided the listeners' rates of speech.

Dependent Variables

We used 8 of the 10 adjective scales to obtain the two dependent variables in the present study—*perceived competence* and *perceived social attractiveness*. We considered the remaining 2 scales as filler items. According to the inter-item correlations for the 8 scales (range = .47–.79), two sets of 4 items were more highly correlated with one another than with items in the other set. We named one set *perceived competence* and the other *perceived social attractiveness*. The comparison of perceived competence with perceived social attractiveness yielded a Pearson correlation coefficient of .68, which is statistically significant and indicates that the two variables share 46% of their variance. However, that correlation also indicates that 54% of the variance was unique and not shared by the variables. To decide whether to use both composite variables or a single composite variable, we submitted the 8 adjectives to a principal components factor analysis with varimax rotation. This factor analysis resulted in two factors, showing that the 4 perceived-competence items were correlated (range = .81–.89) with the first factor and the 4 perceived-social-attractiveness items were correlated (range = .77–.90) with the second factor. Given the results of the factor analysis, we kept the two sets of items as separate dependent variables.

Perceived competence scores. We used a subset of 4 of the 10 adjective scales (intelligent, confident, competent, and ambitious) to obtain a perceived-competence score—that is, the sum of a listener's ratings on the 4 scales for each speaker provided the listener's judgment of that speaker's competence (for the 4 items, inter-item correlations = .73–.80; $\alpha = .93$). Consistent with the results of our factor analysis, Gough and Heilbrun (1983) found that the 4 scales loaded on a single factor that they labeled Achievement. Brown et al. (1973) had used 3 of the adjectives (intelligent, confident, and ambitious), along with the adjectives active and good-looking, to constitute a factor analytically derived subset of scales that they labeled Competence. Street et al. (1983) used the same 3 adjectives (intelligent, confident, ambitious) as part of their measure of competence, along with sincere, good-looking, and effective communicator. Inasmuch as we had added the adjective competent to the 3 common adjectives, it seemed appropriate to consider the set of 4 scales a measure of perceived

competence. Given the number of scales, the range of possible perceived competence scores was from 0 to 36.

Perceived social attractiveness scores. We used the sum of another subset of 4 of the 10 adjective scales (good, pleasant, kind, and likable) as the perceived-social-attractiveness score (for the 4 items, inter-item correlations = .70–.76; $\alpha = .92$). Again consistent with the results of our factor analysis, Gough and Heilbrun (1983) found that 3 of the adjectives (good, kind, and pleasant) load on a factor that they labeled Affiliation. In the present experiment, the adjective likable had an equally high loading on the same factor; thus, we included it in the subset. Moreover, an individual who is good, kind, pleasant, and likable seems more aptly described as socially attractive than as affiliative. Again, Street et al. (1983) used 3 of the adjectives (good, kind, pleasant), together with nice, dependable, and friendly, as their measure of social attractiveness. As with perceived competence, possible scores for social attractiveness ranged from 0 to 36.

Independent Variables

We used four independent variables in the present study: perceived rate differences, actual rate differences, gender of the speakers, and gender of the listeners.

Perceived rate differences. As noted earlier, the listeners used two 10-point Likert-type scales (1 = *very slow,* 10 = *very fast*) to judge each speaker's speech rate and their own. The first scale represented the listeners' perceptions of how fast or slow the speech rate of each speaker was. The second represented their estimates of how they perceived their own speech rates as compared with those of the speakers. According to the task and listener comments, the listeners, after completing the first scale, used the second one to judge the rate of their own speech. For instance, a listener may have judged the speech rate of a speaker as 8 and his or her own speech rate as 7, indicating that the speaker's rate was somewhat faster than the listener's.

