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Reprinted from Social Cognition, Vol. 2, No. 4,
The Guilford Press.

Social Cognition, Vol. 2, No. 4, 1983–1984, pp. 315–342

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Facial features that distinguish human infants were manipulated in schematic adult faces to test the hypothesis that impressions of babies are generalized to adults who in some way resemble babies. The results revealed that large eyes, low vertical placement of features, and short features, either singly or in combination, served to decrease perceivers' impressions of a stimulus person's physical strength, social dominance, and intellectual astuteness. These effects were independent of the perceived age and attractiveness of the faces; this was evidenced by partial correlation analyses, as well as by the finding that babyish features typically had the same impact on impressions of female and male faces, even though they increased the rated attractiveness of the female faces and decreased the rated attractiveness of the male faces. The results are discussed within a theoretical framework that emphasizes the importance of determining what stimulus information in people's appearance and demeanor influences impressions of their psychological attributes.

Anyone who has studied the portraits of great artists—or even looked at old yearbook photographs of strangers—must surely acknowledge that our initial impressions of a person's psychological qualities can be strongly influenced by the person's physical appearance. Indeed, the influence on impressions of directly perceptual attributes, such as facial appearance, vocal qualities, and demeanor, has been well documented (see Knapp, 1980; McArthur, 1982; and Schneider, Hastorf, & Ellsworth, 1979, for reviews of relevant research). However, the preponderance of research on impression formation tends to ignore questions concerning the stimulus information that is provided in people's appearance and demeanor. Instead, the research focuses on identifying the cognitive structures and processes that organize and weight information—most typically, verbal descriptions of a person's traits. As McArthur and Baron (1983) have recently argued, this focus has taught

We would like to thank Shira Sanders for her help in collecting the data. Requests for reprints should be sent to Leslie Zebrowitz McArthur, Department of Psychology, Brandeis University, Waltham, Mass. 02254.

us a great deal about the processing of information, but very little about what the relevant stimulus information is. We know, for example, that there are primacy effects in impression formation: The person who is first perceived as intelligent and then as cold will be evaluated more favorably than one who is first perceived as cold and then as intelligent. But what information other than a verbal label communicates "intelligence" or "warmth"? In the ecological approach to social perception espoused by McArthur and Baron (1983), the answers to questions such as these are crucial to an adequate understanding of impression formation. Yet existing research provides few answers, and much remains to be learned regarding what specific physical characteristics yield what specific impressions.

Secord and his associates (e.g., Secord, Dukes, & Bevan, 1954; Secord & Muthard, 1955) conducted a number of studies in which subjects were shown photographs of faces and asked to rate the physiognomic features as well as their impressions of the personality traits of those pictured. The results revealed that people who were rated similarly on physiognomic features were also rated similarly on personality—that is, people who physically resembled one another were perceived to have similar traits, while people who looked different from one another were perceived to have different traits. In addition to providing evidence that facial features and personality impressions are related, Secord and his associates also investigated the relationship between specific facial features and specific personality ratings. However, few clear relationships were obtained, and it was concluded that the impact of a particular facial feature upon impressions depends upon the other features with which it appears.

More recent research has identified some specific feature–trait relationships. Using very schematic line drawings, Bradshaw (1969) found that vertical placement of the eyes, length of the nose, and width of the mouth all influenced the traits ascribed to faces. While these findings are intriguing, it is difficult to assess their implications for impressions of real people. For one thing, the drawings were so schematic that they bore little resemblance to real faces. Furthermore, this study failed to address the question of what mediates the relationship between particular features and particular impressions. Why was it, for example, that long-nosed faces were perceived as more unhappy? Why was it that wide-mouthed faces were perceived as more stupid? The emotional expressions suggested by the different faces provides one possible explanation for the results (e.g., the wide mouth appeared more "smiley" than the narrow one). Variations in the attractiveness of the features provides another possible explanation for Bradshaw's effects, since it has been well documented that physically attractive people are perceived

more positively on a variety of psychological dimensions. Unfortunately, Bradshaw did not assess the perceived attractiveness of the various faces, and a theoretical explanation for his data remains to be found.

Research by Keating, Mazur, and Segall (1981) has examined the impact of specific facial features upon impressions within a theoretical framework that helps to account for the observed relationships, as well as to generate hypotheses regarding additional links between appearance and trait impressions. Using portrait photographs depicting real people, these researchers asked individuals from a variety of cultures to choose the more dominant person in each of a series of paired photos. For each pair, independent raters then judged whether one of the two models had (1) a more receded hairline, (2) thicker eyebrows, (3) thinner lips, (4) lighter eyes, (5) more prominent ears, (6) a broader jaw, and/or (7) an overall wider face. These physical features were selected on the basis of Guthrie's (1970) proposal that they may signal dominance by virtue of their roots in our phylogenetic past. For example, human jaw size is proposed to signal dominance because of its evolutionary association with teeth as a weapon, while a receding hairline signals the status of seniority. The results yielded some support for Guthrie's ethological postulates. When the two models could be differentiated on the basis of hairline, the one with the more receding hairline was consistently perceived as the more dominant by people from all cultures. Also, models with thinner lips or with faces or chins broader than their pairmates' were more frequently chosen as the more dominant. On the other hand, brow thickness, ear prominence, and eye lightness were not consistently associated with dominance choices.

The findings of Keating *et al.* (1981) suggest the utility of ethological theories for generating hypotheses concerning what facial features yield what impressions. While their predictions were derived from assumptions concerning the evolution of organs for human threat display, another interesting set of predictions can be derived from ethologists' hypotheses concerning the distinguishing features of infants. These hypotheses are based on the assumption that it is essential to species survival that we be able to recognize infants, and that their distinguishing features elicit caregiving, nurturant responses and suppress aggressive ones. More specifically, Lorenz (1943) has proposed a set of seven stimulus characteristics that both characterize the human infant and also reliably elicit certain responses in human perceivers. These stimulus features are a large head in relation to the body; predominance of the brain capsule; large and low-lying eyes; bulging cheek region; short and wide extremities; a springy, elastic consistency; and clumsy movements.

Consistent with Lorenz's hypotheses, a number of researchers have

found that perceivers do identify the age of an organism on the basis of such physical appearance features (e.g., McArthur & Apatow, 1982; Todd, Mark, Shaw, & Pittenger, 1980). In addition, there is evidence that perceivers respond differently to infantile stimuli than to more mature ones. For example, Alley (1981a, 1981b) found that more infantile facial profiles and more infantile body builds were judged to be cuter, more cuddly, and more defense-provoking than the more mature ones. Similarly, Sternglanz, Gray, and Murakami (1977) found that schematic faces with large eyes, small chins, and large foreheads were perceived as cuter than those with a less infantile appearance, and Hildebrandt and Fitzgerald (1979) found that adults' perception of the cuteness of photographs of real infants was positively related to large eyes and a high forehead, as Lorenz would predict. Perceived cuteness in the latter study was also positively related to a short and narrow nose, short and wide ears, and a narrow face below the eyes. Finally, we (McArthur & Apatow, 1982) found that as schematic facial profiles increased in the babyishness of their appearance (increasingly low-lying eyes and increasing predominance of the brain capsule), they were perceived not only to decrease in age, but also to decrease in strength and threateningness while increasing in perceived loveability, kindness, and flexibility.

