Effects of Attractiveness and Maturity of Face and Voice on Interpersonal Impressions

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We examined effects of attractiveness and maturity of face and voice on interpersonal impressions. Higher attractiveness, both facial and vocal, resulted in more positive impressions. However, facial attractiveness influenced primarily interpersonal dimensions (extroversion, warmth, and agreeableness) whereas vocal attractiveness influenced primarily more private dimensions (neuroticism and conscientiousness). Higher maturity, both facial and vocal, resulted in impressions of higher dominance and lower warmth and agreeableness. Higher facial maturity resulted in somewhat less positive impressions whereas higher vocal maturity did not. Consistent with this difference, higher vocal maturity was perceived as more attractive whereas higher facial maturity was not. Finally, the effect of a specific quality (attractiveness or maturity) of face or voice was often moderated by other qualities of the same or different channel. © 1995 Academic Press, Inc.

Interpersonal impressions are influenced by two qualities of face and voice: attractiveness and maturity. Regarding attractiveness, a large body of research has found a positive relation between higher levels of physical attractiveness and more favorable impressions (for recent reviews see Bull & Rumsey, 1988; Hatfield & Sprecher, 1986; Langlois, 1986). Similarly,

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higher vocal attractiveness was shown to elicit more positive ratings (Miyake & Zuckerman, 1993; Zuckerman & Driver, 1989; Zuckerman, Hodgins, & Miyake, 1990). Regarding maturity, investigators have shown that individuals with less mature (more babyish) faces are perceived as less dominant and more warm (Berry, 1991a, 1991b; Berry & Brownlow, 1989; Berry & McArthur, 1985; McArthur & Apatow, 1983/84; McArthur & Berry, 1987). Parallel findings were obtained for the voice (Berry, 1990, 1991b, 1992; Montepare & Zebrowitz-McArthur, 1987).  

Evidence suggests sociobiological origins for both the attractiveness and the maturity phenomena. Effects of physical attractiveness were obtained for 3- to 6-month-old babies and, as such, cannot be attributed to socialization (Langlois, Ritter, Roggman, & Vaughn, 1991; Langlois, Roggman, Casey, Ritter, Rieser-Danner, & Jenkins, 1987; Samuels & Ewy, 1985; Shapiro, Hazan, & Haith, 1984). In addition, perceivers from different cultures tend to agree on the attractiveness of faces and to credit more attractive targets with more positive attributes (Bernstein, Lin, & McClelland, 1982; Cunningham, 1986; Perrett, May, & Yoshikawa, 1994; Wagatsuma & Kleinke, 1979; Zebrowitz, Montepare, & Lee, 1993). A proposed rationale for the attractiveness effect is that attractive physical features serve as external cues of health, sexual maturity, and other qualities desirable for the opposite sex (Cunningham, 1986; Cunningham, Barbee, & Pike, 1990; Symons, 1979). Consistent with this rationale, Singh (1993) has shown that low waist-to-hip ratio in females, which is an accurate indicator of health and reproductive potential, also elicits high attractiveness ratings.

There is also support for cross-cultural generality in the perception and impact of both facial and vocal maturity (McArthur & Berry, 1987; Montepare & Zebrowitz-McArthur, 1987; Zebrowitz et al., 1993). The rationale suggested for the maturity effect is that perceivers overgeneralize traits attributed to babies to adults with immature face or voice (cf. Berry & McArthur, 1985; McArthur & Apatow, 1983/84). Much less is known, however, about vocal attractiveness. Studies of this phenomenon have been conducted only with U.S. subjects and a clear rationale for its effects is still missing.

To further extend understanding of the attractiveness and maturity

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1 In the research on maturity, the dominance dimension was tapped by adjectives such as vulnerable and powerful and the warmth dimension by adjectives such as sympathetic and cold. In addition, the effects of maturity were examined for adjectives related to the dimensions of competence (e.g., industrious, competent) and sincerity (e.g., deceitful, trustworthy). However, factor analyses typically yielded only two factors, one comprised of adjectives related to dominance and competence and another comprised of adjectives related to warmth and sincerity. In addition, effects of maturity on the competence and sincerity impressions were almost identical to those obtained for dominance and warmth, respectively.
effects, the present study had two objectives. One goal was to examine how effects of attractiveness and maturity on impressions vary as a function of the attribute being measured. A second objective was to examine the joint effect of attractiveness and maturity of face and voice on impressions.