We formulated a strategy to determine whether the speakers' perceived rates were faster than, slower than, or similar to that of the listener. We used algebraic differences (obtained by subtracting the rates of the listeners from those of the speakers) between the perceived rates of the speakers and those of the listeners to index the comparison of the speakers' speech rates with those of the listeners. Inasmuch as the listeners did not receive instructions about which parts of the self-rating scale meant "similar," "slower than," and "faster than," we made an arbitrary decision about how to divide the differences between the two scales into those three categories. The range of differences (–4 to +6) suggested that +1 and –1 be used as the cutoff points. Thus, if a difference fell above +1.0, we considered the speaker's rate to be faster than the listener's rate. If it fell below –1.0, we

considered the speaker's rate to be slower than the listener's rate. Finally, if the difference ranged from –1.0 to +1.0, we considered the speaker's rate similar to that of the listener. According to the distribution of perceived differences, approximately equal proportions of female and male listeners perceived that speakers' rates were slower (female listeners: 77 of 168 ratings, 45.8%; male listeners: 45 of 102 ratings, 44.1%), similar (female listeners: 78 of 168 ratings, 46.4%; male listeners: 48 of 102 ratings, 47.1%), and faster (female listeners: 13 of 168 ratings, 7.7%; male listeners: 9 of 102 ratings, 8.8%) than their own speech rate, $\chi^2(2, N = 45) = .14$, $p = .93$.

We coded the three categories with orthogonal polynomials (Cohen & Cohen, 1983) to generate a set of two regression variables such that the first variable allowed for an estimate of the linear relation between the differences and the person-perception scores as well as the second variable, the quadratic relation. Inasmuch as there were six perceived rate differences for each listener (one for each of the six speakers), the derived variables (the linear and quadratic components) constituted a set of within-subjects variables.

Actual rate differences. We obtained actual algebraic differences between the speech rates of the speakers and those of the listeners by subtracting the listeners' actual rates from the speakers' actual rates. The reason for using the actual speech rates was to account for the possibility that the similarity–attraction hypothesis is as applicable to conditions of actual rate similarity as to those of perceived rate similarity. The average speech rate of all the listeners was 157.98 wpm ($SD = 26.90$). The average of the differences between the actual rates of the speakers and listeners was –15.31 wpm ($SD = 29.13$). The differences between the speakers' and listeners' rates ranged from –45 to +105 wpm; again, the distribution suggested that –15 and +15 would be useful as cutoff points. Thus, we used a difference below –15.0 to indicate that a speaker's rate was slower than that of the listener and a difference above +15.0 to indicate that a speaker's rate was faster than that of the listener. If the difference was between (and including) –15.0 and +15.0, we deemed that the speaker's rate was similar to the listener's rate. Again, we coded the three categories with orthogonal polynomials to generate a set of two regression variables that, as with the perceived-rate variables, served to analyze the linear and quadratic components of the person-perception scores. In contrast to the distribution of perceived rate differences, the distribution of actual rate differences was not the same for female and male listeners, $\chi^2(2, N = 45) = 10.96$, $p < .004$. Relative to the speakers' actual rates, a greater proportion of female listeners than of male listeners had slower actual rates (female listeners: 31 of 168 comparisons, 18.5%; male listeners: 8 of 102 comparisons, 7.8%) or faster actual rates (female listeners: 86 of 168 comparisons, 51.2%; male listeners: 45 of 102 comparisons, 44.1%); a lower proportion of female listeners than of male listeners had similar actual rates (female listeners: 51 of 168 comparisons, 30.4%; male listeners: 49 of 102 comparisons, 48.0%).

Gender. For the statistical analysis, we considered the gender of the listeners as a between-subjects variable and the gender of the speakers as a within-subjects variable.