The fact that people show a consistent and strong response to stimulus characteristics that convey the quality of babyishness raises the possibility that our reactions to real babies may be overgeneralized to others who in some way resemble babies. This possibility is reflected in Lorenz's discussion of human reactions to dolls and certain pets:

> The products of the doll industry . . . and also the various types of animals (e.g., pug-dogs and pekinese) which are taken over . . . as substitute objects for their parental care drive, permit a clear-cut abstraction of these babyish characters. (1971, p. 154)

The present study was designed to investigate reactions to adults whose faces vary in structural features that differentiate the faces of babies and adults. Although the experimental hypotheses have been inspired by Lorenz's postulates, it should be acknowledged that the data do not provide a direct test of his theory: The study does not examine actual caregiving or aggressive responses, but rather examines impressions of traits and behaviors that seem relevant to such overt responses.

Based on the distinguishing characteristics of an infant's face, it was assumed that the babyishness of an adult's face would increase with (1) increasingly large eyes relative to the rest of the face; (2) increasingly high forehead and short chin; and (3) increasingly short nose and ears. It was hypothesized that adult faces high in the babyishness of

one or all of these features would be perceived to have more babyish psychological attributes than those medium or low in the babyishness of these features. More specifically, it was hypothesized that as facial features increased in babyishness, the person would be perceived to decrease in physical strength, dominance, and intellectual ability. These hypotheses were based on the fact that babies are indeed weaker, less dominant, and less knowledgeable than adults, as well as on the important survival value of responding appropriately to these particular infantile attributes. Impressions of two additional psychological attributes were also assessed—warmth and honesty. Perceptions of these attributes cannot be so clearly predicted from ethological principles as can perceptions of physical, social, and intellectual weaknesses. However, there was some basis for expecting that increased babyishness of appearance would create impressions of greater honesty and warmth, since such impressions would be consistent with the common view that children are ingenuous and affectionate. The physical appeal of the faces was assessed, both to ascertain whether the documented impact of various features on perceptions of the cuteness and cuddliness of babies generalizes to perceptions of adults, and also to ascertain whether the impact of the features on other impressions is mediated by their physical appeal. A final dimension on which the faces were rated was perceived age.

METHOD

OVERVIEW

For the sake of readability, two studies have been treated as one in the present paper. The first study employed only male faces, while the second study, conducted 1 year later, employed only female faces. Subjects saw nine variations of one basic face: a control face; six faces that were either high or low in the babyishness of a particular feature group; and two faces that were either high or low in the babyishness of all feature groups that had been manipulated independently.[1] Subjects were asked to rate each face on seven bipolar trait scales, as well as on seven corresponding behavioral scales. One additional pair of trait–behavior scales was added in the female face study. Finally, subjects were asked to rate the physical attractiveness and the age of each face.

1. Subjects in the male face study saw two additional faces that varied in ear width—a manipulation that was not possible in the female face study, where the hair on the faces covered the ears. The effects of ear width on impressions are not reported in detail, both because they are limited to the male face study and, more importantly, because the ear width manipulation was not derived from known differences in the protrusion of infant

SUBJECTS

A total of 48 male and 48 female undergraduates enrolled in an introductory psychology course at Brandeis University volunteered to participate in the study for experimental credit. Subjects of each sex were randomly assigned to one of two basic faces (Face A or Face B); one of two random orders of the variations on the basic face; one of two orders of the dependent measures (trait or behavior ratings first); and one of two orders of rating scales within each dependent measure group. The 64 subjects who participated in the spring of 1982 rated male versions of Face A or Face B, while the 32 who participated in the spring of 1983 rated female versions of one of these faces.

INDEPENDENT VARIABLES

Two male and two female control faces were created by selecting different sets of hairstyles, eyebrows, eyes, noses, mouths, ears, and chins from a police Identi-kit. Except for different mouths and hairstyles, male Face A was identical to female Face A, and male Face B was identical to female Face B (see Figure 1). The features of the four control faces were systematically manipulated to create experimental faces that were either high or low in babyishness. More specifically, the eye size, feature length, and vertical placement of all features were independently manipulated to create six faces that were either high or low in the babyishness of a particular feature group. In addition, all of the characteristics described above were manipulated simultaneously to create two faces that were either high or low in the babyishness of all features.

Control Face

The control faces consisted of the medium forms of all feature groups. Specifically, they had vertical eye widths of 6 mm; ear lengths of 28 mm; nose lengths of 20 mm; a distance of 18 mm from the lower lip

versus adult ears, but rather from the reported tendency for adults to judge infants with protruding ears as "cuter" than those with flatter ears (Hildebrandt & Fitzgerald, 1979). When differences in attractiveness of wide versus flat ears were partialed out, the impact of ear width on impressions of the male faces was limited to the perception of wide-eared faces as stronger and less intelligent. The former effect is contrary to what would be predicted from the assumption that wide ears are more "babyish," and the latter effect was not obtained for any of the other feature babyishness manipulations.

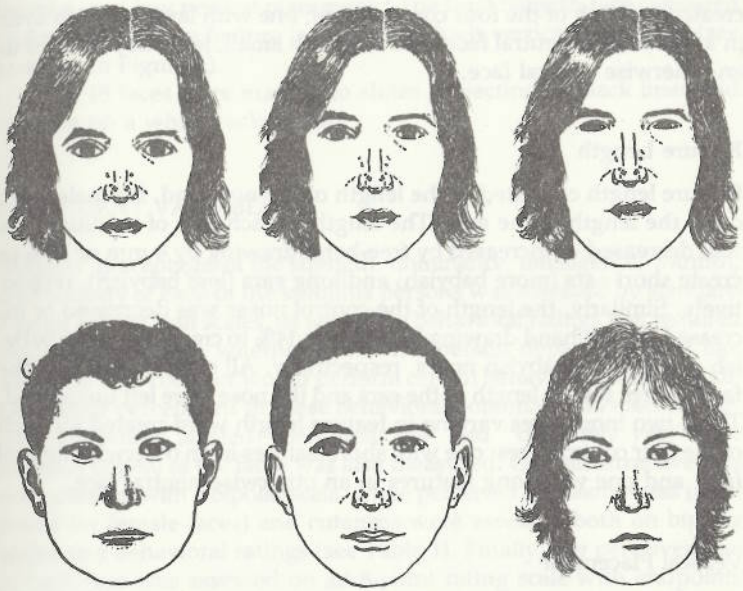

FIGURE 1. The top row depicts female face A with high babyish features, medium features (control), and low babyish features. The bottom row depicts the medium feature (control) versions of male Face B, male Face A, and female Face B.

line to the chin; and, for male faces, ear widths of 7 mm. The control versions of each of the faces were assumed to be intermediate in babyishness.