If physically attractive people are seen as more desirable mates, they also may be seen as more adept at social relations. A recent meta-analysis of physical attractiveness effects (Eagly, Ashmore, Makhijani, & Longo, 1991) seems to support this notion. Eagly et al. used Rosenberg's (1977) scheme to classify studies on attractiveness according to the content of the impression measured. They showed that attractiveness had its strongest effect on inferences of social competence; little or no impact on inferences of integrity and concern for others; and intermediate impact on potency, adjustment, and intellectual competence (see also Feingold, 1992). Eagly et al.'s (1991) results, however, are limited to the theoretical framework that was used. Further, it is not clear whether these findings also generalize to vocal attractiveness. For example, if social competence is the impression most sensitive to physical attractiveness, is it also the impression most sensitive to vocal attractiveness?

In the present study, attractiveness effects were obtained for adjective scales representing the five NEO-Personality Inventory (NEO-PI) factors: neuroticism, extroversion, openness, agreeableness, and conscientiousness (Costa & McCrae, 1985). The NEO model is a comprehensive trait taxonomy and its five-factor structure has emerged in a large number of studies (Costa & McCrae, 1980, 1988; McCrae & Costa, 1983, 1985). Given that the present study examined impressions of personality, it is important to note that the same NEO factors were obtained for both self-reports and peer ratings (e.g., McCrae & Costa, 1987).

The relation of physical and vocal attractiveness with impressions measured by NEO-derived adjectives has been examined in three previous studies (Hodgins, 1991; Miyake & Zuckerman, 1993; Zuckerman et al., 1990). A meta-analysis of their results (available from the authors upon request) revealed that physical attractiveness primarily influenced factors in the public domain (agreeableness and extroversion) whereas vocal attractiveness mostly influenced factors in the private domain (conscientiousness and neuroticism). This pattern is consistent with the rationale provided in the literature for the attractiveness phenomenon. Perceivers observe the better treatment accorded to physically attractive people and consequently credit them with better public interpersonal attributes. In contrast, perceivers are less aware that vocal attractiveness influences interpersonal perception (cf. Zuckerman, Hodgins, & Miyake, 1993). Consequently, attributes related to interpersonal behavior are less influenced than those reflecting one's private world.

However, a pattern established by only three studies may not be that
stable. In addition, each factor was represented in those studies by only one or two adjective scales. In the present study, each NEO factor was represented by four adjective scales. It was expected that the more “public” NEO factors would be influenced by physical attractiveness whereas the more “private” factors would be influenced by vocal attractiveness.

For maturity, the goals of the present study were more exploratory in nature. Specifically, we intended to examine effects of maturity on areas other than dominance and warmth. However, to make the present study comparable to previous investigations on maturity, we measured impressions of dominance and warmth in addition to the five NEO factors.

Turning now to the second objective of the study, our point of departure is the contrast between how an impression is formed in real life and how it is examined in the laboratory. In most real life situations, impressions are elicited by all available cues in both the visual and auditory channels. In most laboratory studies, at least those investigating attractiveness effects, impressions have been examined as a function of one quality (attractiveness) in one channel (visual). The problem is that the effect of one quality in one channel may be moderated by the effects of other qualities in the same or other channels. For example, Zuckerman and Driver (1989), Zuckerman et al. (1990), and Miyake and Zuckerman (1993) repeatedly found an interaction between physical and vocal attractiveness such that the effect of one type of attractiveness was more pronounced at higher levels of the other type of attractiveness. However, maturity was not included in these studies and the studies that did investigate maturity and attractiveness (Berry, 1990, 1991b, 1992) were limited to a single channel. (Zebrowitz-McArthur and Montepare (1989) and Berry (1991a) did examine attractiveness and maturity in more than one channel but did not report analyses that test for possible interactions.)

In the present study, we examined effects of attractiveness and maturity on impressions of targets' personalities in only a visual channel, only an auditory channel, and a combined visual-auditory channel.

METHOD

Overview

Stimulus materials consisted of 110 videotaped targets. Four different groups of judges rated the targets on facial attractiveness, vocal attractiveness, facial maturity, and vocal maturity. Additional judges rated targets' personality on the basis of the face (visual condition), voice (auditory condition), and face plus voice (visual-auditory condition).

