

# **Accuracy in Face Perception: A View from Ecological Psychology**

**Diane S. Berry**

**Julia L. Finch Wero**

Southern Methodist University

**ABSTRACT** It is well documented that people form reliable and robust impressions of a stranger's personality traits on the basis of facial appearance. The propensity to judge character from the face is typically thought to reflect cultural beliefs about mythical relations between aspects of facial appearance and personality. However, recent cross-cultural and developmental research does not support the mythical, cultural stereotype hypothesis. An alternative explanation of the data is that consensus in face-based impressions exists because those judgments are partially accurate. In this article, we explore the theoretical rationale for this "kernel-of-truth" hypothesis, review research that indicates that first impressions based on facial appearance are partially accurate, and discuss the potential mechanisms that may yield links between aspects of facial appearance and personality.

He said "Son, I've made a lifetime  
Out of reading peoples' faces  
Of knowing what their cards held  
By the way they held their eyes;  
Now if you don't mind my saying  
I can see you're out of aces  
For a swallow of your whiskey  
I'll give you some advice."  
—Kenny Rogers, "The Gambler"

Some of the data reported in this article are from a master's thesis conducted by the second author under the direction of the first author. We are grateful to Jamie Pennebaker for his suggestions regarding this work and his comments on a draft of this manuscript. The article also benefited from thoughtful reviews provided by Reuben Baron, David Funder, Steve Gangestad, Steve West, and an anonymous referee. Correspondence should be addressed to Diane S. Berry, Department of Psychology, Southern Methodist University, Dallas, TX 75275.

*Journal of Personality* 61:4, December 1993. Copyright © 1993 by Duke University Press. CCC 0022-3506/93/\$1.50

Like the proverbial gambler in Kenny Rogers's popular song, we do indeed make a lifetime out of reading people's faces. Moreover, many people believe that doing so is a worthwhile activity. For example, Liggett (1974) reported that over 90% of college students believe that a person's facial appearance is a valid source of information about her or his character. Psychologists have also been interested in perceivers' propensity to draw conclusions about personality from the face, and a number of researchers have studied the facial qualities that influence social perception. In general, this work has revealed that we form strong impressions about what people are like on the basis of their facial appearance. For example, numerous studies have found that individuals with attractive faces are perceived more positively than are persons with an unattractive facial appearance (e.g., Dion, Berscheid, & Walster, 1972). Another line of research has shown that people with "babyish" facial configurations (i.e., large eyes, a small nose and chin, and a high forehead) are perceived to be less dominant and powerful, but more naive, honest, and warm than adults who have more "mature" faces (Berry & McArthur, 1986). Perhaps the most striking aspect of these data is the impressive agreement revealed between the attributions that different perceivers make regarding a given face (e.g., Alley, 1988; Bull & Rumsey, 1988; Cunningham, Barbee, & Pike, 1990; Langlois, 1986; McArthur, 1982).

Why might people agree as to what a stranger is like merely on the basis of his or her face? One appealing explanation is that this consensus is the result of socially communicated cultural stereotypes about links between personality and facial appearance (cf. McArthur, 1982). Proponents of this view believe that although there are no true correlations between disposition and appearance, we are socialized to believe that such associations exist. For example, because the media repeatedly portrays attractive people as successful, popular, and happy, we may come to believe that "what is beautiful is good" (Dion et al., 1972). It seems very likely that such processes perpetuate the belief that there are connections between appearance and disposition. However, the cultural stereotype hypothesis is somewhat less than satisfying, as it provides no explanation for the *origins* of the specific links that are reliably perceived between facial appearance and personality: Why is it that a particular facial configuration consistently yields impressions of dominance, whereas another is reliably identified as looking submissive?

There is an accruing body of data that further weakens this explanation of our propensity to use facial appearance as a guide to character.

These data come from two sources. First, in addition to within-culture consensus on face-based impressions, the available research indicates that this agreement extends across cultures. For example, McArthur and Berry (1987) asked native Korean subjects to evaluate faces along a number of personality dimensions. Very strong correlations were found between these subjects' trait ratings of the faces and those obtained from U.S. undergraduates (mean  $r = .85$ ). Moreover, the same facial features predicted impressions for both groups of subjects. Other researchers have reported similar results (e.g., Keating, 1985).

Additional evidence that consensus in appearance-based impressions cannot be entirely attributed to socialization processes comes from research on the development of sensitivity to facial appearance. Langlois and her associates have reported that infants as young as 3 months of age show visual preference for faces that adults identify as attractive (Langlois et al., 1987). Moreover, this preference is revealed regardless of the ethnic origin of the stimulus faces (Langlois, Ritter, Roggman, & Vaughn, 1991). Infants also behave differentially to a stimulus face as a function of its attractiveness. For example, Langlois, Roggman, and Rieser-Danner (1990) had an adult female interact with 12-month-old infants while wearing either an attractive or unattractive facial mask. The infants showed more positive affect toward and were more likely to approach the woman when she wore the attractive mask. In a second study, Langlois et al. (1990) further found that infants played longer with a doll that featured an attractive face than with one that exhibited an unattractive face. These data indicate that differential responses to facial appearance occur as early as 3 months of age, and these responses mirror adult preferences for certain feature configurations. It is very difficult to make a convincing case that infants have internalized cultural values regarding the significance of attractiveness within 3 months of birth.

If the cultural stereotype hypothesis cannot fully explain people's propensity to make character attributions on the basis of facial appearance, what alternative explanation of this phenomenon remains? We propose that there is consensus in appearance-based impressions because such impressions are partially accurate. This "kernel-of-truth" hypothesis posits that there are, in fact, reliable associations between certain aspects of facial appearance and certain dispositional qualities, and that social perceivers are sensitive to these covariations. In this article, we first explore the theoretical underpinnings for this hypothesis. Second, we review the relatively few studies that have examined the

accuracy of personality judgments based on facial information, including an ongoing program of research in our laboratory. Finally, we discuss the mechanisms that may produce the observed relations between facial appearance and personality.