Eye Size

Eye size was manipulated by systematically increasing and decreasing the vertical width of the eyes. The distance from the upper eyelash line to the lower lid line of each control eye was increased or decreased by free-hand drawing by 2 mm or 33% to create the most and least babyish eyes, respectively. All other characteristics of the eyes, such as lid width, pupil size, and the distance from the upper eyelash line to the eyebrow, remained constant.[2] Thus, two faces varying in eye size were

2. It should be noted that control of eyebrow height and pupil size was important, inasmuch as it has been found that low brows create the impression of dominance (Keating, Mazur, Segall, Cysneiros, Divale, Kilbride, Komin, Leahy, Thurman, & Wirsing, 1981), and large pupil size has been found to influence impressions positively (e.g., Hess, 1965).

created for each of the four control faces: one with large babyish eyes in an otherwise neutral face, and one with small, less babyish eyes in an otherwise neutral face.

Feature Length

Feature length consisted of the length of the nose and, for male faces only, the length of the ears. The length of each pair of medium ears was decreased or increased by free-hand drawing by 4 mm or 14% to create short ears (more babyish) and long ears (less babyish), respectively. Similarly, the length of the control noses was decreased or increased by free-hand drawing by 4 mm or 14% to create the more babyish and the less babyish noses, respectively. All characteristics of the faces except for the length of the ears and the nose were left untouched. Thus, two more faces varying in feature length were created for each of the four control faces: one with short features in an otherwise neutral face, and one with long features in an otherwise neutral face.

Vertical Placement

In a full-face view, a large forehead and a short face below the eyes are comparable to the babyish facial feature of a predominant brain capsule in a profile view. Therefore, vertical placement of the facial features was employed as the manipulation of cranial size. The vertical placement of the facial features (eyebrows, eyes, nose, and mouth) as a group was manipulated: A constant relation of all the facial features to one another was maintained, while the distance of the lower lip line to the chin line was varied. This distance was decreased by 4 mm or 22% or increased by 4 mm or 22% from the control position to create the most babyish face and the least babyish face, respectively, on the dimension of vertical placement. Thus, two additional faces were created for each of the four control faces: one with a large forehead and short chin in an otherwise neutral face (low vertical placement), and one with a small forehead and long chin in an otherwise neutral face (high vertical placement).

All Features

A final variation of babyishness was created by the simultaneous manipulation of all of the feature characteristics described above. The most babyish version of each face consisted of the large eyes, short feature lengths, and low vertical placement.[3] The least babyish face consisted of small eyes, long feature lengths, and high vertical placement (see samples in Figure 1).

The 18 faces were made into slides projecting as black lines and shading on a white background.

DEPENDENT VARIABLES

Subjects' perceptions of the strength, dominance, intelligence, warmth, and honesty of each of the stimulus persons was assessed by standard 7-point bipolar trait scales, as well as by behavioral ratings that required subjects to indicate whether or not the person depicted looked like someone who could or would perform certain behaviors. Subjects indicated their perceptions of these behavioral potentials on 7-point scales with endpoints labeled "definitely no" and "definitely yes." The physical appeal of the faces was also measured. Overall attractiveness was assessed with a bipolar scale, while perceived handsomeness (prettiness for female faces) and cuteness were assessed both on bipolar scales and behavioral ratings (see Table 1). Finally, the perceived age of each face was assessed on an 8-point rating scale with endpoints labeled "less than 18" and "more than 35" and with the 6 intermediate points each specifying a 3-year age span (e.g., 18–20 years, 21–23 years, etc.). In addition to these scaled age ratings, subjects in the female face study were asked to indicate the age in years of any faces for which they checked "less than 18" or "more than 35."

PROCEDURE

Upon arrival at the experimental room, subjects were told that they were participating in a study of person perception and that they were to rate faces on various character traits. After signing a consent form, subjects were given the following specific instructions:

> You will be shown a series of slides that depict men [women] between the ages of 18 and 35 years. Your task is to rate each man [woman] on a number of scales. As you will see, the slides are only rough sketches of the man's [woman's] face. Furthermore, some of the sketches may look very similar

3. The most babyish male face also had wide ears, while the least babyish male face had flat ears. See footnote 1.

TABLE 1
Behavioral Potential Questions and Their Corresponding Trait Scales

Does s/he look like someone with whom you would want to cuddle? (not at all cute–very cute)
Does s/he look like someone with whom you would arrange a blind date for a male/female friend who likes dating good-looking girls/guys? (not at all pretty/handsome–very pretty/handsome)
Does s/he look like someone who would be able to move several boxes of your heaviest books? (weak–strong)
Does s/he look like the kind of roommate who would comply with all of your wishes about the furniture arrangement, quiet hours, radio station, etc.? (submissive–dominating)
Does s/he look like someone who could explain a very difficult theory to you? (unintelligent–intelligent)
Does s/he look like someone who would believe a far-fetched story that you tell on April Fool's Day? (naive–shrewd)
Does s/he look like someone who would turn a cold shoulder to your attempts at friendly conversation? (cold–warm)
Does s/he look like the kind of person who would look at a classmate's paper for answers during a final exam? (dishonest–honest)

> to one another. This is because we are interested in first impressions of people based upon very limited information about them. So, don't worry if it seems to you that you don't have enough information to make confident judgments about these men [women]. There are no right answers; we are just interested in your gut reactions to these people. Each page in this questionnaire contains a series of scales, one for each slide. Please indicate your impression of the man [woman] shown in each slide by placing an X between the vertical lines at the appropriate point on the scale for that slide.

The instructions included an example of the kind of scales subjects would be filling out. They also informed subjects that they would be shown each slide for 8 seconds, during which time they should make their rating, and that there would be an interval of 2 seconds between slides. Finally, they were told that when they had finished all rating scales on a given page, they should turn to the next page in the questionnaire in order to familiarize themselves with the next rating scale. Subjects saw the faces in one of two orders, which was constant across rating scales. Half of the subjects made trait ratings first and behavioral potential ratings second, while the order was reversed for the remaining subjects. The order of the specific rating scales within each group (i.e., trait group and behavior group) was also varied. Half of the subjects completed the scales in one random order, and the remainder completed them in the reverse of this order. For all subjects, ratings of attractiveness and age were always the last two, and subjects rated all faces on one dimension (e.g., warm–cold) before moving on to another rating dimension. These procedures were adopted in order to weaken halo effects in the ratings of a particular face and to reduce the likelihood that subjects would be explicitly aware that the faces varied in the babyishness of their appearance.