Subjects

The target persons were 48 male and 62 female undergraduate students who were videotaped and rated on attractiveness by Zuckerman et al. (1990). The judges of attractiveness in that study were 16 male and 17 female undergraduates. Recruited for the present study were judges of maturity (17 male and 13 female undergraduates) and judges of targets'
personality (140 male and 109 female undergraduates). All subjects participated in partial fulfillment of an introductory course requirement.

**Procedure**

Videotaping sessions. Targets were seated in an armchair facing a board that presented a standard statement which was neutral in content. Each target became familiar with the text and then signaled that he or she was ready for a final reading. Uniform below-the-shoulders to over-the-head, 35-s color videotapes were made as each target read the paragraph.

Attractiveness and maturity ratings. Facial attractiveness and maturity were rated separately from pictures without voice. Seven male and nine female undergraduates rated the former and eight male and six female undergraduates rated the latter. Vocal attractiveness and maturity also were rated separately from voice without picture. Nine male and eight female undergraduates rated the former and nine male and seven female undergraduates rated the latter. Seven-point scales were used for all ratings with appropriate anchors (1 = very unattractive or babyish, 7 = very attractive or mature). Judges were not given any training prior to the rating tasks. Interjudge reliabilities (Cronbach alphas) for attractiveness were .95 for face and .86 for voice; the corresponding reliabilities for maturity were .85 for face and .92 for voice.

Personality ratings. Targets were rated on scales representing the NEO-PI factors and dominance and warmth. Each NEO-PI factor was represented by four 7-point adjective scales; dominance and warmth were each represented by three 7-point adjective scales. Because it is difficult for a judge to rate targets on so many adjectives, we divided the 20 scales associated with the NEO-PI factors into four subsets. Each subset included five adjective scales, one from each of the five factors. Assignment of adjective to a particular subset was random. Judges working with a particular subset thus rated the targets on adjectives representing all NEO-PI factors. Because judges rated the targets in one of three channels, this procedure yielded 12 rating conditions (4 subsets × 3 channels). The adjectives representing Neuroticism were calm—worrying, secure— insecure, relaxed—tense, and at ease—nervous. Those representing Extroversion were outgoing—reserved, joyful—serious, sociable—not sociable, and fun loving—sober. Those representing Openness were imaginative—not imaginative, curious—not curious, creative—not creative, and original—conventional. Those representing Agreeableness were irritable—good natured, disagreeable—agreeable, not sympathetic—sympathetic, and soft hearted—ruthless. Finally, those representing Conscientiousness were conscientious—negligent, careful—careless, reliable—unreliable, and organized—disorganized.

Additional judges rated the targets on six adjective scales, three representing dominance and three representing warmth. The dominance-related scales were not forceful/forceful, not assertive/assertive, and submissive/dominant. The warmth-related scales were sensitive/not sensitive, not quarrelsome/quarrelsome, and warm/cold. The six scales were administered in one of the above-mentioned three channels, adding three more rating conditions.

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2 The original NEO model listed several facets for the neuroticism, extroversion, and openness factors. The adjectives that were used in the present study tapped the anxiety facet of neuroticism and the gregariousness facet of extroversion. The adjectives representing openness were not limited to a particular facet. Interestingly, the NEO model includes warmth and dominance as facets of extroversion. However, because we wanted to replicate previous work on maturity (e.g., Berry & McArthur, 1985; McArthur & Berry, 1987), we used that work as the source for adjectives representing warmth and dominance in the current research.
The number of judges in each rating condition ranged from 12 to 18, with approximately equal gender ratio across conditions. Rating sessions were conducted individually or in small groups of up to 8 judges. Each judge participated in only one rating condition. The study was presented as an investigation of how people form impressions about others. Each judge rated all 110 targets in one of two orders: the original order in which the videotape (or audi-tape) was recorded, 1 to 110; or first targets 56 to 110 and then targets 1 to 55. The adjective scales in each rating condition were presented in a constant random order.

RESULTS

Relations among Dependent Variables

We created subscale scores by averaging ratings across judges and then averaging the resulting mean scores across adjectives associated with each NEO factor and with dominance and warmth. All adjectives were scored in the direction of high social desirability so that higher scores on the subscales indicated low neuroticism, high extroversion, high openness, high agreeableness, high conscientiousness, high dominance, and high warmth. Reliabilities of the seven subscale scores (Cronbach alphas) in the three channels (a total of 21 reliabilities) ranged from .75 to .97. Note that for the NEO subscales, high consistency among items also indicates high interjudge reliability. The reason is that items belonging to the same NEO subscale were rated by different judges. It follows that correlations among such items imply interjudge agreement on the common domain of the item.

