BABY TALK TO THE BABYFACED

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ABSTRACT: The power of an infantile appearance to elicit baby talk was investigated by assessing the use of baby talk in task instructions to four-year-old children, who were portrayed as either relatively babyfaced or maturefaced. Men and women taught two tasks to a randomly selected boy or girl via a telephone conversation after being shown a photograph, which presumably depicted the child whom they were instructing. Paralleling facial differences between babies and adults, babyfaced children had rounder faces, larger eyes, thinner eyebrows, and smaller noses than the maturefaced. As predicted, adults used more baby talk when instructing babyfaced than maturefaced children. This effect was manifested in linguistic indicators of baby talk (slow timing and high clarification, simplification, and attention maintenance), as well as in paralinguistic indicators of baby talk (high pitch and changing intonation). The receipt of linguistic baby talk, in turn, facilitated the child's ability to choose a card which matched the one being described. The fact that facial babyishness influenced baby talk even when baby- and maturefaced children were equated in age, attractiveness, and perceived competence suggests that a small approximation to the craniofacial qualities that distinguish infants from adults may in and of itself be sufficient to elicit this speech register.

"Baby talk" characterizes the nature of speech directed toward young children up to the age of three or four. It includes the use of diminutives, endearments, and pet names, the prosodic qualities of high pitch and exaggerated intonation, and the linguistic qualities of short, simple sentences, common vocabulary, repetitions, and attention-getting devices like "aah" and "ooh" and questions (Ferguson, 1977; Garnica, 1977). These features of baby talk facilitate communication-clarification, which enables

greater understanding by young listeners, as well as the expression of nurturance and affection (Brown, 1977).

Baby talk seems to be a universal response to young children. It is stable across contexts, such as teaching, conversing, and story telling (see Snow & Ferguson, 1977, for reviews), and it occurs across time and culture. A Roman grammarian noted the high pitch and exaggeration intonation of speech to children more than two thousand years ago, and in modern times baby talk has been documented in various social classes (Snow, Arlman-Rupp, Hassing, Jobse, Joosten, & Vorster, 1976) and in a wide variety of languages (Ferguson, 1964, 1977). Baby talk is also manifested at an early age. Two-year-olds showed shorter utterances, more repetitions, and more attention-getting devices when talking to their 14-month-old siblings than when talking to their mothers. Diminutives and other affectionate utterances were also shown by these young children, albeit only when they had warm and affectionate relationships with their younger siblings (Dunn & Kendrick, 1982). Other research has shown that children's baby talk is responsive to the age of the listener, being more pronounced for younger listeners, and that it is used by young children whether or not they have young siblings (Shatz & Gelman, 1973).

There is some evidence that baby talk to young listeners is not controlled by their communicative needs. Thus, baby talk is addressed to children even when they give clear signs of understanding what is being said (Bohannon & Marquis, 1977). Also, although some features of baby talk in mothers' speech to their own children, such as utterance length, vary with the child's communicative abilities, other baby talk features, such as sentence complexity, do not show such variation (Cross, 1977). Similarly, individual differences in children's linguistic and cognitive sophistication (as judged by adults after hearing a brief conversation) had no effect on the extent to which baby talk was directed to them by other adults (DePaulo & Coleman, 1986).

Compared with baby talk to children, "secondary baby talk" to listeners other than children who also elicit affectionate reactions and/or the perception of low linguistic competence is more responsive to the competency of the listener. Speech directed toward foreign or retarded adults had more baby talk features than speech directed toward normal, native adults, but this effect diminished as the sophistication of the foreigners and retarded individuals increased (DePaulo & Coleman, 1986). On the other hand, the elevation in baby talk in speech addressed to the institutionalized aged did not vary with the competence or likability of the aged listeners (Caporael, 1981).