Statistical Analysis

We subjected the data to trend analyses by using split-plot, hierarchical multiple regression equations, with separate equations for the dependent variables (perceived competence and perceived social attractiveness). We used a within-subjects design to test the effects of rate to obtain a stronger test of the expectations, because that design controls for the confounding of intersubject differences with intrasubject differences among the rates. We entered the independent variables into each of the equations in the following order: (a) listener gender, (b) the appropriate between-subjects criterion-scaled error scores (Pedhazur, 1982), (c) speaker gender, (d) the product of listener gender by speaker gender, (e) the appropriate within-subjects criterion-scaled error scores, (f) orthogonal polynomials representing the linear trend of the perceived or actual rate differences, (g) orthogonal polynomials representing the quadratic trend of the perceived or actual rate differences, (h) the product of linear polynomials by listener gender, (i) the product of quadratic polynomials by listener gender, (j) the appropriate within-subjects criterion-scaled error scores, (k) the product of the linear polynomials by speaker gender, (l) the product of quadratic polynomials by speaker gender, and last (m) the products of the linear and quadratic polynomials by speaker gender by listener gender. Given the order in which they occurred, the products "carried" the interaction effects of the variables that they comprised (Cohen & Cohen, 1983).

Results

We described earlier the relationship between the two dependent variables, perceived competence and perceived social attractiveness. In addition, the semipartial correlation coefficient indexing the relation of the perceived differences to the actual differences between speakers' and listeners' speech rates was .19 (p = .001). Although there was a weak relationship between how the listeners thought their rates differed from the speakers' rates and how the two rates actually differed, that relation did not vary as a function of the listeners' gender.

Perceived Competence

Gender. The female listeners judged the speakers to be more competent than did the male listeners (Table 1), a finding that supports Hypothesis 2. The gender of the speakers did not yield a significant effect, in contrast to the expectation of Hypothesis 3.

Perceived rate differences. The perceived speech-rate differences represent instances in which the listeners judged their own speech rates to be faster than, slower than, or similar to those of the speakers, and the hypotheses suggest trend analyses of the data. Analysis of the linear and quadratic trends of the perceived speech-rate differences with respect to perceived competence yielded a significant main effect for each trend (Table 1)—that is, the perceived differences were linearly and quadratically related to perceived competence. Although the linear relation was positive and indicated that the listeners' attributions of competence tended to become higher as the speakers' rates increased from slower to faster than those of the listeners, it was modified by the quadratic relation, which indicated that the listeners rated speakers whose speech rates they perceived to be similar to their own as more competent than they rated those whose rates they perceived as either slower or faster than their own. That result provides support for Hypothesis 1.

Actual rate differences. As in the case of perceived competence, the trend analysis yielded a significant linear effect, as well as a significant interaction of the quadratic trend with listener gender (Table 2). Again, the linear trend was posi-

TABLE 1
Relation of the PSRD Between the Speakers and Listeners to the Perceived Competence of the Speakers

Source	*df*	*MS*	*F*	*r*
Gender				
LG	1	374.972	4.76*	.16
Listeners/LG (S/LG) (E_1)	43	78.773		
SG	1	11.204	< 1	
SG × LG	1	52.599	3.49	
SG × S/LG (E_2)	43	15.086		
PSRD				
Linear trend	1	706.255	29.44**	.22
Quadratic trend	1	378.685	15.79**	.16
Linear Trend × LG	1	19.186	< 1	
Quadratic Trend × LG	1	0.622	< 1	
PSRD × S/LG (E_3)	86	23.991		
Linear Trend × SG	1	189.458	2.24	
Quadratic Trend × SG	1	23.892	< 1	
PSRD × SG × S/LG (E_4)	86	84.506		

Note. PSRD = perceived speech-rate differences. LG = listener's gender. E = error score. SG = speaker's gender. The table is based on a multiple regression analysis in which we entered the variables in the order listed. Following the advice of Rosenthal and Rosnow (1991), we used r rather than r^2 as an estimate of effect size. The sign of the r indicates the direction of the relationship. We coded the female listeners and speakers as 1 and the male listeners and speakers as 0.
*$p < .05$. **$p < .01$.