The Cronbach alphas of the subscales (essentially the correlation of each scale with itself) were generally higher than the correlations between the scales. In fact, there were only two exceptions to this trend in a total of 126 comparisons (the number of comparisons is the product of the six comparisons between the internal reliability of each subscale and its correlation with the other 6 subscales \( \times 7 \) subscales \( \times 3 \) channels). This pattern supports the discriminant validity of the subscales.

At the same time, the intercorrelations of the subscales were substantial and mostly positive. Median intersubscale correlations were .37 in both the visual and the visual–auditory conditions and .56 in the auditory condition. In fact, the only notable exceptions to this pattern were the negative correlations between dominance and warmth (mean \( r = -.54 \) across the three conditions) and between dominance and agreeableness.

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1 Preliminary correlational analyses indicated that relations among items associated with the same subscale were generally stronger than relations among items associated with different subscales. The scale not quarrelsome/quarrelsome was an exception in that it was more highly correlated with the three dominance items (mean \( r = -.86 \) with not quarrelsome, implying less dominance) than with the two other warmth items (mean \( r = .61 \) with not quarrelsome, implying more warmth). Accordingly, it was decided to drop the scale from the analysis and to calculate warmth scores on the basis of only two items.
(mean $r = -.22$). Thus, targets who were positively evaluated on one subscale were likely to receive positive evaluations on other scales. Accordingly we decided to combine all adjectives into one 25-item positivity scale. The internal reliability (Cronbach alpha) of the positivity scores in the three conditions ranged from .92 to .95.

**Relations among Independent Variables**

Relations between attractiveness and maturity in the two channels are best reviewed in light of previous findings. In the present study, the correlations between facial attractiveness and maturity were low for both females ($r = .20$) and males ($r = -.09$). Based on three previous studies, the comparable mean $r$ (after Fisher z transformations) for females was $-.11$ (Berry, 1991a, 1991b; Berry & Brownlow, 1989); based on eight previous studies, the comparable mean $r$ for males was $-.02$ (Berry, 1991a, 1991b; Berry & Brownlow, 1989; Berry & McArthur, 1985; Cunningham et al., 1990, Studies 2 and 3; McArthur & Berry, 1987; Zebrowitz et al., 1993). Finally, Zebrowitz-McArthur & Montepare (1989) reported a mean $-.17$ correlation for males and females combined. It thus appears that in the face, attractiveness and maturity are only minimally related.

The present relation between vocal attractiveness and maturity was positive among both males ($r = .59$) and females ($r = .47$). The corresponding correlations in a previous study (Berry, 1990) were .39 for males and $-.18$ for females. Thus, there is evidence that the two vocal qualities are correlated at least for male targets.

The present findings showed a relation between facial and vocal attractiveness in females ($r = .29$) but not in males ($r = .03$). The corresponding correlations from two previous studies (Zuckerman & Driver, 1989, Study 1 and Study 2) were .02 for females and .16 for males. At best, then, there is a weak positive relation between facial and vocal attractiveness for both males and females.

Finally, there was a positive relation between facial and vocal maturity, with somewhat higher correlations among males ($r = .52$) than among females ($r = .32$). Berry (1991a) also reported positive correlations between the two variables (for males $r = .35$, for females $r = .28$), but Zebrowitz-McArthur and Montepare (1989) did not (mean $r = -.09$). The bulk of the evidence suggests that facial and vocal maturity may be related.

The correlations presented above can be summarized around two themes. First, more mature voices were perceived as more attractive but more mature faces were not perceived as more attractive. The implication of this finding will be elaborated under Discussion. Second, facial and vocal maturity were correlated in two out of three studies, indicating perhaps a biological origin for maturity (judges of maturity were exposed
only to one channel so the correlation between channels must have originated from targets rather than from judges). There was little evidence for the existence of a similar general attractiveness factor as facial and vocal attractiveness were only minimally correlated.

**Effects of Attractiveness and Maturity on Impressions**

To examine the effects of attractiveness and maturity on judges’ impressions, scores from the overall positivity scale and the seven subscales (the five NEO-PI subscales plus dominance and warmth) were separately regressed on the relevant predictors. These regression analyses were conducted separately in the visual, auditory, and visual–auditory conditions.\(^4\)

**Visual condition.** In each regression equation, sex was entered first, followed by the simultaneous entry of facial attractiveness and facial maturity. The fourth and fifth predictors were the interaction of attractiveness and of maturity with sex, entered according to the magnitude of their effects. The sixth predictor was the Attractiveness × Maturity interaction and the seventh predictor was the Attractiveness × Maturity × Sex interaction.