RESULTS

OVERVIEW OF THE DATA ANALYSES

Separate analyses of variance were performed on the dependent measures for each of the four feature-group manipulations, utilizing sex of subject (2), basic face (2), sex of face (2), and trait-rating order (2) as between-subject factors. Since each subject rated high, medium, and low babyish versions of the same face, the three-level babyishness variable (all features, eye size, feature vertical placement, or feature length) was a within-subject factor.[4] These overall analyses were followed by linear trend analyses with one degree of freedom to test the specific hypothesis that there would be a linear relationship between feature babyishness and impressions. Table 2 reports the mean ratings on each dependent measure for each feature group, as well as *F* values for the overall babyishness effects, the linear trend effects, and the residual quadratic effects. The results of the linear trend analyses are fully reported in the text, while the quadratic effects are discussed only when they are as strong as or stronger than the predicted linear trends. Significant interactions between babyishness and basic face, sex of face, or sex of subject were followed by simple-effect linear trend analyses to determine the significance of the predicted babyishness effect for faces of each type and sex and for subjects of each sex. In the interest of brevity, these interaction effects are reported only when they qualify the predicted babyishness effect.

In addition to the analyses described above, partial correlations were performed on the data for each of the four feature groups in order

4. The control face served as the medium babyish face in each of the four feature groups. Separate analyses employing a three-level babyishness factor were performed within each of the feature groups, rather than an overall analysis employing a nine-level feature factor, for the following reasons: A three-level babyishness factor permitted a direct test of the hypothesis that there would be a linear relationship between feature babyishness and impressions, as well as a comparison of the strength of linear effects with that of residual quadratic effects; a three-level babyishness factor permitted a clear assessment of interactions between the babyishness of each feature and sex of face, basic face, or sex of subject.

Although slide order and rating scale order were varied, these factors were not included in the statistical analyses.

TABLE 2
Mean Ratings of Schematic Faces Varying in Eye Size, Vertical Placement of Features, and Length of Features

		BABYISHNESS—ALL FEATURES					EYE SIZE				
RATING	MEDIUM[a]	HIGH	LOW	F(TOT)	F(LIN)	F(QUAD)	BIG	SMALL	F(TOT)	F(LIN)	F(QUAD)
Age	3.3	1.3	5.3	217.6	435.3	<1	2.5	4.2	49.7	90.2	9.2
Attractive	4.1	2.3	2.1	61.1	<1	121.3	4.4	2.5	72.3	124.8	19.8
Cute	3.6	3.7	1.7	50.6	71.9	29.4	4.6	2.2	88.4	176.8	<1
Cuddly	2.9	3.1	1.5	39.9	56.9	22.9	3.7	1.8	54.9	109.8	<1
Handsome (Pretty)	3.5	2.1	2.1	32.5	<1	65.1	3.9	2.6	31.5	56.9	6.1
Datable	3.5	2.0	1.9	36.0	<1	71.8	4.1	2.2	54.8	102.0	7.6
Strong	4.3	1.7	6.1	424.7	828.9	20.5	3.7	5.4	53.6	105.1	2.1
Lift boxes	4.6	1.6	6.3	529.4	1024.6	34.1	3.6	5.5	55.4	110.6	<1
Dominating	3.9	1.7	6.0	271.7	543.3	<1	3.3	5.6	74.7	149.4	<1
Submissive	4.4	5.3	2.5	88.0	159.6	16.3	5.2	2.5	118.1	219.7	16.5
Intelligent	4.5	3.3	3.0	24.9	2.0	47.9	4.8	3.6	23.2	40.9	5.5
Explain theory	4.5	2.8	3.2	23.8	2.4	45.1	4.6	3.4	18.5	34.2	2.7
Shrewd	4.3	1.9	5.2	62.1	116.3	7.9	3.5	5.4	22.8	45.0	<1
Believe story	3.3	5.6	2.6	28.2	51.7	4.7	4.3	2.2	21.5	43.0	<1
Warm	4.1	4.6	2.3	60.1	110.4	9.8	5.0	2.2	122.7	245.5	<1
Cold shoulder	3.4	2.9	5.6	78.5	126.0	31.0	2.7	5.6	114.8	214.7	15.0
Honest	4.8	5.1	2.5	82.1	128.4	35.8	5.5	2.4	170.7	289.1	52.3
Cheat on exam	3.4	2.6	5.0	52.2	94.1	10.4	2.8	5.2	66.3	132.2	<1

		VERTICAL PLACEMENT					FEATURE LENGTH				
RATING	MEDIUM[a]	LOW	HIGH	F(TOT)	F(LIN)	F(QUAD)	SHORT	LONG	F(TOT)	F(LIN)	F(QUAD)
Age	3.3	2.2	4.7	76.9	153.8	<1	3.0	3.9	13.8	26.6	1.0
Attractive	4.1	3.1	3.4	16.5	3.1	29.9	4.2	4.0	1.3	<1	2.0
Cute	3.6	3.6	3.0	12.7	9.6	15.9	3.8	3.6	1.7	1.4	2.0
Cuddly	2.9	3.0	2.5	7.6	7.9	7.4	3.2	3.0	3.6	2.3	5.0
Handsome (Pretty)	3.5	2.9	3.3	4.7	5.0	4.4	3.7	3.7	3.5	<1	6.9
Datable	3.5	2.9	3.1	7.5	1.4	13.6	3.7	3.6	1.8	<1	3.3
Strong	4.3	2.9	5.4	151.0	301.9	<1	4.1	4.6	7.2	14.3	<1
Lift boxes	4.6	3.0	5.5	117.8	215.9	19.6	4.4	4.8	4.4	8.7	<1
Dominating	3.9	2.8	5.3	132.5	255.4	9.6	4.1	4.3	1.1	<1	1.6
Submissive	4.4	4.5	3.7	9.5	12.3	6.6	4.6	4.2	2.6	5.2	<1
Intelligent	4.5	3.6	4.2	12.3	8.8	15.9	4.6	4.3	2.5	3.5	1.4
Explain theory	4.5	3.6	4.2	10.4	8.1	12.6	4.4	4.4	<1	<1	1.0
Shrewd	4.3	3.1	5.0	26.4	51.7	1.1	3.8	4.6	4.6	9.2	<1
Believe story	3.3	4.7	3.0	18.0	32.3	3.8	4.0	2.9	10.4	20.1	<1
Warm	4.1	4.2	3.8	3.3	3.0	3.6	4.4	4.0	4.7	7.6	1.7
Cold shoulder	3.4	3.4	3.7	3.1	2.0	4.1	3.2	3.6	3.7	4.4	2.9
Honest	4.8	4.6	4.0	10.6	8.1	13.1	4.8	4.5	2.8	4.1	1.5
Cheat on exam	3.4	3.4	3.9	7.2	8.1	6.4	3.2	3.6	2.9	5.5	<1

Note. All ratings were made on 7-point scales, except for age, which was rated on an 8-point scale. $n = 96$ in each cell, except for ratings of "shrewd" and "believe story," where $n = 32$.