TABLE 2
Relation of the ASRD Between the Speakers and Listeners to the Perceived Competence of the Speakers

Source	*df*	*MS*	*F*	*r*
Gender				
LG	1	374.972	4.76*	.16
Listeners/LG (S/LG) (E_1)	43	78.773		
SG	1	11.204	< 1	
SG × LG	1	52.599	3.49	
SG × S/LG (E_2)	43	15.086		
ASRD				
Linear trend	1	76.404	6.08*	.07
Quadratic trend	1	44.685	3.55	
Linear Trend × LG	1	0.722	< 1	
Quadratic Trend × LG	1	79.511	6.33*	.07
ASRD × S/LG (E_3)	86	12.569		
Linear Trend × SG	1	21.886	< 1	
Quadratic Trend × SG	1	0.497	< 1	
ASRD × SG × S/LG (E_4)	86	108.372		

Note. ASRD = actual speech-rate differences. LG = listener's gender. E = error score. SG = speaker's gender. The table is based on a multiple regression analysis in which we entered the variables in the order listed, with the listener's race and age as covariates. Following the advice of Rosenthal and Rosnow (1991), we used *r* rather than r^2 as an estimate of effect size. The sign of the *r* indicates the direction of the relationship. We coded the female listeners and speakers as 1 and the male listeners and speakers as 0.
*$p < .05$.

tively related to the ratings of competence: The speakers who actually spoke more rapidly than the listeners received higher ratings of competence than those who spoke more slowly. The interaction of the quadratic trend with listener gender indicated that, although both male and female listeners rated as most competent those speakers whose rates were similar to their own, the female listeners rated them as more competent than the male listeners rated them, protected $t(124) = 3.15$, $p < .005$. The female listeners and the male listeners did not differ significantly in their ratings of those speakers whose rates were slower, $t(120) = 0.92$, $p > .05$, or faster, $t(20) = 0.40$, $p > .05$, than their own (Figure 1). Those results provide further support for Hypotheses 1 and 2.

Perceived Social Attractiveness

Gender. Although the gender of the listeners did not influence their perceptions of social attractiveness, the gender of the speakers did. In support of Hypothesis 3, both the male and the female listeners viewed the male speakers as more socially attractive than the female speakers (Table 3).

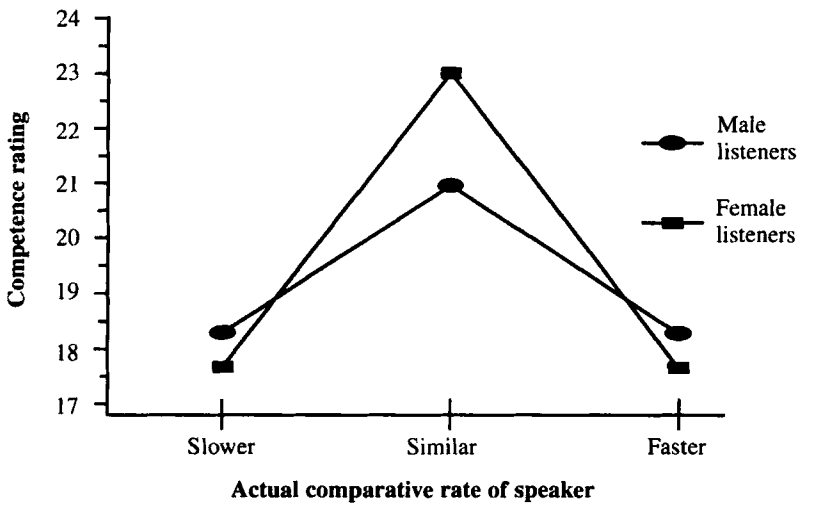

FIGURE 1. The combined influence of the quadratic component of the actual speech-rate differences between the speakers and listeners and listener gender on perceived competence.

Perceived speech rate. The perceived speech rates of the speakers influenced the listeners' perceptions of their social attractiveness. In general, the listeners viewed the speakers whose speech rates they perceived to be faster than their own as more socially attractive than those whose rates they perceived as slower than or similar to their own (Table 3). That linear relation, however, interacted with listener gender, and the interaction presents a different picture (Figure 2). Technically, the interpretation of that interaction effect indicates that, for the female listeners, perceptions of the speakers' speech rates were negatively related to their perceptions of the speakers' social attractiveness, whereas the opposite was true for the male listeners. However, the male listeners judged the speakers whose rates they perceived to be faster than their own as more socially attractive than those speakers whose rates they perceived as slower than their own, $t(51) = 1.96$, $p < .05$, whereas the female listeners gave statistically equivalent ratings to slower talking and faster talking speakers, $t(115) = 1.61$, $p > .05$. That finding provides further support for Hypothesis 2.