### Theoretical Issues

Given the data just reviewed, why have psychologists been reluctant to explore the possibility that there is a kernel of truth in impressions based on facial appearance? Historically, this area of research may have suffered from its perceived association with the writings of the physiognomists, who proposed a number of specific links between facial features and character traits (e.g., Lavater, 1783). Their ideas sparked a great deal of interest during the 1700s and 1800s. However, the physiognomists eventually fell into disrepute because the assertions that they made about relations between personality and physical appearance were not based on scientific observation. Second, some people may be personally uncomfortable with the idea that impressions based on facial appearance are partially accurate. Indeed, such discomfort led researchers to neglect studying the effects of variables such as physical attractiveness on social experience for many years (cf. Berscheid, 1981). The notion of making judgments about people based on their appearance seems to violate our sense of fair play. The suggestion that these judgments may have some validity may be perceived as especially unfair.

However, an additional problem has probably contributed to the neglect of the question of whether or not people can successfully pick up information from appearance. In particular, the cognitively oriented theoretical perspectives on social knowledge acquisition that have been in vogue for the past several decades simply would not lead one to ever raise such questions. One tenet of these cognitive views is that there is little structure or meaning in the stimulus environment from which knowledge can be obtained: In the words of William James (1890/1950), we are constantly confronted with "a booming, buzzing confusion." Perception is therefore envisioned to be a highly inferential and elaborative task in which people continually strive to interpret and impose meaning on incoming information. Thus, structure and meaning are thought to be the results of *internal* cognitive processes, rather than existing *externally* in the stimulus array. Moreover, although social perceivers may be hard-working, they are not thought to be especially com-

petent. A great deal of work in the area of social cognition has focused on the biases that can result from the inferential processes people are believed to rely on when making social judgments. In fact, the term "naive scientist" has been coined to describe the social perceiver. This implies that the net result of this approach (inference, cognitive elaboration, and hypothesis testing) is limited accuracy in social perception (see Fiske & Taylor, 1991, for a comprehensive review).

Is it really surprising that a field dominated by this cognitive focus has not attended to the question of whether we can learn anything about other people from their appearance? We think not, for two reasons. First, the cognitive perspective guides researchers toward questions about how social perceivers make mistakes, rather than about how they get things right. Second, even if the extent to which perceivers make correct social judgments became a topic of interest to social cognition researchers, they would probably not look to aspects of the environment (e.g., physical appearance) to explain that accuracy. The primary reason that people are thought to need to resort to inference and elaboration in the first place is that external stimulus information is of little inherent value. As noted by Fiske and Taylor (1984), "[P]eople's traits are nonobservable attributes that are vital to thinking about them. . . . [B]oth a person and a cup can be fragile, but that characteristic is more directly seen in the cup. . . . [B]ecause peoples' traits and intentions are hidden from view, and because they affect us in ways that objects do not, social cognition automatically involves social explanation" (pp. 16-17). In light of these prevailing beliefs, it is not a surprise that during the past two decades person perception researchers have not devoted much energy to the study of accuracy in general, and to the kernel-of-truth hypothesis in particular.

An alternative to the cognitive perspective counters that the stimulus environment is extremely rich in visual and acoustic information, and that information can reveal to us other people's states, traits, intents, and goals. This ecological view has its roots in the work of the Gibsons on object perception (e.g., J. J. Gibson, 1966, 1979) and perceptual development (e.g., E. J. Gibson, 1969). This perspective argues that socially important qualities structure stimulus information, and that social perception is the process of extracting meaning from that structure (McArthur & Baron, 1983). In other words, we can literally see and hear qualities such as dominance, anger, attraction, and dependency. The job of the scientist, therefore, is the articulation and isolation of the very complex structure to which social perceivers are

sensitive. In fact, instead of viewing perceivers as naive *scientists*, the ecological perspective sees the scientist as a naive *perceiver*, who has just begun to identify the nature of the stimulus information to which our perceptual systems so quickly respond.

Another tenet of the ecological perspective is that useful information is most likely to be revealed in dynamic, multimodal stimulus events that unfold over time. Thus, this view predicts that research paradigms that artificially restrict the stimulus information available to perceivers will underestimate their perceptual abilities. The ecological position further emphasizes the adaptive nature of perception. This adaptive function is thought to operate at both the species and the individual level. Therefore, perceivers are expected to be highly sensitive to stimulus information that is useful and informative either for individuals' survival or for goal attainment. Finally, the ecological perspective argues that because the purpose of perception is to inform and guide adaptive behavior, perception is inevitably linked to action.

What are the implications of such a perspective for research on social perception? Because the purpose of perception is assumed to be the guidance of adaptive action, this view naturally leads to the study of the accuracy of social perception. The ecological perspective further leads researchers to look to the stimulus environment for sources of people's accuracy in identifying the states and traits of others. This view holds that aspects of people's appearance, vocal quality, and movements are indeed rich sources of knowledge about them. In fact, it has been proposed that many studies of person perception generated by the cognitive perspective may underestimate perceivers' social perception skills because they substitute artificial sources (e.g., written descriptions) for the sources of information that are typically present when impressions are formed (e.g., physical appearance, nonverbal cues) (Funder, 1987; McArthur & Baron, 1983).

Indeed, the results of recent research that has examined perceivers' ability to detect accurate information about other people are more consistent with the ecological position than with the cognitive view that people's dispositional qualities are completely hidden (Jussim, 1991; this issue; Kenny, 1991).<sup>1</sup> For example, Ambady and Rosenthal (1992)

1. It is not our intent to imply that all people who study accuracy in social perception would describe themselves as proponents of the Gibsonian view. For example, some researchers in this area favor a Brunswickian (1956) model of the social perception process (e.g., Borkenau & Liebler, 1992; Gangestad et al., 1992). However, such lines

reported a recent meta-analysis of studies of the accuracy of social judgments based on short observations of behavior. Each of the 44 studies included in the analysis assessed the accuracy of some social judgment (e.g., identifying high- vs. low-anxiety patients, predicting compliance) from clips of behavior less than 5 minutes in length. The effect size ( $r$ ) revealed in this analysis was .39. Moreover, accuracy was just as good when observers were provided with samples of behavior that were less than 30 seconds in length as when they were 4 or more minutes in length. Thus, perceivers are fairly skilled at extracting information from the behavioral stream, and they do so very quickly. Certainly, we would not claim that accuracy could not be impeded by factors such as self-presentation. However, people are less able to manipulate our impressions of them than the cognitive perspective presumes (cf. DePaulo, 1992).

In sum, research guided by the ecological theory of social perception attempts to consider the extent to which our perceptions of other people are accurate, to identify the aspects of the stimulus array that reveal this information, and to articulate the mechanisms that produce links between particular stimulus qualities and people's states and traits. In this article, we will describe a program of research generated by this approach that evaluates the kernel-of-truth explanation of impressions based on static facial appearance.