A summary of the results (see top part of Table 1) shows the partial correlations of attractiveness and maturity with positivity and the seven subscales (none of the interactions was significant). Higher attractiveness but lower maturity resulted in higher overall positivity. Regarding the subscales, attractiveness had a strong effect on extroversion; intermediate effects on neuroticism, agreeableness, and openness; and no effect on conscientiousness. Its effects on dominance and warmth were positive (i.e., the higher the attractiveness, the higher the dominance and warmth scores) and significant, but relatively small.

Maturity had a large negative effect on warmth and agreeableness (i.e., the higher the maturity, the lower the warmth and agreeableness scores) and a large positive effect on dominance. It also had a positive effect on conscientiousness and negative effects on the remaining NEO-PI subscales; however, these latter effects were relatively small and not always significant.

**Auditory condition.** The regression analyses here were identical to those in the visual condition except that vocal attractiveness and vocal maturity replaced facial attractiveness and facial maturity as predictors. A summary of the results is presented in the bottom part of Table 1. Higher attractiveness resulted in higher positivity but higher maturity did not. Attrac-

\(^4\) All analyses were first conducted separately for male and female judges. Because the two sexes yielded almost identical results, we report only regressions conducted for the entire group of judges. Accordingly, all future references to sex effects concern the effects of sex of targets, not sex of judges.
<table>
<thead>
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<th>Predictors</th>
<th>Positivity</th>
<th>Extroversion</th>
<th>Neuroticism*</th>
<th>Agreeableness</th>
<th>Conscientiousness</th>
<th>Openness</th>
<th>Dominance</th>
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<td>-.01</td>
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<td>-.18</td>
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<td>-.14</td>
<td>-.22*</td>
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<td>-.12</td>
<td>-.20*</td>
<td>-.15</td>
<td>-.08</td>
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* All scales were scored in the positive direction so that high scores on Neuroticism indicate lower neuroticism.
* * * p < .001.
* * * p < .01.
* * p < .05.
TABLE 2
POSITIVITY SCORES FOR VOCAL MATURITY X VOCAL ATTRACTIVENESS X SEX IN THE
AUDITORY AND VISUAL-AUDITORY CONDITIONS

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<th>Males</th>
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<td>3.71</td>
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</table>

tiveness also had strong positive effects on neuroticism and warmth, followed by conscientiousness and agreeableness; its effects on the remaining scales were somewhat smaller.

As in the visual condition, higher maturity resulted in impressions of lower warmth and agreeableness and higher dominance. Higher maturity also resulted in impressions of less neuroticism, a complete reversal of the corresponding effect in the visual condition. Its remaining effects were smaller and not significant.

The results also showed an Attractiveness X Maturity interaction, close to significant ($p < .10$) for positivity and significant for three of the seven subscales. This two-way interaction was qualified, in turn, by an Attractiveness X Maturity X Sex interaction, significant for positivity and for two of the seven subscales (the remaining five showed interactions in the same direction, however). To illustrate the three-way interaction, we used the regression equation to identify the predicted positivity scores for male and female targets that were high and low in vocal attractiveness and maturity (for procedure, see Cohen & Cohen, 1983, Chapter 8). High and low levels were defined as one standard deviation above and one standard deviation below the mean. The results are presented in the top part of Table 2. It can be seen that for males a greater attractiveness effect was obtained under low vocal maturity whereas for females a greater attractiveness effect was obtained under high vocal maturity. (The two-way interaction produced the pattern found for females; thus the three-way interaction meant that the two-way interaction was more true for females than for males).

**Visual-auditory condition.** The predictors in this condition were sex, facial and vocal attractiveness, facial and vocal maturity, and all their
possible interactions. The regression analyses included eight steps. First, the dependent variable was predicted from sex. Second, four predictors (facial attractiveness, vocal attractiveness, facial maturity, and vocal maturity) were entered in the equation. Third, all two-way interactions involving sex (e.g., Facial attractiveness × Sex) were entered into the equation. Fourth, all two-way interactions without sex (e.g., Facial attractiveness × Vocal attractiveness) were entered. Fifth, all three-way interactions involving sex (e.g., Facial attractiveness × Vocal attractiveness × Sex) were entered. Sixth, all three-way interactions without sex were entered. Seventh and eighth, all four-way interactions (first those with sex and then those without sex) were entered.