[a]This control face served as the medium feature face in each of the four feature groups.

to ascertain the relationship between feature babyishness and trait or behavior ratings when perceptions of age and attractiveness were controlled. In order for subjects to contribute only one pair of scores to each correlation, their ratings of the faces at the three levels of babyishness within each feature group had to be reduced to a single score. This was accomplished as follows. First, subjects were randomly divided into two groups—those with odd and even identification numbers—such that both sexes, both stimulus-person faces, and both trait-rating orders were equally represented in the two groups. Then, for each dependent measure, a "babyishness effect" was computed for odd-numbered subjects by subtracting their ratings of the control face from their ratings of the high babyish face (i.e., the face with all babyish features, large eyes, low vertical placement, or short features); a "maturity effect" was computed for even-numbered subjects by subtracting their rating of the control face from their ratings of the low babyish face (i.e., the face with no babyish features, small eyes, high vertical placement, or long features). This yielded one value per subject for each dependent measure within each of the four feature-group manipulations. These values were correlated with the babyishness of the stimulus face, which was given the arbitrary value of 1 for odd-numbered subjects and 0 for even-numbered subjects, with the consequence that positive correlations signified a positive relationship between facial babyishness and trait or behavior ratings, while negative correlations signified a negative relationship between facial babyishness and ratings. Partial correlations controlling for age and attractiveness were performed separately for the male and female faces. The resulting correlations were averaged with a parallel set of correlations for male and female faces, which was obtained when the "babyishness effect" was computed for even- rather than odd-numbered subjects and the "maturity effect" was computed for odd- rather than even-numbered subjects. The averaged partial correlations for each dependent measure and for each feature-group manipulation are presented in Table 3. The zero-order correlations, which provide essentially the same information as the ANOVA linear trend effects, are provided in Table 4 for the interested reader.

AGE AND PHYSICAL APPEAL

Analyses of Variance

Age

As the babyishness of all features increased, as eye size increased, and as feature vertical placement or feature length decreased, there was a significant linear decrease in the perceived age of the stimulus persons,

TABLE 3
Facial Babyishness Correlated with Trait and Behavior Ratings Partialing Out Perceived Age and Attractiveness

	ALL FEATURES		EYE SIZE		VERTICAL PLACEMENT		FEATURE LENGTH	
	SEX OF FACE		SEX OF FACE		SEX OF FACE		SEX OF FACE	
RATING	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Cute	+.45***	+.50***	+.41***	+.33*	+.10	+.34*	+.06	+.03
Cuddly	+.30**	+.22	+.23*	+.19	+.13	+.24	+.09	−.10
Handsome (Pretty)	+.01	+.30*	+.15	+.15	+.03	+.17	−.11	+.37**
Datable	−.04	−.01	+.32**	+.12	−.08	+.03	+.03	+.10
Strong	−.77***	−.64***	−.43***	−.30*	−.55***	−.58***	−.28**	−.05
Lift boxes	−.75***	−.72***	−.39***	−.30*	−.39***	−.64***	−.24*	−.15
Dominating	−.63***	−.67***	−.52***	−.34*	−.50***	−.67***	−.13	+.27
Submissive	+.34***	+.48***	+.43***	+.56***	+.14	+.20	+.25**	−.12
Intelligent	+.04	+.08	+.11	+.30*	−.07	−.03	+.11	+.09
Explain theory	−.04	−.11	+.16	−.08	−.08	−.16	−.01	+.15
Shrewd		−.45**		−.31*		−.44**		−.16
Believe story		+.33*		+.44**		+.37**		+.43**
Warm	+.37***	+.44**	+.45***	+.53***	+.13	+.33*	+.16	+.09
Cold shoulder	−.39***	−.17	−.42***	−.45**	+.01	−.02	−.06	−.14
Honest	+.31**	+.53***	+.58***	+.53***	+.10	+.27	+.06	+.17
Cheat on exam	−.36***	−.33*	−.42***	−.30*	−.12	+.25	−.16	−.22

Note. Degrees of freedom for each of the partial correlations are equal to 60 for the male faces and equal to 28 for the female faces.
*$p < .10$, two-tailed.
**$p < .05$, two-tailed.
***$p < .01$, two-tailed.

TABLE 4
Facial Babyishness Correlated with Trait and Behavior Ratings

RATING	ALL FEATURES		EYE SIZE		VERTICAL PLACEMENT		FEATURE LENGTH	
	SEX OF FACE		SEX OF FACE		SEX OF FACE		SEX OF FACE	
	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
Cute	+.36***	+.63***	+.65***	+.56***	+.00	+.48***	+.04	+.14
Cuddly	+.27**	+.48***	+.50***	+.52***	+.04	+.36**	+.11	+.02
Handsome (Pretty)	−.22*	+.44**	+.38***	+.47***	−.29**	+.24	−.14	+.26
Datable	−.16	+.34*	+.46***	+.48***	−.20	+.19	−.02	+.19
Strong	−.88***	−.80***	−.52***	−.49***	−.72***	−.66***	−.30**	−.12
Lift boxes	−.88***	−.86***	−.54***	−.49***	−.60***	−.72***	−.20	−.16
Dominating	−.84***	−.74***	−.66***	−.42**	−.68***	−.66***	−.17	+.22
Submissive	+.58***	+.68***	+.62***	+.72***	+.16	+.30*	+.20	−.06
Intelligent	+.02	+.24	+.34***	+.37**	−.18	−.12	+.08	+.18
Explain theory	−.12	−.02	+.36***	+.22	−.20	−.08	−.06	+.16
Shrewd		−.68***		−.52***		−.52***		−.27
Believe story		+.58***		+.54***		+.44**		+.45***
Warm	+.54***	+.54***	+.68***	+.68***	+.02	+.25	+.15	+.14
Cold shoulder	−.56***	−.54***	−.64***	−.66***	−.02	−.18	−.05	−.28
Honest	+.50***	+.65***	+.74***	+.64***	+.06	+.36**	+.08	+.18
Cheat on exam	−.47***	−.61***	−.60***	−.54***	−.12	−.33*	−.12	−.21

Note. Degrees of freedom for each of the correlations are equal to 62 for the male faces and equal to 30 for the female faces.
*$p<.10$, two-tailed.
**$p<.05$, two-tailed.
***$p<.01$, two-tailed.

all p's $<.0001$. The mean ages in years estimated for the female stimulus persons were as follows: medium features, 24.3; all babyish features 16.0; no babyish features, 31.2; large eyes, 21.5; small eyes, 27.7; low feature vertical placement, 22.8; high feature vertical placement, 28.6; short features, 22.7; long features, 25.7.[5]

Physical Appeal

The impact of the various feature manipulations on ratings of cuteness and cuddliness were consistent with past research on perceptions of infants (e.g., Alley, 1981a, 1981b; Hildebrandt & Fitzgerald, 1979; Sternglanz *et al.*, 1977). More specifically, although feature length had no impact on these measures, p's $>.10$, increasing babyishness of all features, increasing eye size, and decreasing vertical placement of features each yielded significant linear increases in the perceived cuteness and cuddliness of the stimulus persons, p's $<.0001$ for all features and eye size and p's $<.01$ for feature vertical placement.