### Evidence for the Kernel-of-Truth Hypothesis

As noted above, although the idea that personality can be read from a person's face has enjoyed great popularity among the lay public, the kernel-of-truth hypothesis has received limited scientific scrutiny. During the early 1900s, a number of researchers investigated the validity of judgments based on facial physiognomy, with mixed results. These data are difficult to evaluate, as many of the studies suffered from serious methodological flaws (cf. Alley, 1988). However, investigations did provide evidence that people are able to distinguish criminals from noncriminals on the basis of a facial photograph, and can even match criminals' faces to the types of crimes that they committed at greater-than-chance levels (cf. Bull & Green, 1980). Other researchers reported

---

of inquiry do follow directly from an ecological approach, and we hope that our perspective has helped to guide people back to the study of these basic and important questions.

that people could make judgments of intelligence at greater-than-chance levels on the basis of facial appearance (cf. Alley, 1988). Although provocative, the data generated by these studies again should be interpreted with caution, due to their methodological shortcomings.

Additional support for the kernel-of-truth hypothesis comes from recent research using variants of what Kenny and his associates have labeled the "zero-acquaintance" paradigm (Albright, Kenny, & Malloy, 1988; Berry, 1990; Borkenau & Liebler, 1992, this issue; Gangestad, Simpson, DiGeronimo, & Beik, 1992; Kenny, Horner, Kashy, & Chu, 1992; Watson, 1989). In this research, individuals are asked to judge the personalities of strangers without having an opportunity to interact with them (e.g., rating a stranger who is sitting across the room; rating a stranger after viewing a short videotape of him or her sitting alone in a room). In these situations, judges have little more than physical appearance on which to base their judgments. These first impressions have repeatedly been found to be significant predictors of the stimulus persons' self-ratings. For example, significant self-other correlations in ratings of Agreeableness (Borkenau & Liebler, 1992), Extraversion (Albright et al., 1988; Borkenau & Liebler, 1992; Kenny et al., 1992; Norman & Goldberg, 1966; Watson, 1989), Conscientiousness (Albright et al., 1988; Watson, 1989), social potency, social closeness, and sociosexuality (Gangestad et al., 1992) have been revealed. Several of these authors have suggested that facial appearance may be responsible for this agreement. However, this is speculative, as a number of other variables (e.g., dress, body appearance, vocal quality, nonverbal behaviors) are usually available to subjects in the zero-acquaintance paradigm. Borkenau and Liebler (1992) recently reported significant self-other correlations when raters' judgments were based on still frames taken from videotapes of stimulus persons. This more strongly suggests that physical appearance is responsible for the self-other agreement revealed in the studies noted above, but again does not directly evaluate whether facial appearance is the basis of this agreement.

Some data directly related to the question of the validity of judgments based on facial appearance come from research on the relations between individual difference measures and attractiveness. As noted previously, there is a large literature that has documented an attractiveness halo effect in person perception. In particular, people with attractive faces are attributed with more desirable personality characteristics than unattractive people (e.g., Dion et al., 1972). Some studies

have examined whether the physically attractive indeed possess more positive traits than less attractive persons. In a recent meta-analysis of research assessing links between attractiveness and individual difference measures, Feingold (1992) found that attractive persons are more popular, more sexually experienced, less lonely, less socially anxious, and have better social skills than less attractive people. Qualities such as dominance, intellect, mental stability, sociability, and character did not covary with attractiveness. Thus, one could use attractiveness to make certain judgments about individuals. However, the types of factors that are most clearly related to attractiveness are not those that we tend to think of as personality traits. Instead, these could be better described as differences in social experience that are, at least in part, regulated by the greater range of opportunities that attractive people have available to them. For example, the fact that people's attractiveness is positively related to their amount of sexual experience is probably indicative of the fact that attractive individuals are provided with more opportunities for sexual intimacy than unattractive people, rather than of any inherent link between physical appearance and libido.

The tenuous links that have been revealed between attractiveness and personality are often cited as evidence that there is no validity to impressions based on facial appearance. However, this line of thought assumes that facial attractiveness and facial appearance are one and the same concept. This is not a valid assumption. Overall facial appearance is extremely complex and incorporates many other dimensions than attractiveness that may influence social judgment. For example, recent research has shown that subsets of equally attractive faces can be identified that produce qualitatively different impressions (Berry, 1991a). Therefore, the only conclusion that can be drawn from the above data is that variations in attractiveness cannot account for all links that may exist between face-based impressions and personality traits such as dominance and intellect. If one wishes to assess whether such associations exist, the appropriate comparison is between impressions formed from *overall* facial appearance (e.g., How dominant does this face look?) and some measure of personality (e.g., self-reports of dominance). Oddly, few social psychologists have approached the question of the validity of impressions based on facial appearance in this manner. In our laboratory, we have taken this approach in a series of studies that assess the accuracy of social perceptions based on specific nonverbal cues. Although this program of research has explored people's ability to extract useful information from a number of channels, including vocal

quality, body movement, and facial movement, here we will only discuss research that has focused on the accuracy of impressions based on static facial appearance.

In the first study that we conducted (Berry, 1990, Experiment 1), students enrolled in sections of an experimental psychology course provided ratings of one another along standard trait scales during the 1st, 5th, and 9th weeks of the semester. All of the participants were unacquainted at the beginning of the semester. These classes were small (15 or fewer students), students often met outside of class to work on group projects, and a great deal of class time was spent on group discussion and problem solving. Therefore, the participants were fairly well acquainted by the end of the semester. After the personality judgments were collected, neutral-expression facial photographs were taken of the students. Judges who were unacquainted with the students rated the photographs on the same trait scales that their classmates had described them on. Comparisons were then made between the photograph ratings and the acquaintance ratings, which served as the criterion measure for accuracy. Analyses revealed that the judgments of the photographs were significant predictors of impressions reported by classmates even after 9 weeks of acquaintance for all trait dimensions studied. For example, people who were judged to look warm in a neutral-expression photograph were also described as warm by their classmates after 9 weeks of acquaintance,  $r = .39$ ,  $p < .05$ . Similar relations were found for impressions of honesty,  $r = .42$ ,  $p < .05$ , and social power,  $r = .37$ ,  $p < .05$ .<sup>2</sup>