Interpretation of the linear relation and its interaction with gender, however, was also modified by the significant quadratic relation, which indicated that the listeners judged the speakers perceived to have speech rates similar to their own as the most socially attractive, consistent with the expectation of Hypothesis 1.

TABLE 3
Relation of the PSRD Between the Speakers and Listeners to the Perceived Social Attractiveness of the Speakers

Source	*df*	*MS*	*F*	*r*
Gender				
LG	1	163.144	2.11	
Listeners/LG (S/LG) (E_1)	43	77.423		
SG	1	97.200	5.41*	.10
SG × LG	1	33.630	1.87	
SG × S/LG (E_2)	43	17.973		
PSRD				
Linear trend	1	64.812	4.67*	.08
Quadratic trend	1	107.931	7.77**	.10
Linear Trend × LG	1	69.960	5.04*	.08
Quadratic Trend × LG	1	10.013	< 1	
PSRD × S/LG (E_3)	86	13.892		
Linear Trend × SG	1	0.183	< 1	
Quadratic Trend × SG	1	6.368	< 1	
PSRD × SG × S/LG (E_4)	86	44.752		

Note. PSRD = perceived speech-rate differences. LG = listener's gender. E = error score. SG = speaker's gender. The table is based on a multiple regression analysis in which we entered the variables in the order listed. Following the advice of Rosenthal and Rosnow (1991), we used r rather than r^2 as an estimate of effect size. The sign of the r indicates the direction of the relationship. We coded the female listeners and speakers as 1 and the male listeners and speakers as 0.
*$p < .05$. **$p < .01$.

Actual speech rate. Only the quadratic relation was significant. Thus, the listeners judged those speakers whose actual speech rates were similar to their own as more socially attractive than those whose rates were slower or faster than their own (Table 4).

Discussion

We derived the general hypotheses from the assumption of similarity–attraction research that people tend to like others with similar attitudes, interests, and personality characteristics. Serious questions have arisen about the viability of Rosenbaum's (1986b) hypothesis that "similarity does not lead to liking, but dissimilarity does indeed lead to repulsion" (p. 1156). However, Rosenbaum was talking specifically about attitudinal similarity; it is not clear that the rebuttal to his position (Byrne, Clore, & Smeaton, 1986) and Rosenbaum's (1986a) rejoinder clarified the issues. In the present study, in contrast, we were concerned with behavior (i.e., global speech rate). In support of the similarity–attraction hypothesis, our results suggest, as have those of previous research (e.g., Kleinke, 1972), that the assumption about similarity of attitudes may be extended to include similarity of behavior.