While the various feature manipulations had parallel effects on the perceived cuteness and cuddliness of the stimulus persons, they had quite divergent effects on ratings of attractiveness, handsomeness (prettiness), or desirability as a date. These ratings were not significantly affected by feature length, p's $>.10$; they showed a positive, linear relationship with eye size, all p's $<.0001$; and they showed a quadratic relationship with the babyishness of all features, reflecting a tendency to perceive the stimulus persons who were intermediate in babyishness as more appealing than those who were high or low, all p's $<.0001$. Similar quadratic trends were obtained for manipulations of feature vertical placement, where the medium placement yielded the highest ratings of handsomeness (prettiness), desirability as a date, and attractiveness, p's $<.05$, .0001, and .0001, respectively.

Significant all features × sex of face and vertical placement × sex of face interaction effects revealed that the impact of a babyish appearance on ratings of attractiveness, handsomeness (prettiness), and desirability as a date was quite different for male and female faces, all p's $<.001$. Although the aforementioned quadratic trends for the manipulations of all features and feature vertical placement were highly significant for both male and female faces, reflecting a tendency to regard the intermediate faces as the most appealing, the linear trends

5. An accurate index of perceived age in years cannot be determined for the male faces, since absolute age estimates were not systematically collected from subjects who checked scale values 1 ("less than 18") or 8 ("more than 35").

differed for the two sexes. More specifically, ratings of female faces' attractiveness, prettiness, and datability were higher when the babyishness of all features was high than when it was low and when the vertical placement of all features was low than when it was high, p's $< .0001$ for all features and p's $< .01$ for vertical placement; the reverse was true for male faces, p's $< .001$ for vertical placement and p's $< .10$, .0001, and .01, respectively, for all features. A significant feature length × sex of face interaction effect, $F(2, 160) = 7.2$, $p < .001$, revealed a similar divergence in ratings of the handsomeness (prettiness) of male versus female faces: Females with short, more babyish feature lengths were rated as prettier than those with long lengths, $p < .001$, while a nonsignificant trend in the opposite direction was obtained for males, $p < .10$. It should be noted that ratings of cuteness and cuddliness were not so strongly influenced by the sex of the face as were ratings of attractiveness, handsomeness (prettiness), and desirability as a date. Feature vertical placement was the only manipulation to interact significantly with sex of face, reflecting a tendency for decreased vertical placement of features to increase ratings of the cuteness and cuddliness of female faces, p's $< .001$, but not male faces, F's < 1.

Partial Correlations

Since the feature manipulations often had a significant impact on the perceived attractiveness of the faces, a "halo effect" explanation for their impact on other ratings of the faces is possible. Similarly, one could argue that variations in subjects' perceptions of the ages of the faces may account for the other differences perceived among them. As noted above, to assess the feasibility of these alternative explanations, partial correlation analyses were performed in which the babyishness of each face was correlated with subjects' ratings of it, partialing out age and attractiveness ratings. As one would expect, most of the feature manipulations lost their significant relationship with ratings of handsomeness (prettiness) in these partial correlation analyses, the exceptions being a tendency for all babyish features or short features on female faces to remain at least marginally correlated with perceptions of their prettiness. The majority of the effects for ratings of cuteness did remain significant in the partial correlation analyses, suggesting that "cuteness," unlike "handsomeness" and "prettiness," can be differentiated from "attractiveness." All babyish features as well as large eyes remained correlated with perceptions of the cuteness of male and female faces, while low vertical placement of features remained marginally correlated with perceptions of the cuteness of female faces (see Table 3).

PHYSICAL, SOCIAL, AND INTELLECTUAL WEAKNESS

Analyses of Variance

Physical Weakness

All of the feature manipulations, both singly and in combination, had the predicted impact on perceptions of physical weakness. As the babyishness of all features increased, as eye size increased, and as feature vertical placement or feature length decreased, there was a linear decrease in perceptions of the stimulus persons' general physical strength, as well as of their specific ability to lift heavy boxes, all p's $< .0001$ except feature length, for which p's $< .001$ and .01, respectively. All of these effects held true for both basic faces, both male and female faces, and subjects of both sexes.

Social Weakness

The feature manipulations also had the predicted impact on perceptions of social weakness. As the babyishness of all features increased, as eye size increased, or as feature vertical placement decreased, there was a linear decrease in perceptions of the stimulus persons' general dominance and a linear increase in perceptions of their more specific likelihood of submitting to all of a roommate's requests, all p's $< .001$. Whereas these effects held true for both basic faces, both male and female faces, and subjects of both sexes, the impact of feature length on perceptions of social weakness was qualified by interactions with sex of face. Decreasing feature length did yield the predicted linear increase in perceptions of submission to a roommate's requests, $p < .05$. However, a feature length × sex of face interaction, $F(2, 160) = 3.23$, $p < .05$, revealed that this effect was significant for male, but not for female faces, $p < .01$ and $F < 1$. Also, although decreasing feature length did not yield the predicted linear decrease in impressions of general dominance, $F < 1$, a significant feature length × sex of face interaction effect, $F(2, 160) = 8.74$, $p < .001$, revealed that feature length did have the predicted impact on the perceived dominance of male faces, while it had the reverse effect for female faces, both p's $< .05$.

Intellectual Weakness

The feature manipulations did not have the predicted influence on perceptions of general intelligence or the ability to explain a difficult theory. There was no significant linear relationship between the babyishness

of all features or feature length and either of these measures, p's > .05, and eye size was positively related to perceptions of intelligence and the ability to explain a theory, p's < .0001—just the reverse of what had been predicted. Finally, although decreasing vertical placement of features yielded the predicted linear decrease in ratings on both of these measures, p's < .01, the residual quadratic effects were larger than the linear ones, p's < .001, reflecting a tendency to perceive the persons with the medium vertical placement of features as more intellectually able than those with high or low placement. Similar quadratic trends were obtained for the simultaneous manipulation of all features, p's < .0001. While the effects of the various feature manipulations on impressions of general intelligence did not support predictions based on the assumed babyishness of the faces, it should be noted that they are consistent with an attractiveness "halo effect." The faces that were perceived as most attractive within each feature-group manipulation (intermediate babyishness of all features, large eyes, and intermediate vertical placement) were also perceived as the most intelligent and the most capable of explaining a difficult theory.