Two additional studies were conducted that further assessed the validity of impressions based on facial appearance using self-report data as an assessment of accuracy. In one (Berry, 1990, Experiment 2), 52 stimulus persons completed the Rathus Assertiveness Scale (Rathus, 1973), and the Social Potency, Social Closeness, and Aggression subscales of Tellegen's Multidimensional Personality Questionnaire (MPQ; Tellegen, 1982). The subjects also described themselves along trait scales that assessed self-views of interpersonal warmth and social power. Neutral-expression facial photographs of the participants were prepared, and the photos were rated on standard trait scales by judges who did not know the target persons. For both males and females,

2. The mean number of acquaintances who provided impressions of their classmates in this study was 13. In all of our studies described in this article, 18 to 24 judges provided ratings of the photographed faces.

ratings of the power and dominance of the photographed stimulus persons were significantly correlated with their scores on the Rathus Assertiveness Scale, the MPQ Social Potency and Aggression subscales, and self-ratings on trait scales related to dominance, mean partial  $rs$  controlling for gender = .43, all  $ps < .05$ . For male target persons, photograph-based ratings of warmth further predicted scores on the MPQ Social Closeness scale and self-ratings of interpersonal warmth, mean  $rs = .45$ , all  $ps < .05$ , although these relationships did not attain significance for women, mean  $r = .13$ , ns. These results were generally replicated in a second study of 86 target persons (Berry, 1991b).

Thus, evaluations of an individual's personality made on the basis of a neutral-expression facial photograph predict both self-views of that person and evaluations of him or her provided by acquaintances. Does this mean that impressions based on facial appearance are accurate? An alternative explanation of these data could be that physical appearance is a more powerful determinant of impressions of traits such as honesty than are behaviors, even when people know the person whom they are evaluating. Similarly, people may use their own physical appearance to infer self-views. Thus, relations between appearance-based impressions and self- and acquaintance ratings could conceivably be interpreted as evidence that appearance stereotypes are extremely robust and persist in the face of inconsistent behavioral information, rather than as indicative of accuracy in impressions based on physical appearance. The available data in fact suggest that such ratings can successfully predict behavioral criteria (cf. Funder, 1987). However, to address such alternative explanations directly, we have recently begun to consider whether impressions based on facial appearance do predict behavior. Recall that one of the dimensions of acquaintances' impressions that could be predicted from a photograph was that of honesty (Berry, 1990). Recently, in collaboration with researchers at Texas Christian University, we have examined the validity of perceptions of deceptiveness based on facial appearance, using a behavioral measure of willingness to deceive (Bond, Berry, & Omar, in press).

In this study, subjects were asked to indicate which of a number of experiments they would be willing to take part in as a way of satisfying a course requirement. Subjects were provided with a packet that contained descriptions of eight experiments in which they could elect to participate. Two of the procedures involved no deception (i.e., judging nonverbal behavior; reading instructions aloud), and six would require the subject to deceive another student (i.e., by promising a bogus

reward, by simulating pain, by giving false personality feedback, by feigning mental illness, by concocting "answers" to impossible questions, and by misleading other students into thinking that they would have to give a public speech). The experimenter noted to subjects that some of these procedures involved deception, and read aloud to them a description of what each of the eight procedures entailed. They were then asked to indicate in writing whether they would be willing to participate in each procedure. The subjects were told that they would later be scheduled to participate in one of the procedures to which they had agreed. The experimenter encouraged them to indicate agreement to as many procedures as possible in order to increase flexibility in scheduling their participation times. It also, however, was made clear to the subjects that they should feel free to decline to participate in the deceptive procedures if they were uncomfortable about lying to others as part of an experiment. After supplying these answers and having a photograph of their faces taken, the subjects were debriefed.

Raters unacquainted with the subjects rated the photographs on a bipolar scale with endpoints of honest/dishonest. Correlations revealed a modest but reliable relation between the number of deceptive experimental procedures that subjects indicated they would be willing to participate in and the rated dishonesty of their faces,  $r = .22$ ,  $p < .025$ . Analyses were further conducted to ensure that subjects' general cooperativeness or willingness to assist the experimenter could not account for the results. In particular, a partial correlation was computed in which the total number of sessions in which a subject had agreed to participate was statistically controlled. The relation between rated dishonesty and willingness to perform deceptive behaviors remained significant.<sup>3</sup>

3. In all of the above studies, we attempted to identify the specific dimensions of facial appearance that mediated the relations between impressions based on appearance and self-view. In particular, we obtained measures of the faces' attractiveness and babyishness, which are known to exert robust and reliable influences on impressions. Some relations between these variables and self-view have been revealed. In general, facial attractiveness is positively related to self-reported assertiveness and social power (e.g., Berry, 1991b), and facial babyishness is negatively related to scores on the Aggression subscale of the MPQ (Berry, 1990a; Berry & Brownlow, 1989). However, partial correlations between face-based impressions and self-view typically remain significant when these variables are statistically controlled. This indicates that we do not as yet have a clear understanding of the specific aspects of facial configuration that contribute to these links. We are pursuing lines of research intended to address this issue.

### What Mechanisms Might Create Links between Appearance and Personality?

The idea that character is revealed in the face has enjoyed great popularity among the lay public. The research reviewed here provides evidence for the kernel-of-truth hypothesis, and there does appear to be some validity to impressions based on facial appearance. In particular, impressions formed about people on the basis of facial photographs predict self-reports of personality, scores on standardized personality tests, descriptions provided by acquaintances, and behavioral propensities. These data indicate that there are some reliable correlations between aspects of personality and facial configuration, and that perceivers are sensitive to those relations. What mechanisms might produce these links between disposition and appearance?

One commonly evoked explanation of connections between appearance and behavior is behavioral confirmation, or self-fulfilling prophecy. It is well-known that the expectations that we communicate to other people can have effects on their behaviors (e.g., Rosenthal & Jacobson, 1968). Assume, for example, that in accordance with the attractiveness halo effect Herman expects attractive Myrtle to be warm, friendly, and responsive. As a result, he may interact with her in a highly positive manner that elicits warm, friendly, and responsive behaviors. On the other hand, if he expects unattractive Mildred to be cold, unfriendly, and unresponsive because of her appearance, he may be less enthusiastic and charming during their interaction. In response, she may emit exactly the kinds of behaviors he expects. Through such a process, people can actually elicit behaviors from others that correspond with their originally erroneous expectations. This has two implications. First, these experiences will reinforce and strengthen the perceiver's appearance-based expectations. Second, if such differential treatment on the basis of appearance is consistent, it may influence personality development. Therefore Mildred, who has suffered through years of unrewarding interactions with men, may be predisposed to be unfriendly and unresponsive in these interactions. On the other hand Myrtle, who has enjoyed years of responsive, enjoyable interactions with members of the opposite sex, will venture into such encounters with high expectations and great enthusiasm. The internalization of appearance-based expectations can eventually either produce associations between appearance and behavior that did not previously exist, or enhance small relations among these variables. Therefore, some have predicted links

between appearance and self-view as a result of self-fulfilling prophecy (e.g., Adams, 1977; Langlois, 1986).