The inflexibility of baby talk to children and the elderly, as opposed to

foreign or retarded adults, could reflect a tendency for baby talk to be elicited by the appearance of certain targets rather than being controlled by assumptions about their level of understanding. Indeed, Lorenz (1943) argued that the physical characteristics that differentiate infants from adults act as automatic releasers of caregiving behaviors that have adaptive value for the survival of the infant. Such behaviors could include baby talk insofar as it facilitates communication and nurturance. It is also conceivable that the aged face releases caregiving behaviors, since it would have been advantageous in our evolutionary past to optimize protection of and communication with the elderly, who were the repositories of accumulated wisdom. Consistent with the foregoing arguments, Ryan, Giles, Bartolucci, and Henwood (1986) note that merely categorizing individuals as elderly, usually from physiognomic cues, can invoke "overaccommodative" speech. And Bohannon and Marquis (1977) conclude that the presence of a child may be a sufficient condition for the occurrence of baby talk.

The argument that baby talk to children is elicited by their distinctive appearance suggests that whereas baby talk is relatively unresponsive to individual differences in children's competency, it should respond to individual differences in their appearance. Past research has revealed a babyface overgeneralization effect whereby people with faces resembling a baby's are perceived to have more childlike traits than their maturefaced peers (Berry & McArthur, 1986; McArthur & Baron, 1983; Zebrowitz & Montepare, 1992). For example, babyfaced children, who have round, big eyed faces resembling an infant, are perceived as more affectionate, dependent, and naive than maturefaced children of the same age and attractiveness. These impressions are associated with significant social consequences. Specifically, the misbehaviors of babyfaced children are perceived as less intentional and they are punished less severely (Zebrowitz, Kendall-Tackett, & Fafel, 1991).

The fact that babyfaced children look dependent, affectionate, and naive may also have other social consequences. In particular, this appearance should elicit speech which is high in affection and clarification, and such speech may, in turn, facilitate learning. In accordance with this reasoning, the present study was designed to test the hypothesis that children believed to be babyfaced would elicit more baby talk from adults than equally attractive children of the same age who are believed to be maturefaced, and that children who receive more baby talk while learning a task would perform better.

Although the manipulation of facial maturity in the present study equated the actual competence of children portrayed as babyfaced versus maturefaced, perceived competence could nevertheless differ. Indeed, as

noted above, past research has revealed that, when no information other than a photograph is provided, babyfaced children are perceived as less competent. Perceptions of competence were therefore assessed to determine whether greater baby talk to babyfaced children is mediated by the presumption that they are less competent.

Method

Subjects

Twenty-nine preschoolers (16 female, 13 male) served as learners and twenty-nine undergraduates (15 females, 14 males) served as teachers. The preschoolers, who were were recruited primarily from two local day care centers, ranged in age from 44 to 54 months ($M = 49.31$) and received stickers for their participation, contingent on parental wishes and day care approval. Each of the teachers was randomly assigned to interact with a male or female child learner. Parental consent was obtained for each child involved in the study. The undergraduates were recruited from an Introductory Psychology class and received partial credit toward a course requirement for their participation. Due to a poor quality recording of one conversation between a female undergraduate and a girl, the total N was reduced to 28 for measures based on the transcripts or tape excerpts.

Tasks

Dowel game. The dowel game, patterned after Rubin and Brown (1975), consisted of three plastic dowels, each mounted in the center of a 22 cm × 7 cm × 3 cm wooden stand over which four circular wooden discs could be placed. The diameters of the discs were approximately 6 cm, 5 cm, 4 cm, and 3 cm. When stacked in descending order of size on a dowel, the discs form a pyramid-like structure. The object of the game was to move the pyramid from one dowel to another by transferring the discs, one at a time, back and forth between the dowels without ever placing a larger disc on top of a smaller one.

Card recognition game. The second task was a card recognition game, with similar procedure and stimuli to that utilized by Flavell and colleagues (1968). The teacher described the shapes (e.g., triangle, square, rhombus, snake) and/or numbers (e.g., five, three) on his or her card, and the child had to pick that card from four cards, three of which were close matches while one was an exact replica. Each card contained four or five

objects. Four different card sets, each with a different color background, were utilized.