With hindsight, the failure to confirm the hypothesis regarding perceptions of intellect was attributed to a poorly chosen dependent measure. The intellectual weakness of infants does not lie so much in their lack of intelligence as in their naiveté. In accordance with this reasoning, subjects in the female face study were asked to rate the shrewdness and gullibility of the stimulus persons. Consistent with the revised hypothesis, as the babyishness of all features increased, as eye size increased, and as feature vertical placement or feature length decreased, there was a linear increase in perceptions of the stimulus persons' general naiveté, as well as their likelihood of believing a far-fetched story, p's < .0001 except for the impact of feature length on ratings of naiveté, for which $p < .01$. Unlike ratings of general intelligence, these linear trends for ratings of naiveté were not qualified by stronger quadratic effects. They were also not qualified by interactions with basic face or subject sex.

Partial Correlations

The large majority of the relationships between facial features and impressions of physical, social, and intellectual weakness were retained in the partial correlation analyses, where ratings of age and attractiveness were controlled. More specifically, the impact of all features on these impressions remained significant, as did the impact of eye size, albeit at a marginal level for female faces. The effects of feature vertical placement also remained significant, with the exception of ratings of

the likelihood of submitting to a roommate's requests. Finally, the effects of feature length on impressions of physical and social weakness remained at least marginally significant for male faces, although not for females, and its effects on impressions of intellectual weakness held up for ratings of the likelihood of believing a far-fetched story, but not for ratings of general naiveté (see Table 3).

WARMTH AND HONESTY

Analyses of Variance

Warmth

Consistent with expectations, as the babyishness of all features increased, as eye size increased, and as feature length decreased, there was a linear increase in perceptions of the stimulus persons' general warmth and a linear decrease in perceptions of their likelihood of turning a cold shoulder to friendly overtures, p's < .0001 for all features and eye size and p's < .05 for feature length. None of these effects were qualified by interactions with basic face, sex of face, or sex of subject. Although vertical placement also had a significant overall effect on these impressions, the predicted linear trends were not significant, p's > .05.

Honesty

Perceptions of honesty yielded effects similar to those obtained for warmth. Increasing babyishness of all features, increasing eye size, and decreasing feature length each yielded a linear increase in the perceived honesty of the stimulus persons, as well as a linear decrease in the perceived likelihood that they would cheat on an exam, p's < .0001 for all features and eye size and p's < .05 for feature length. Whereas these effects were not qualified by interactions with basic face, sex of face, or sex of subject, the linear relationships between feature vertical placement and impressions of honesty and the likelihood of cheating, p's < .01, were qualified by significant interactions. More specifically, an interaction between vertical placement and sex of face for ratings of honesty revealed different trends for male and female faces, $F(2, 160) = 3.10$, $p < .05$. Female faces were rated as increasingly honest with decreasing vertical placement of features, as had been predicted, $p < .001$. However, male faces with a medium vertical placement of features received the highest honesty ratings, and the linear trend was not significant, $p > .10$. In addition, a significant vertical placement × sex

of subject interaction effect for perceptions of the tendency to cheat, $F(2, 160) = 3.28$, $p < .05$, revealed that female but not male subjects rated faces as increasingly likely to cheat with decreasing vertical placement of features, $p < .001$, and $F < 1$, respectively.

Partial Correlations

Many of the relationships between facial features and impressions of warmth and honesty were eliminated in the partial correlation analyses, where ratings of age and attractiveness were controlled. The impact of eye size remained at least marginally significant, as did the impact of all babyish features, with the single exception of impressions of the likelihood that female faces would turn a cold shoulder to friendly overtures. However, all of the effects of feature length on these impressions were eliminated when age and attractiveness ratings were controlled, as was the single effect of feature vertical placement on impressions of the honesty of female faces (see Table 3).

DISCUSSION

The present findings provide strong evidence that impressions of people's psychological attributes are influenced by facial features that differentiate babies and adults. Large eyes, low vertical placement of feaures, and short features singly or in combination served to decrease perceivers' impressions of a stimulus person's physical strength and social dominance. These effects held true for subjects of both sexes and for two basic faces. With the exception of the impact of feature length on impressions of social weakness, they also held true for both male and female faces.[6] Finally, the effects were independent of any influence of the feature manipulations on the perceived age or attractiveness of the faces, since they remained significant when age and attractiveness ratings were partialed out.

While each of the manipulated facial features had the predicted impact on impressions of physical and social weakness, their impact on impressions of intellectual weakness was more complex. Contrary to expectation, impressions of general intelligence were increased by babyish large eyes, unaffected by short features, and curvilinearly related

6. The discrepancy in the impact of the feature length manipulation on impressions of male and female faces may be due to the fact that for male faces, the manipulation included variations in ear length as well as nose length, while only nose length was varied for female faces.

to feature vertical placement as well as to the babyishness of all features combined. The direction of these effects exactly paralleled the impact of the various feature manipulations on attractiveness ratings, and none of the features bore a significant relationship with ratings of general intelligence in the partial correlation analyses, where attractiveness was controlled. It thus appears that the inconsistent influence of the various features on impressions of general intelligence was mediated by variations in their physical appeal.

In contrast to the ratings of general intelligence, an attractiveness halo effect cannot account for ratings on the two measures of intellect that were derived from the hindsight observation that the intellectual weakness of babies is more their naiveté than their lack of intelligence. Large eyes, short features, and low-lying features, both singly and in combination, yielded the perception of lesser shrewdness and a greater likelihood of believing a far-fetched story. These effects, assessed only for female faces, held true for both basic faces and for subjects of both sexes. Thus, each of the manipulated facial features consistently yielded the predicted effects on impressions of intellectual naiveté. Moreover, with the exception of the relationship between feature length and ratings of general shrewdness, these effects held up in the partial correlation analyses, which controlled for perceived age and attractiveness.

Unlike the measures of physical and psychological strength, the measures of physical appeal yielded some striking differences in the influence of babyish features on ratings of male and female faces. As the babyishness of feature length, vertical placement, or all features combined was increased for female faces, ratings of their prettiness, attractiveness, and desirability as a date also increased. For male faces, on the other hand, increased babyishness of feature length, vertical placement, or all features combined yielded decreases in ratings of handsomeness, attractiveness, and desirability as a date. These divergent ratings of baby-faced males and females held true for subjects of both sexes and for both basic faces. It is interesting to note that the actual morphological differences between male and female faces reflect a greater retention of infantile characteristics in the adult female than in the adult male (Gray, 1973; Liggett, 1974). Thus the finding that a "baby face" is appealing on a female but not on a male may reflect an aesthetic preference for faces that are prototypical for their gender.

It is significant that the feature manipulations tended to have the same impact on ratings of the physical and social strength of male and female faces, despite diverent effects on their physical appeal. Together with the partial correlation analyses, this pattern of results indicates that the impact of large eyes, low vertical placement, and short features

on impressions of physical, social, and intellectual weakness is not simply due to a positive halo effect deriving from the greater attractiveness of these features than of their more mature counterparts.