Table 3 presents a summary of the results. For each step we present only the contributions that were significant. (An exception was Step 2 where null results of the contributions of attractiveness and maturity were of particular interest.) Missing steps imply that none of the relevant predictors made a significant contribution.

Both facial and vocal attractiveness influenced overall positivity (see Step 2). Regarding the subscales, facial attractiveness influenced only qualities related to interpersonal behavior (extroversion, warmth, and agreeableness). In contrast, vocal attractiveness influenced mostly qualities in the private domain (conscientiousness and neuroticism), although it also influenced agreeableness.

Facial and vocal maturity did not affect overall positivity. Facial maturity had a negative effect on extroversion and a positive effect on conscientiousness. However, with vocal maturity controlled for, it lost its traditional relation with dominance and warmth. Higher vocal maturity resulted in impressions of lower neuroticism, lower agreeableness, higher dominance, and lower warmth.

The regression analyses also produced three clusters of interactions. The first cluster included two interactions previously identified in the auditory condition: (a) Vocal attractiveness × Vocal maturity (significant at $p < .10$ and therefore not presented in Table 3), and (b) Vocal attractiveness × Vocal maturity × Sex (Step 5 in Table 3). The latter three-way interaction also was significant for neuroticism and conscientiousness and close to significant ($p < .10$) for openness and dominance. The lower part of Table 2 presents the predicted scores for the positivity scale. As in the auditory condition, male targets showed a greater attractiveness effect under low vocal maturity whereas females showed a greater attractiveness effect under high vocal maturity.

The interpretation of these results may be based on the finding that more mature voices sound more masculine. Smith (1979) noted that both immature voices and female voices have a higher pitch than the immature and male counterparts. Montepare and Zebrowitz-McArthur (1987) re-
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<td>× Vocal maturity × Sex</td>
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<td>.11</td>
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<td>.30**</td>
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<td>× Vocal attractiveness</td>
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<tr>
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<td>.24*</td>
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<td>× Facial maturity × Vocal maturity</td>
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* All scales were scored in the positive direction so that high scores on Neuroticism indicate lower neuroticism.
* * * p < .001.
* * * p < .01.
* * * p < .05.
ported that a feminine voice composite (an average of vocal characteristics related to ratings of femininity) was highly related ($r = .49$) to a childlike voice composite. The present results show, therefore, that vocal attractiveness produced greater effects when targets' voices were not gender appropriate. Apparently, vocal attractiveness is less of an issue and therefore matters less when a female's voice sounds as it should (feminine or low in maturity) and when a male's voice sounds as it should (masculine or high in maturity).

The next cluster of interactions includes a Facial Attractiveness $\times$ Vocal Attractiveness effect (not quite significant, $p < .07$, and therefore not presented in Table 3) and two higher-order interactions (presented in Steps 6 and 8 in Table 3). The Facial Attractiveness $\times$ Vocal Attractiveness interaction (see predicted positivity scores in top part of Table 4) showed that the effect of each type of attractiveness was more pronounced at the higher level of the other type of attractiveness. This resulted in a synergistic pattern, indicating that targets high on both types of attractiveness were rated more positively ($M = 4.31$) relative to the three remaining combinations of facial and vocal attractiveness ($M = 3.83, 3.86, \text{and } 3.97$).\footnote{In previous studies (e.g., Miyake & Zuckerman, 1993), the Facial Attractiveness $\times$ Vocal Attractiveness interaction was obtained without controlling for the effects of other two-way interactions involving facial or vocal maturity. If two-way interactions involving maturity are not controlled for in the present study, the Facial Attractiveness $\times$ Vocal Attractiveness interaction is significant ($p < .025$).}