More researchers have speculated about the import of behavioral confirmation than have actually documented appearance-based self-fulfilling prophecy effects. However, a few innovative studies have provided evidence of the power of this phenomenon. For example, J. W. Pennebaker (personal communication, August 1, 1992; see also Pennebaker, 1992) studied the effects of wearing facial masks on the experiences of people participating in small group interactions. Participants in this study interacted in groups of seven for a 30-minute period. Within each group, five of the seven participants' masks were blank, one depicted a happy facial expression, and one an angry facial expression. The groups were videotaped from above for the duration of the interaction, and self-report measures were later obtained from each participant. Although none of the participants successfully identified what kind of mask he or she was wearing, the facial expression depicted on a mask had a profound impact on the experience of the person wearing it. For example, people wearing masks with angry facial expressions were physically excluded from the groups, and, on average, stood several feet further from the group center than the other participants. Moreover, people wearing the angry masks participated less in the conversation and reported feeling uncomfortable and isolated during the interaction. Most interesting, however, is that these people attributed their discomfort to poor social skills on their part. In essence, the people wearing the angry masks made dispositional attributions regarding the reasons for the avoidant behaviors that the mask's appearance elicited from other people.

Snyder, Tanke, and Berscheid (1977) have also provided evidence for appearance-based self-fulfilling prophecy effects. In their study, men and women participated in a "get-acquainted" session over the telephone. Men were duped into thinking that their partners were either very attractive or unattractive through the use of a facial photograph that was attached to a bogus personal information sheet. In fact, the true level of attractiveness of the women was random across conditions. The ensuing conversations were taped, and the men's impressions of the women were obtained. As one might expect, men rated women more positively in the attractive condition than in the unattractive condition. More interesting, however, were the analyses of the content of the conversations. Judges who were blind to the hypotheses of the study rated the men's behavior as more friendly and responsive in the attractive than

in the unattractive photo condition. Moreover, women whose partners thought they were attractive were also rated by the judges to be very friendly and responsive. These data suggest that behavioral confirmation effects can alter the experience and resulting behaviors of women participating in opposite-sex interactions in a manner consistent with the expectations elicited by their appearance.

Although appearance-based expectancy effects may indeed contribute to the relations between facial appearance and personality that we have reported, there are several reasons to question whether self-fulfilling prophecy effects can fully account for these links. For example, it seems unlikely that expectancies will be internalized as a result of an occasional encounter such as Mildred's interaction with Herman, described above. To make a convincing argument that facial appearance will influence personality development via this process, it needs to be established that people are repeatedly treated in a particular manner as a function of their appearance. Several factors are prerequisite to this. First, if a person's facial appearance elicited impressions of low warmth at age 9, but produced impressions of high warmth at age 12, the expectations elicited by appearance would not be consistent, and the internalization of these expectations would be unlikely to occur. To our knowledge, no study has compared the personality impressions elicited by people's facial appearances longitudinally. However, Zebrowitz, Olson, and Hoffman (1992) reported that two configurational properties of faces—attractiveness and babyishness—show differential stability across the lifespan. Thus, people's faces may elicit reliable first impressions throughout much of their lives.

In addition to the need for stability in the impressions elicited by an individual's facial appearance across time, there would need to be consistency among the responses produced by an individual's appearance across partners if behavioral confirmation effects are to occur. Whereas it is the case that there is strong consensus among the *perceptions* produced by facial appearance, there may still be individual differences in perceivers' *behaviors* toward target persons as a function of how they look. We actually know very little about the direct effects of facial appearance on perceiver behaviors. Research is needed to address this issue.

Finally, and perhaps most important, behavioral confirmation explanations point to perceiver expectations as the source of behavior-appearance links. However, these models beg the question of the *origins* of these expectations. That is, why do people anticipate a link between

certain features and certain personality attributes in the first place? In sum, appearance-based expectancies can exert a powerful impact on behavior. Additional research is needed before we can evaluate the extent to which these effects may contribute to the relations that have been observed between facial appearance and personality. Moreover, although self-fulfilling prophecies may enhance or amplify whatever links exist between appearance and behavior, they do not address the issue of why particular appearance qualities are associated with specific dispositional properties in the first place. What other explanations might address this point?

One possibility is that there are biological or genetic factors that yield relations between certain aspects of physical appearance and personality. Although this may at first sound unlikely, there are some documented associations between behavioral style and appearance that arise from a common neurochemical basis. For example, Kagan and his colleagues (e.g., Kagan, 1989) have conducted a great deal of research on early differences in temperament. This work has revealed that there are stable differences in behavioral inhibition or shyness that appear very early in life. An unanticipated finding to emerge from this work is that individuals who exhibit an inhibited behavioral style are much more likely to have blue eyes than would be expected, whereas people who are low in inhibition are very likely to have brown eyes. Kagan (1989) reports that he and his colleagues have observed these relations in five independent samples of children. Moreover, unpublished data from other laboratories replicate these strong associations between eye color and shyness in samples of both undergraduates and schoolchildren (Cheek, cited in Kagan, 1989; Rubin, cited in Kagan, 1989). The third variable that produces a link between these two factors is norepinephrine level during the prenatal period. High levels of this neurochemical inhibit the production of melanin in the iris, yielding a light eye color, and are also related to an inhibited behavioral style. We certainly are not claiming that this is the specific factor that yielded the relations reported in this article, but these data do indicate that such biological links are indeed plausible and should be explored.