Facial Maturity Manipulation

Photographs of two maturefaced and two equally attractive babyfaced children of each sex were used to manipulate the facial maturity of the preschoolers in the present study. These photos were chosen from a sample of black and white, shoulders-up year book photographs of 24 preschool boys and 24 preschool girls that had been rated by 12 male and 12 female undergraduates on 7-point bipolar scales assessing perceived facial maturity (babyfaced/maturefaced) and attractiveness (very unattractive/very attractive). Craniofacial measurements were made by two independent judges who had an average interrater reliability of .82. These measurements further established that the babyfaced targets had more infantile craniofacial proportions as reflected in a composite of features (eye size, eyebrow thickness, facial roundness, and nosebridge size) that predicted facial maturity ratings across the lifespan (mean z scores for features in the composite were .42 and $-.70$ for babyfaced and maturefaced targets, respectively, with a standard deviation of .60 for the entire set of 48 faces).

Procedure

A female experimenter met with the child either in a quiet room in the day care center or at the child's home. The children were told that they would be learning some games from a teacher over the phone, and that they could stop playing at any time. Either a speakerphone or a portable cellular telephone with an attachable microphone was used so that the child could communicate with the teacher while having hands free to complete the games.

The teacher-subject met with a second female experimenter and signed a consent form after being informed that the task would be to teach some games over the telephone to a child who was about four years old and of average intelligence. The two games were then explained. First, the experimenter trained the teacher on the dowel game, explaining that, while there were many possible ways to complete the game, she would be demonstrating the quickest, most efficient way. The teacher was instructed to learn the goal of the game and the rules of the game at first, and to try later to understand the specific steps. The game was demonstrated nonverbally so that no linguistic information and game descriptions would be imparted to teachers, who were expected to develop their own method of

verbally explaining the game to the child. After indicating a grasp of the game, the teacher then demonstrated it for the experimenter. The experimenter pointed out errors that directly violated the rules of the game (i.e., stacking a larger disc over a smaller disc, moving more than one disc at a time) by saying, "You've made a mistake. Please start over." The teacher was required to perform the game perfectly three times before attempting to teach it to the child. The most efficient way to complete the game incorporated fifteen steps, and the game was learned by all teachers within ten minutes. After learning the game, the teachers were told that the child would have a copy of the dowel game, and that they themselves might find it easier to teach the game if they made each move as it was being taught. Next, the card recognition game was explained to the teachers, who were told that they would have to describe what they saw on a card so that the child could pick a matching card out of a group of four cards that were very similar to one another.

Before the teacher called the child on the telephone, s/he was told that, in general, people find it easier to interact with others and teach them things if they can form a mental picture of their appearance. Teachers were then given a picture of a child who was the same sex and approximately the same age as the child they would be teaching, and they were told that it was the child whom they would instruct. The teacher then called the child and taught first the dowel game followed by the card recognition game. The teacher spoke into a tape recorder so that the instructions could be recorded, and a tape recorder was used in the room with the child in order to capture the dialogue between teacher and child.

As the teacher gave instructions for the dowel game to the child, each move the child made was recorded by one experimenter, while each move the teacher made was recorded by the other experimenter. The record was made by assigning each disc a number, known only to the experimenters, and drawing each move on paper as it was made. In addition, the experimenter working with the child recorded the total amount of time the dowel game was played, and whether the child gave up or tried to finish the game. The game was terminated either when the child had successfully completed it, when the child said s/he didn't want to play anymore, or when 20 minutes had elapsed, whichever came first.

After the dowel game ended, the experimenter working with the teacher then provided, in turn, each of the cards to be described in the card recognition game, with the order of presentation determined by a latin square. The set of four cards from which a correct match had to be chosen was aligned for each child in the same order. In order to control for position effects, the correct card appeared once in each of the four

possible positions. The experimenter working with the child recorded the card chosen in response to each of the teacher's descriptions.[1]

At the conclusion of the interaction, the teacher-subjects rated the child's competence and appearance, and they were then fully debriefed. All understood why the deception regarding the identity of the photographed child was necessary to test the hypotheses under investigation, and all agreed not to reveal this information to others who might subsequently participate. The children were asked if they wanted to play the dowel game again with the experimenter in order to alleviate any frustration they may have had during the telephone play.