Step 6 in the regression analysis (see Table 3) yielded a Facial Attractiveness $\times$ Vocal Attractiveness $\times$ Facial Maturity interaction, significant for positivity, neuroticism, and openness. As seen in the middle part of Table 4, this three-way interaction indicates that the established pattern of greater effect of one type of attractiveness at the higher level of the other type of attractiveness was more pronounced at higher facial maturity. Step 8 in the regression analysis (see Table 3) yielded a Facial Attractiveness $\times$ Vocal Attractiveness $\times$ Facial Maturity $\times$ Vocal Maturity interaction, significant only for positivity and dominance, but close to significance ($p \approx .10$) for extraversion, neuroticism, and openness. As seen in the bottom portion of Table 4, this four-way interaction indicates that the synergistic pattern of attractiveness (higher positivity ratings for targets high on both types of attractiveness relative to all other targets) was more pronounced for both (a) high facial and high vocal maturity and (b) low facial and low vocal maturity. It thus appears that there are two types of combined physical plus vocal attractiveness that elicit positive impressions: mature kind of attractiveness (both face and voice are seen as mature) and babyish kind of attractiveness (both face and voice are
<table>
<thead>
<tr>
<th>(a) Facial attractiveness × vocal attractiveness</th>
<th>Low facial attractiveness</th>
<th>High facial attractiveness</th>
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<th>(b) Facial attractiveness × vocal attractiveness × facial maturity</th>
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<td>Low vocal attractiveness</td>
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<td>High vocal attractiveness</td>
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<th>(c) Facial attractiveness × vocal attractiveness × facial maturity × vocal maturity</th>
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<th>High vocal maturity</th>
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<td></td>
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<tr>
<td>Low vocal attractiveness</td>
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seen as immature). Perhaps inconsistency between facial and vocal qualities of maturity interferes with this pattern. The implication is that the attractive person who is not clearly mature or babyish does not seem that attractive.

The third cluster of interactions included a single effect—a Vocal Maturity × Facial Maturity × Facial Attractiveness × Sex interaction (Step 7 in Table 3). In addition to positivity, this interaction was significant for extroversion, agreeableness, openness, and warmth. However, the mean scores did not yield a clear pattern and we were not sure how to interpret this effect (predicted scores for this effect are available from the authors upon request).

**DISCUSSION**

The present study was designed to examine (a) how attractiveness and maturity effects vary as a function of the impression being measured and (b) how attractiveness and maturity together influence impressions.

It should be noted at the outset that our findings are constrained by the instrument with which the impressions were measured. We chose to use adjective scales that represented Costa and McCrae's (1985) NEO factors. The effects that were obtained are specific to how these factors were originally conceptualized and to their operationalization in the current study. Recall, for example, that of the various facets of Neuroticism we measured only anxiety (see footnote 2). Also note that overall positivity in the present study is simply the mean of the adjective scales that were selected. A different group of adjectives could yield different results. Clearly, the conclusions that follow should be treated with caution.

In both the visual and visual-auditory condition, facial attractiveness had its strongest effect on extroversion. Across the two conditions, facial attractiveness also had sizable effects on agreeableness and warmth and no effects at all on conscientiousness. Effects on neuroticism, openness, and dominance were significant in the visual condition but not in the visual-auditory condition. But it is the visual-auditory condition that allows us to hold constant both visual and auditory qualities that are related to facial attractiveness. The results from this condition imply, therefore, that facial attractiveness uniquely influences only attributes that are relevant to interpersonal behavior (extroversion, agreeableness, and warmth).

In both the auditory and visual-auditory conditions, vocal attractiveness had strong effects on neuroticism and conscientiousness. Effects on the remaining subscales were all significant in the auditory condition but (except for agreeableness) not significant in the visual-auditory condition. Thus, in the condition allowing the identification of attributes unique to vocal attractiveness, vocal attractiveness mostly influenced impressions.
relevant to the target's private domain (neuroticism and conscientiousness).

The difference in attributes influenced by facial and vocal attractiveness may be due to the opportunities people have to observe the stereotypes in action. Facialy attractive people often do well socially and are thus credited with better interpersonal skills. Vocally attractive people are not known to excel in social situations. Observers, therefore, generalize the attractive voice to more "private attributes." Interestingly, although facial and vocal attractiveness influence different types of impressions, their effects on overall positivity was the same.

In contrast to attractiveness, maturity seems to exert influence on more specific impressions. In the single channels (i.e., visual condition and auditory condition), high maturity (both facial and vocal), resulted in impressions of higher dominance and lower warmth. Both facial and vocal maturity also resulted in impressions of lower agreeability, and neither influenced conscientiousness. For the remaining subscales, the effects of facial maturity were more negative (less extroversion, more neuroticism, and less openness) than those of vocal attractiveness (less neuroticism and no significant effects on extroversion and openness). Consistent with these results, facial maturity also resulted in less positive impressions overall whereas vocal maturity did not.