Impressions of warmth and honesty were less independent of the physical appeal of the faces than were impressions of physical, social, and intellectual strength. Only the simultaneous manipulation of babyishness on all dimensions and the individual manipulation of increasing eye size augmented these impressions when perceived age and attractiveness ratings were controlled. The linear relationship between feature length and impressions of warmth and honesty was eliminated in the partial correlation analyses, as was the linear relationship between vertical placement and impressions of the honesty of female faces. It thus appears that the influence of certain features on impressions of warmth and honesty may be mediated by their physical appeal.

It should be noted that the methodology employed in the present research allows one to draw firmer conclusions than past research regarding the impact of specific facial features upon impressions of a person's other attributes. Not only has it been possible to rule out an attractiveness halo effect as an explanation for the relationship between facial features and certain impressions, but it has also been possible to determine with certainty exactly what feature group is contributing to perceivers' impressions. Eye size, vertical placement, and feature length were each manipulated independently of the others, and all other facial characteristics were carefully controlled—something that is not possible when photographs of real faces are employed. For example, Keating *et al.* (1981) reported that 7 of the 12 portrait pairs that differed in facial width also differed in hairline. It is conceivable that they also differed along some expressive dimension. Such built-in correlations make it difficult to determine with certainty whether a receding hairline, a broader face, and/or some unknown, uncontrolled feature is contributing to the impressions of dominance. There is, of course, a tradeoff involved in the increased control over the independent variables that is provided by the use of schematic portraits. Although the drawings employed in the present study were quite realistic and incorporated feature variations that one could expect to find in real faces (something that cannot be said for the drawings employed by Bradshaw, 1969), these drawings do entail a sacrifice in realism. Thus, having demonstrated the independent effects of eye size, feature length, and vertical placement, it would be desirable to investigate the impact on impressions that each has when it appears in real faces.

In addition to the aforementioned strengths of the present methodology, some potential weaknesses should also be acknowledged. First, the number of faces on which the feature manipulations were performed was small, and it is conceivable that the obtained effects would not generalize across a large population of faces. However, the fact that the vast majority of effects did generalize across those faces that were employed, together with the fact that an attempt was made to create basic faces quite different in appearance, does give reason to be optimistic regarding the generality of the findings.

A second potential limitation to the generalizability of the results derives from the within-subjects design. The advantage of this design is, of course, that it permits much more data to be collected than a between-subjects design. (If each subject had rated only one face, the experimental design would have required 36 groups of subjects.) On the other hand, there may be unknown carryover effects as subjects rate one face after another, and subjects may be more likely to guess the experimental hypothesis. Evidence to argue against the latter confound is provided by the investigators' experience with the slides, as well as by postexperimental feedback from the subjects. First, the experimenters had difficulty distinguishing certain faces from one another, even when they were directly adjacent and even though they knew what to look for. Indeed, when conducting the experiment, it was necessary to label the slides so that they would not get mixed up. Since the subjects did not know what to look for, and since they saw the slides one at a time with no opportunity for direct comparison, it is even more likely that they were not consciously aware of differences between many of the slides, let alone the experimental hypotheses. Consistent with this argument, when subjects were asked at the completion of the female face experiment to write down whatever differences they had discerned among the faces, only five subjects mentioned anything about differences in maturity of appearance. Moreover, even these five did not discern that all of the faces differed along this dimension. Thus, for example, one subject said, "Two looked extremely young and innocent, whereas another two seemed to be much more masculine, older, and devious." Similarly, another said, "[One was a] very mature, motherly type; [another was] rounder, younger, more feminine looking." Finally, only one of the five subjects who mentioned facial maturity said anything explicit about what features were more mature. Other subjects did mention one or more of the manipulated features in their descriptions of the faces, but they did not reveal any awareness that these were manipulations of babyishness. Moreover, facial characteristics that were not varied (e.g., hair, mouth, head size, expression) were mentioned even more often than those that were manipulated. It thus appears that experimental demand characteristics cannot account for the present findings.

As noted earlier, Lorenz (1971) has argued that it is essential to

species survival that an infant's distinguishing features elicit caregiving, nurturant responses and suppress aggressive ones, and he has further suggested that our reactions to real infants may be overgeneralized to others who in some way resemble babies. While the present study has not directly tested these ethological postulates, the findings are quite consistent with them. Perceiving submission is known to suppress aggression in many species (Van Hooff, 1967), and faces with babyish large eyes or short or low-lying features were perceived as the most submissive. Similarly, perceiving weakness, ignorance, and cuddliness would seem to be a necessary condition for the delivery of essential caregiving responses, and faces with babyish features were perceived as the weakest, the most naive, and the most cuddly.

Although the data are consistent with the ethological theory from which the hypotheses were derived, they do not provide direct support for that theory, and other interpretations of the data are conceivable. One possibility is that the variations in facial structure influenced perceived facial expression. While such effects have recently been demonstrated by Laser and Mathie (1982), their ability to explain the present pattern of data requires discovering a facial expresion that is conveyed either by large eyes, by short features, or by low vertical placement of features, and that could plausibly signify physical weakness, social submissiveness, naiveté, warmth, and so on. Another possible explanation for the present results is that they reflect learned associations between specific facial features and specific psychological attributes. Although conceptually different from the ethological theory, a learned-association explanation would predict the same results in the present study if the associations derive from interactions with babies. Moreover, it is difficult to conceive of a way to differentiate the two explanations empirically. On the other hand, one might be able to differentiate between them if the learned associations derive from interactions with large-eyed, short-featured, or short-chinned adults who, for some reason, tend to have particular behavioral tendencies, only some of which are "babyish." The question, however, is this: Why would people with such a facial appearance manifest weakness, submission and naiveté? It certainly seems unlikely that there is a genetic link between eye size and bicep strength. A more plausible mechanism is that of self-fulfilling prophecy—perhaps people with certain features act weak, submissive, and naive because they are expected to act this way. But this totally begs the question. Why are they expected to act this way? Because they look like babies?

While a definitive theoretical interpretation of the findings must await further research, the data are interesting in their own right, for they begin to answer the question of what stimulus information in people's appearance, voice, or demeanor will influence our impressions of their psychological attributes. They also provide some inroads into the determinants of physical attractiveness. Increasing eye size yields increased attractiveness for men as well as women. Short or low-lying features on females are perceived as more attractive than long or high-placed features, while the reverse is true for males.

CONCLUSIONS

The present findings reveal that impressions of people's psychological attributes are influenced by the size of their eyes, as well as by the length and vertical placement of their facial features. Many of the obtained effects were extremely strong, reflecting little variation among perceivers in their impressions of each face. Moreover, most effects generalized across two faces of each sex and were independent of the perceived age and attractiveness of the faces. These findings not only are interesting in their own right, but also affirm the value in balancing current information-processing approaches to impression formation with a search for the directly perceivable stimulus information that produces particular impressions.

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