The last mechanism we will discuss that may produce associations between impressions of faces and personality is direct expression. In behavioral confirmation, one's face is thought to essentially shape one's personality and experience. Direct expression explanations reverse the direction of these causal arrows, and propose that one's experience and personality influence facial appearance. Malatesta, Fiore, and Messina

(1987) provide one explanation of how this might occur. In their study, raters judged the facial expressions of photographed older adult women. The photographs had been taken while the women exhibited neutral expressions. The women also completed Izard's Differential Emotions Scale (DES; Izard, 1972), which measures how often people report experiencing a number of emotions. Malatesta and her associates found that judges often mistakenly identified the neutral expressions as reflecting a particular emotion, and the pattern of their errors was predicted by the women's scores on the DES. For example, the neutral facial expressions of women who said that they experienced a great deal of anger were often mistakenly identified as hostile. The implication of these data is that the repeated exhibition of certain facial expressions leaves a residual effect, perhaps in the form of particular wrinkle patterns.

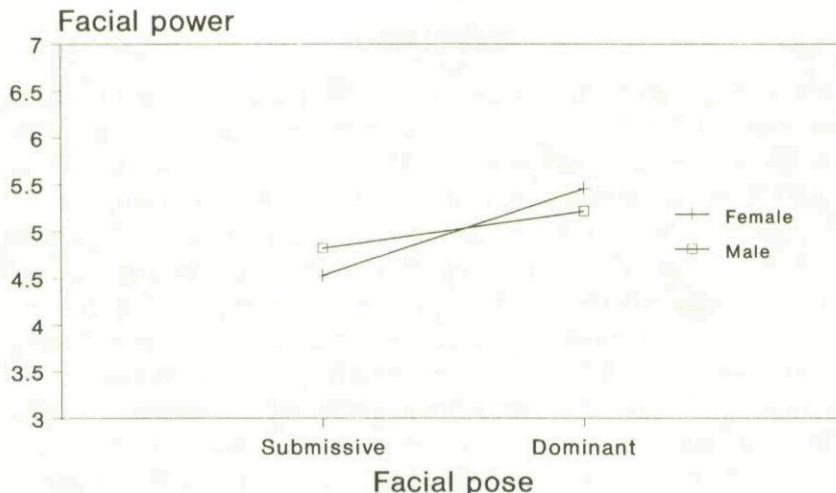
Malatesta et al.'s (1987) research provides one example of how people's dispositional characteristics can influence their appearance. We are currently exploring other ways by which one's face may reveal one's personality. For example, we have found that people can project their internal states through very subtle variations in facial pose that influence personality impressions. In one study, college students were photographed while exhibiting the facial pose that they associate with feeling very dominant, and the pose that they would assume while feeling very submissive. In order to help them with this task, the subjects were asked to think of a particular occasion in which they had felt dominant, and one in which they felt submissive. They were then asked to show how they thought their face looked on those occasions. Because we know that facial gestures can influence impressions of dominance (e.g., Keating, 1985), it was stressed to the subjects that they should not use such gestures or exhibit emotional expressions to accomplish these tasks (e.g., a smile or a frown). Subjects were photographed once while communicating dominance, and once while communicating submissiveness.

Ratings of the emotional expressions perceived in the photographed faces were obtained in order to ensure that the subjects had followed our instructions and not used facial gestures such as smiles or frowns to communicate dominance and submission. More specifically, 20 judges were told that the people in the photographs would be displaying expressions of either happiness, anger, disgust, surprise, fear, or a neutral expression. They were asked to indicate which of these six labels best described each expression. The judges then viewed slides of a subset of the target faces, along with filler slides that depicted people exhibiting

facial expressions that depicted the five emotion labels provided to the raters. Only people whose photos were rated as neutral in emotional expression by over 90% of the judges were retained as stimulus persons in the study. This resulted in a final set of 64 stimulus faces that included 16 males and 16 females, photographed both while expressing submissiveness and dominance.

Personality judgments of the faces were provided by undergraduate subjects who were not acquainted with the stimulus persons. They were randomly assigned to view one of four subsets of faces. A given subject saw either the 16 male or 16 female target persons, half of whom were exhibiting a dominant pose and half of whom were exhibiting a submissive pose. A particular stimulus person was only seen in one pose by a given subject. To reduce demand characteristics, these target faces were viewed while embedded in a larger set of distractor faces. The faces were viewed in one of several orders of presentation. The social power or dominance perceived in the faces was ascertained through ratings on scales of assertiveness, invulnerability, strength, and dominance. Again to reduce demand characteristics, these scales were embedded in a larger set of personality descriptors. Because previous research has revealed that facial attractiveness and maturity influence impressions of dominance (e.g., Berry, 1991a), judges were also asked to provide ratings of the faces on these appearance dimensions.

Ratings of dominance, assertiveness, strength, and invulnerability were highly correlated, and therefore incorporated into a composite measure of facial power. A  $2 \times 2 \times 2$  (Sex of Face  $\times$  Sex of Subject  $\times$  Facial Pose) repeated measures analysis of variance revealed a main effect of facial pose on perceived power,  $F(1, 89) = 142.07$ ,  $p < .0001$  (see Figure 1). Photographs taken of people while they attempted to express dominance were indeed rated as more powerful than were photographs of people's faces that had been taken while they tried to express submissiveness. Analyses were further conducted to ascertain whether people were accomplishing this by somehow manipulating the perceived attractiveness or babyishness of their faces. Analyses of variance revealed that people's faces were indeed more attractive,  $F(1, 89) = 5.60$ ,  $p < .05$ , and more babyish,  $F(1, 89) = 68.46$ ,  $p < .0001$ , when in a submissive than in a dominant pose. However, these differences could not entirely explain the effects of facial pose on power. Specifically, the main effect of pose remained significant when attractiveness and babyishness were statistically controlled in an analysis of covariance,  $F(1, 87) = 46.45$ ,  $p < .0001$ , although babyishness was a



**Figure 1**  
Perceived Power as a Function of Facial Pose

significant covariate in this analysis,  $F(1, 87) = 22.53, p < .0001$ . This suggests that people were indeed manipulating the babyishness of their faces to express dominance and submissiveness, but that these differences could not completely account for the differences in impressions of power that the facial poses produced.

What are the implications of these data for our understanding of the links that have been revealed between personality and impressions of faces? It may be the case that people either consciously or unconsciously manipulate their facial poses in very subtle ways that project their internal states. To the extent that a person characteristically feels dominant, for example, the assumption of such a facial pose may become habitual, and accurately communicate this aspect of their personality, even in a neutral-expression photograph. Similarly, submissive people may habitually manipulate their faces in ways that communicate this to observers. Of course, because subjects in this study performed these manipulations on command, we can't be sure that such poses are naturally assumed as people go about their daily business. However, these data do demonstrate that people have the ability to project such traits through their faces. This could constitute one source of the validity of impressions of faces that has been documented.