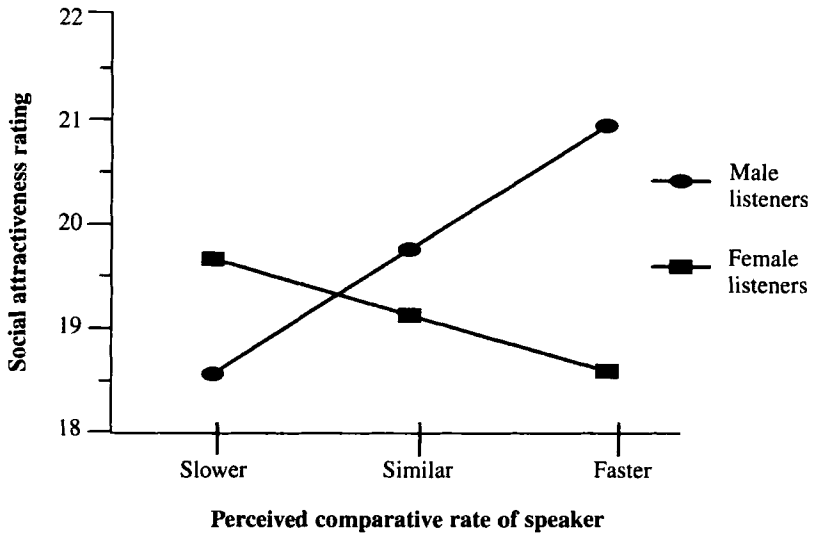

FIGURE 2. The combined influence of the linear component of the perceived speech-rate differences between the speakers and listeners and listener gender on perceived social attractiveness.

We also derived the hypotheses from the expectations of, and findings associated with, the speech accommodation theory (e.g., Giles et al., 1987; Putman & Street, 1984), which suggests that, when the verbal–vocal behaviors of interacting individuals converge, they tend to perceive each other positively. An explicit aspect of the latest reformulation of that expectation regarding the consequences of convergent accommodation on the part of a speaker is that "convergence will be positively evaluated by the message recipients, that is, will lead to high ratings for friendliness, attractiveness, and solidarity when recipients *perceive* [italics added] . . . a match to their own communicational style" (Giles et al., p. 38). The consequence of divergence is that it "will be negatively rated by recipients when they perceive . . . a mismatch to their own communicational style" (p. 38). In other words, the consequences posited for convergence–divergence in the literature concerned with the coordination–accommodation of verbal–vocal behavior are very like those associated with interpersonal similarity and dissimilarity in the similarity–attraction literature. That finding is not surprising in the case of Giles's theory inasmuch as the theory was derived, at least in part, from similarity–attraction research (Giles et al.).

Although the present results tended to support the implications of speech accommodation theory mentioned earlier, the support was indirect because the

TABLE 4
Relation of the ASRD Between the Speakers and Listeners and the Perceived Social Attractiveness of the Speakers

Source	*df*	*MS*	*F*	*r*
Gender				
LG	1	163.144	2.11	
Listeners/LG (S/LG) (E_1)	43	77.423		
SG	1	97.200	5.41*	.10
SG × LG	1	33.630	1.87	
SG × S/LG (E_2)	43	17.973		
ASRD				
Linear trend	1	0.083	< 1	
Quadratic trend	1	42.510	6.41*	.06
Linear Trend × LG	1	1.678	< 1	
Quadratic Trend × LG	1	0.193	< 1	
ASRD × S/LG (E_3)	86	6.628		
Linear Trend × SG	1	1.277	< 1	
Quadratic Trend × SG	1	13.764	< 1	
ASRD × SG × S/LG (E_4)	86	54.338		

Note. ASRD = actual speech-rate differences. LG = listener's gender. E = error score. SG = speaker's gender. The table is based on a multiple regression analysis in which we entered the variables in the order listed, with the listener's race and age as covariates. Following the advice of Rosenthal and Rosnow (1991), we used *r* rather than r^2 as an estimate of effect size. The sign of the *r* indicates the direction of the relationship. We coded the female listeners and speakers as 1 and the male listeners and speakers as 0.
*$p < .05$.

speakers and listeners did not interact with each other. To *converge* means to become similar (Giles et al., 1987). In the present experiment, the listeners heard the speakers; rated how similar the speakers' rates were to their own; and, after hearing each speaker, provided a sample of their own speech. The speech of the listeners did not become, or fail to become, similar to that of the speakers. Rather, the speech rates of the listeners and speakers were (or were perceived to be) or were not (or were perceived not to be) similar.

There was, however, strong support for the general hypothesis. The listeners rated competence and social attractiveness highest for those speakers whose perceived rates were similar to their own. The comparison between competence and the speakers' actual rates yielded a similar quadratic relationship that interacted with the listeners' gender. The speakers whose actual rates were similar to the listeners' own were also perceived as most socially attractive. Moreover, the results revealed a linear relation between perceived speech rate and both competence and social attractiveness; in the case of social attractiveness, the gender of the listeners influenced the linear relation. Finally, there were two main effects of gender: (a) The female listeners rated all the speakers as more competent than did

the male listeners, and (b) all the listeners considered the male speakers to be more socially attractive than the female speakers.