One possible reason for the difference between the overall effects of facial and vocal maturity in the single-channel conditions is the difference between their developmental trajectories. Facial cues of maturity develop more gradually and as such are less noticeable than vocal cues of maturity. It follows that a babyish voice in young adults is more likely to indicate improper development than a babyish face. Consistent with this speculation, we showed earlier that a babyish voice is considered less attractive than a mature voice whereas maturity of face is unrelated to facial attractiveness. Higher vocal maturity could have resulted in more positive impressions than higher facial maturity because vocal maturity is more indicative of proper development.

Another point to consider is that the mature voice is characterized by lower pitch, lower tightness, and higher clarity (Montepare & Zebrowitz-McArthur, 1987). All three characteristics may explain why the vocally mature target was perceived as less neurotic (or as more calm and relaxed). Lower pitch, in particular, is a correlate of lower stress and positive emotions (Fairbanks, 1940; Scherer, 1980a, 1980b). Because facial characteristics of maturity do not serve as indicators of lower stress, they could not duplicate the effect of vocal maturity. In fact, facial maturity was related to higher neuroticism, indicating perhaps that adults are perceived as more worrying and tense than are children.

In the visual–auditory condition, facial maturity retained the negative
direction of its overall effect and vocal maturity retained the positive direction of its overall effect; neither effect was significant, however. An inspection of the subscales most influential by maturity in the single channels (dominance, warmth, and agreeableness) indicates strong and significant effects by voice compared with weak and nonsignificant effects by face. This difference must be interpreted with caution, as it differs from the results reported by Zebrowitz-McArthur and Montepare (1989). These investigators showed that warmth and weakness were better predicted from facial than from vocal maturity. However, because their sample was small (n = 14), the difference in results may simply reflect a sampling error. To the extent that the present results withstand additional testing, they indicate that the voice is a better indication of maturity than is the face. As noted above, this difference may be due to more noticeable vocal changes in the course of one’s development.

Three clusters of interactions were also identified. It should be noted that except for the Facial Attractiveness × Vocal Attractiveness interaction these effects have not been predicted and, therefore, require replication in new data sets.

The current results can be summarized in three parts. (a) Attractiveness effects: We found that physical attractiveness influences primarily perception of the public person whereas vocal attractiveness influences primarily perception of the private person. (b) Maturity effects: We found that maturity has stronger impact on specific attributes (e.g., warmth) than on overall positivity and that its effects in a visual–auditory situation are mostly based on the voice. (c) Interaction effects: We found that the effect of each quality is sometimes moderated by the level of other qualities. For example, the well-replicated synergistic pattern of facial and vocal attractiveness was obtained only when face and voice conveyed a consistent message of either maturity or immaturity.

The effects of attractiveness and maturity on interpersonal impressions give rise to the kernel-of-truth hypothesis: Do attractive and/or mature targets possess the traits with which they are credited (cf. Berry & Wero, 1993)? A meta-analysis of characteristics associated with physical attractiveness showed “...no notable relationships between physical attractiveness and basic personality traits (e.g., sociability, dominance, mental health)...” (Feingold, 1992, p. 333). The only exceptions were attributes representing social skills rather than personality dispositions. For example, attractive people reported less loneliness, lower social anxiety, and more sexual experience. Feingold (1992) suggested that because attractiveness increases access to social situations, physically attractive people have more opportunities to develop social competence.

There is reason to believe that, like physical attractiveness, vocal attractiveness is not related to personality traits. Zuckerman et al. (1990)
have shown that impressions of people familiar with the targets were not influenced by targets' attractiveness, either facial or vocal, whereas impressions of strangers were influenced by both qualities. Stereotypes without a kernel-of-truth are not expected to affect perceivers who are well acquainted with the targets.

To the best of our knowledge, there have been no tests of the relation between either physical or vocal maturity and personality dispositions. However, if maturity effects reflect overgeneralization of what people think about children there is little reason to expect any degree of correspondence between maturity and actual dispositions.

A potential discrepancy between attractiveness- (or maturity-) based impressions and targets' actual personality may be a topic for future research. The questions of interest are whether targets are aware of the discrepancy and the conditions under which they consider it a liability or an advantage.

REFERENCES


Cunningham, M. R. (1986). Measuring the physical in physical attractiveness: Quasi-ex-