## CONCLUSION

Many people believe that character is revealed in the face, and research has repeatedly documented consensus in the personality attributes that people ascribe to a particular face. Due in part to the fact that social psychology has recently been dominated by a cognitive constructivist approach to social knowing, most person-perception researchers have not taken seriously the possibility that qualities such as physical appearance may provide useful information about people's dispositional qualities. Rather, most have taken the position that consensus in such impressions reflects shared cultural beliefs about links between personality and facial appearance that are erroneous in nature. A recent renewed interest in the accuracy of interpersonal perception, however, has resulted in an accruing body of data that challenge that assumption. The present article describes a program of research inspired by an ecological model of social perception that has empirically tested the hypothesis that there are links between dispositional properties and facial appearance. This research reveals that there may indeed be a kernel of truth in these judgments. More specifically, people are able to predict a target person's social dominance, interpersonal warmth, and honesty from facial photographs with some accuracy.

These findings are provocative, and they raise several important questions that need to be addressed in future work. First, most of our research described here has used static stimuli such as photographs to study appearance/personality links. At first glance, this may seem to run counter to the ecological perspective, which is widely known for its emphasis on the informativeness of dynamic, multimodal stimuli and its interest in studying active perceivers. However, as noted elsewhere (Alley, 1990; Neisser, 1985), the idea that the ecological perspective uniformly frowns on the use of static or otherwise degraded stimulus materials is a misconception. One goal of an ecological approach is to isolate the parameters of stimulus information that inform perceivers. To do so often involves using stimuli in which particular parameters are artificially manipulated or isolated (Berry & Misovich, *in press*). For example, it was necessary to use static photographs rather than videotapes in the studies described here to ensure that people were indeed relying on facial appearance to assess personality, rather than some other dimension such as facial animation or expressivity. A second goal of the ecological approach, however, is to complement such work with research that examines the impact of those parameters on perception

and action in the natural stimulus array. In the realm of social perception, this means, of course, that the impact of these variables on ongoing interactions needs to be assessed. We are currently conducting a series of studies that address just that question (Berry, Hiller, & Mueller, 1993).

The issue of what types of dispositional attributes are most likely to be accurately revealed by facial information also deserves greater attention. The ecological view that the purpose of perception is to guide adaptive action provides us with some guidelines for making predictions in this area that have only begun to be explored. For example, because of the evolutionary importance of dominance hierarchies in guiding interaction, one would expect perceivers to be sensitive to social power or dominance (Gangestad et al., 1992). Similarly, as it is probably adaptive to differentiate those who like us from those who do not, one might expect sensitivity to qualities such as interpersonal warmth and attraction. On the other hand, perceiving a dimension of personality such as culture is probably less crucial, and social perceivers may be less skilled at recognizing it.

Finally, greater attention needs to be paid to the articulation of the mechanisms that create relations between personality and facial appearance. As discussed, self-fulfilling prophecy has been the most commonly proffered explanation of appearance-personality links. However, a number of conditions must hold before self-fulfilling prophecy effects could actually affect personality development (e.g., stability of facial appearance across time; consistency in behavioral responses to appearance), and our knowledge about these issues is limited. Moreover, expectancy explanations do not address the question of where such links originate. Explanations that focus on biologically based relations between personality and appearance and direct expression processes such as those discussed in this article may ultimately be better able to account for relations between disposition and appearance, but have received little attention. These constitute rich areas for future study. We hope that this article will encourage researchers studying both social perception and personality to seriously pursue these avenues of exploration.

## REFERENCES

- Adams, G. R. (1977). Physical attractiveness research: Toward a developmental social psychology of beauty. *Human Development*, 20, 217-239.  
Albright, L., Kenny, D. A., & Malloy, T. E. (1988). Consensus in personality judg-

- ments at zero acquaintance. *Journal of Personality and Social Psychology*, **55**, 387-395.
- Alley, T. R. (1988). *Social and applied aspects of perceiving faces*. Hillsdale, NJ: Lawrence Erlbaum.
- Alley, T. R. (1990). The ecological approach to person perception. *Contemporary Social Psychology*, **14**, 153-158.
- Ambady, N., & Rosenthal, R. (1992). Thin slices of expressive behavior as predictors of interpersonal consequences: A meta-analysis. *Psychological Bulletin*, **111**, 256-274.
- Berry, D. S. (1990). Taking people at face value: Evidence for the kernel of truth hypothesis. *Social Cognition*, **8**, 343-361.
- Berry, D. S. (1991a). Attractive faces are not all created equal: Joint effects of facial babyishness and attractiveness on social perception. *Personality and Social Psychology Bulletin*, **17**, 523-531.
- Berry, D. S. (1991b). Accuracy in social perception: Contributions of facial and vocal information. *Journal of Personality and Social Psychology*, **61**, 298-307.
- Berry, D. S., & Brownlow, S. (1989). Were the physiognomists right? Personality correlates of facial babyishness. *Personality and Social Psychology Bulletin*, **15**, 266-279.
- Berry, D. S., Hiller, W., & Mueller, J. (1993). [Facial and vocal influences on social interaction]. Unpublished raw data, Southern Methodist University.
- Berry, D. S., & McArthur, L. Z. (1986). Perceiving character in faces: The impact of age-related craniofacial changes on social perception. *Psychological Bulletin*, **100**, 3-18.
- Berry, D. S., & Misovich, S. J. (in press). Methodological approaches to the study of social event perception. *Personality and Social Psychology Bulletin*.
- Berscheid, E. (1981). An overview of the psychological effects of physical attractiveness. In G. Luckner, K. Ribbins, & J. McNamara (Eds.), *Psychological aspects of facial form* (pp. 21-44). Ann Arbor: University of Michigan Press.
- Bond, C. F., Jr., Berry, D. S., & Omar, A. (in press). The "kernel of truth" in judgments of deception. *Basic and Applied Social Psychology*.
- Borkenau, P., & Liebler, A. (1992). Trait inferences: Sources of validity at zero acquaintance. *Journal of Personality and Social Psychology*, **62**, 645-657.
- Brunswick, E. (1956). *Perception and the representative design of psychological experiments*. Berkeley: University of California Press.
- Bull, R., & Green, J. (1980). The relationship between physical appearance and criminality. *Medicine, Science and the Law*, **20**, 79-83.
- Bull, R., & Rumsey, N. (1988). *The social psychology of facial appearance*. New York: Springer-Verlag.
- Cunningham, M. R., Barbee, A. P., & Pike, C. L. (1990). What do women want? Facial metric assessment of multiple motives in the perception of male facial physical attractiveness. *Journal of Personality and Social Psychology*, **59**, 61-72.
- DePaulo, B. (1992). Nonverbal behavior and self-presentation. *Psychological Bulletin*, **111**, 203-243.
- Dion, K. K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. *Journal of Personality and Social Psychology*, **24**, 285-290.