However, in all but one of the previous studies (Apple et al., 1979) in which more positive attributions were associated with faster speech rates, the researchers used fast, moderate, and slow rates. In the present study, by comparison, we used rates that were, or were judged to be, slower than, similar to, and faster than those of the listeners. Indeed, the range of rates in the present study was relatively narrow (i.e., 125 wpm–154 wpm). Thus, comparisons with most previous studies are not entirely appropriate. In one exception (Street et al., 1983), listeners perceived speakers with speech rates faster than and similar to their own to be more competent and socially attractive than speakers with slower rates than their own. The present results are essentially in accord with those of Street et al., despite differences in the rates of speech and in the procedure, as well as the much narrower range of speech rates of the present stimuli.

Perhaps the most important result of the present study is that gender affected the relationships of the perceived and actual speech rates to the perceptions of the speakers. One possible explanation is in terms of the differing presentation strategies of men and women. Deaux (1977) proposed that the strategy of men can be characterized as a "status assertive mode" (p. 360), whereas that of women is essentially affiliative and likely to be more interpersonally positive. Such a position would seem to account both for the generally higher competence ratings given by the female listeners and for the higher competence ratings given by female, rather than male, listeners to speakers whose rates were similar to their own.

Another, certainly testable conjecture, is that the present female listeners viewed everyone as more competent than did the male listeners because women tend to have lower self-evaluations than do men (e.g., Feather, 1969; Kaplan & Sedney, 1980; Pasquella, Mednick, & Murray, 1981; Sohn, 1982; Tavris & Wade, 1984).[4] The quadratic interaction effect does not contradict such a conjecture.

Explicitly in speech accommodation theory and implicitly in the theoretical underpinnings of similarity–attraction research is the notion that the respondent must perceive and recognize the similarity of the stimulus person's attitudes, personality, or behaviors. In general, the present analyses of the attributions in terms of the perceived speech rates yielded results that seem clear: The listeners assigned higher competence and social-attractiveness scores to those speakers

[4]Self-evaluation in the present study represents a broader range of behaviors than do self-esteem scales (on which men and women frequently do not differ; Deaux, 1977). An example of such behaviors is the finding (Deaux, 1976) that men tended to attribute their success to ability and to deny responsibility for failure, whereas women tended to attribute their success to luck and their failure to lack of ability. Other findings are that men tended to overestimate, and women to underestimate, predictions of their performance; moreover, men tended to assess their performance more favorably than women did (Crandall, 1969).

whose speech rates they believed to be similar to their own than to those whose rates they believed to be different from their own. The results were similar in the case of speakers whose speech rates were, in fact, similar to or different from those of the listeners. The fit of the results to speech accommodation and similarity–attraction theories, however, was somewhat complicated by the fact that, as already discussed, the gender of listeners affected their perceptions of speakers. It is instructive, perhaps, that neither of the aforementioned theories considers the role of gender—of either the speaker or the listener—in its formulation. It seems clear that the theories would benefit from revisions that take gender into account.

One can question whether the present results were a function (a) of the content of the stimuli (i.e., TAT stories; Murray, 1943) or (b) of the fact that the segments of the listeners' speech were not stories. However, both the stories and the listeners' speech were spontaneously produced. Nevertheless, it may be useful for future researchers to conduct a conceptual replication with spontaneously produced stimuli that are not stories. It would also be interesting to include in such a replication an explicit assessment of the self-evaluations of the listeners to test the conjecture about gender differences in person perception that we presented earlier.

In short, the contributions of the present study are the extension of the results of relevant previous research to more ecologically valid conditions and the addition of weight to the findings of the similarity–attraction literature and to Festinger's (1950) social comparison theory.

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