- Feingold, A. (1992). Good-looking people are not what we think. *Psychological Bulletin*, **111**, 304-341.
- Fiske, S. T., & Taylor, S. E. (1984). *Social cognition*. New York: Random House.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition*. New York: McGraw-Hill.
- Funder, D. C. (1987). Errors and mistakes: Evaluating the accuracy of social judgment. *Psychological Bulletin*, **101**, 75-90.
- Gangestad, S. W., Simpson, J. A., DiGeronimo, K., & Biek, M. (1992). Differential accuracy across traits: Examination of a functional hypothesis. *Journal of Personality and Social Psychology*, **62**, 688-698.
- Gibson, E. J. (1969). *Perceptual learning and perceptual development*. New York: Appleton-Century-Crofts.
- Gibson, J. J. (1966). *The senses considered as perceptual systems*. Boston: Houghton-Mifflin.
- Gibson, J. J. (1979). *The ecological approach to visual perception*. Boston: Houghton-Mifflin.
- Izard, C. E. (1972). *Patterns of emotion: A new analysis of anxiety and depression*. San Diego: Academic Press.
- James, W. (1950). *Principles of psychology*. New York: Dover. (Original work published 1890)
- Jussim, L. (1991). Social perception and social reality: A reflection-construction model. *Psychological Review*, **98**, 54-73.
- Kagan, J. (1989). *Unstable ideas: Temperament, cognition and the self*. Cambridge, MA: Harvard University Press.
- Keating, C. F. (1985). Human dominance signals: The primate in us. In S. L. Ellyson & J. F. Dovidio (Eds.), *Power, dominance and nonverbal behavior* (pp. 89-108). New York: Springer-Verlag.
- Kenny, D. A. (1991). A general model of consensus and accuracy in interpersonal perception. *Psychological Review*, **98**, 155-163.
- Kenny, D. A., Horner, C., Kashy, D. A., & Chu, L. (1992). Consensus at zero acquaintance: Replication, behavioral cues, and stability. *Journal of Personality and Social Psychology*, **62**, 88-97.
- Langlois, J. H. (1986). From the eye of the beholder to behavioral reality: The development of social behaviors and social relations as a function of physical attractiveness. In C. P. Herman, M. P. Zanna, & E. T. Higgins (Eds.), *Physical appearance, stigma and social behavior* (pp. 23-51). Hillsdale, NJ: Lawrence Erlbaum.
- Langlois, J. H., Ritter, J. M., Roggman, L. A., & Vaughn, L. S. (1991). Facial diversity and infant preferences for attractive faces. *Developmental Psychology*, **27**, 79-84.
- Langlois, J. H., Roggman, L. A., Casey, R. J., Ritter, J. M., Rieser-Danner, L. A., & Jenkins, V. Y. (1987). Infant preferences for attractive faces: Rudiments of a stereotype? *Developmental Psychology*, **23**, 363-369.
- Langlois, J. H., Roggman, L. A., & Rieser-Danner, L. A. (1990). Infants' differential social responses to attractive and unattractive faces. *Developmental Psychology*, **26**, 153-159.
- Lavater, J. C. (1783). *Essays on physiognomy*. London: Ward-Lock.
- Liggett, J. C. (1974). *The human face*. New York: Stein & Day.

- Malatesta, C. Z., Fiore, M. J., & Messina, J. J. (1987). Affect, personality, and facial expressive characteristics of older people. *Psychology and Aging*, **1**, 64-69.
- McArthur, L. Z. (1982). Judging a book by its cover: A cognitive analysis of the relationship between physical appearance and stereotyping. In A. Hastorf & A. Isen (Eds.), *Cognitive social psychology* (pp. 149-211). New York: Elsevier/North Holland.
- McArthur, L. Z., & Baron, R. M. (1983). Toward an ecological theory of social perception. *Psychological Review*, **90**, 215-238.
- McArthur, L. Z., & Berry, D. S. (1987). Cross-cultural agreement in perceptions of babyfaced adults. *Journal of Cross-Cultural Psychology*, **18**, 165-192.
- Neisser, U. (1985). Toward an ecologically oriented cognitive science. In T. M. Shlechter & M. P. Toglia (Eds.), *New directions in cognitive science* (pp. 35-47). Norwood, NJ: Ablex.
- Norman, W. T., & Goldberg, L. R. (1966). Raters, ratees, and randomness in personality structure. *Journal of Personality and Social Psychology*, **4**, 681-691.
- Pennebaker, J. W. (1992). Inhibition as the linchpin of health. In H. S. Friedman (Ed.), *Hostility, coping, and health* (pp. 127-140). Washington, DC: American Psychological Association.
- Rathus, S. A. (1973). A 30-item schedule for assessing behavior. *Behavior Therapy*, **4**, 398-406.
- Rosenthal, R., & Jacobson, L. (1968). *Pygmalion in the classroom: Teacher expectations and student intellectual development*. New York: Holt, Reinhart & Winston.
- Snyder, M., Tanke, E. D., & Berscheid, E. (1977). Social perception and interpersonal behavior: On the self-fulfilling nature of social stereotypes. *Journal of Personality and Social Psychology*, **35**, 656-666.
- Tellegen, A. (1982). *A brief manual for the Differential Personality Questionnaire*. Unpublished manuscript, University of Minnesota.
- Watson, D. (1989). Strangers' ratings of the five robust personality factors: Evidence of a surprising convergence with self-report. *Journal of Personality and Social Psychology*, **57**, 120-128.
- Zebrowitz, L. A., Olson, K., & Hoffman, K. (1992). *The stability of babyfacedness and attractiveness across the lifespan*. Unpublished manuscript, Brandeis University.

*Manuscript received August 20, 1992; revised March 4, 1993.*

This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.