Dependent Measures

Teacher linguistic behaviors. Tape recordings and verbatim transcripts of the dialogue between each child and teacher were used to examine linguistic differences in the instructions given to baby- and maturefaced children. Fifteen measures of linguistic behavior that DePaulo and Coleman (1986) had found to differentiate speech addressed to children and adults were extracted from the transcripts of the teacher's instructions. A factor analysis on these measures by DePaulo and Coleman had yielded four separate factors with high internal consistency, which they labeled Clarifying, Simplifying, Timing, and Attention Maintenance. This a priori factor structure was employed in the present study rather than an indigenously generated structure both because of its proven validity and also because of the the small ratio of subjects to variables in the present study.

Clarifying consisted of total time of interaction, total number of words uttered by the teacher, number of sentences, and number of thought repetitions (exact, partial, or paraphrased restatement of a thought or direction). Simplifying consisted of the commonness of the adult vocabulary (a count of the number of the first 100 words of adult speech which were among the top 500 most common words according to Thorndike and Lorge, 1952), the number of pronouns and verbs in the first 100 words, the number of nouns in the first 100 words (scored in a negative direction), and the average pre-verb length for each of the first 20 sentences (also scored in a negative direction). Timing consisted of speech rate (number of words uttered by the teacher divided by total time, scored in a negative direction) and average pause length (length of each pause of at least 2 s divided by the total number of pauses of at least 2 s). A score of 0 was given to teachers who had no pauses of at least 2 s. Attention Maintenance was measured by the number of times the child's name was used, the number of questions asked of the child, the number of no verb sentences in the first

20 sentences of adult speech, and the average sentence length (total words uttered by the teacher divided by the number of sentences, scored in a negative direction).

Several of the foregoing measures were extracted with the aid of a personal computer and/or tape recordings of the dialogue which displayed running time in seconds: number of words, number of times name used, number of questions, average sentence length, and rate. Pause lengths and the number of pauses of at least 2 s were taken from a taped, representative sample of teacher speech (see below), which was played on a tape recorder that displayed tape running time in seconds. The remaining linguistic measures were extracted by a rater whose reliability was checked by comparing the judgments of a second rater for a subset of the data.

Teacher paralinguistic behaviors. In order to examine paralinguistic differences in the instructions given to baby- and maturefaced children, a representative sample of three 15 s clips was taken from the tapes containing only the teachers' speech. Each tape was advanced one minute, at which time 15 s of speech was spliced onto a new tape. The tape was then advanced another minute to excerpt the second 15 s of speech and likewise for the third 15 s excerpt. Each of the three 15 s segments was directly segued into one 45 s segment, with a 10 s break left at the end of each set of clips. The tapes were spliced in a random order.

In return for partial course credit, twelve untrained judges (six male, six female) rated on 7-point scales the teachers' intonation (monotone/changing) and pitch (high/low). They also made more global ratings of the teachers' speech style (sophisticated/not sophisticated; talked down to/did not talk down to; talks to the child like a baby/talks to the child like an adult). The babytalk measure was always presented last so that it would not influence the other ratings, while the other measures were rated in one of two orders.[2]

Child performance. Success on the dowel game was assessed by the number of rule violations, the number of steps that the student matched correctly to the teacher's instructions, and the number of times the student did not explicitly follow the teacher's instructions. Success on the card recognition game ..as assessed by the number of cards correctly chosen (out of four).

Teacher perceptions of the child's competence. Teachers rated the child's competence on four 7-point, bipolar scales. These were presented in one of two orders, and they assessed perceptions of the amount of sim-

plification in instructions that had been required and perceptions of the child's ability to follow the instructions given, to answer the phone and relay simple messages, and to understand complicated directions. After completing the competence measures, teachers rated on 7-point scales the child's facial maturity (babyfaced/maturefaced), attractiveness (very attractive/very unattractive), and they estimated the child's age in years and months.

Results

Each of the dependent measures was subjected to a 2 (Sex of Adult) × 2 (Sex of Child) × 2 (Facial Maturity of Child) between-groups analysis of variance. Correlational analyses were also performed to test specific hypotheses.

Manipulation Checks

As expected, children for whom maturefaced photos were provided were rated as more maturefaced ($M = 4.40$) than those for whom babyfaced photos were provided ($M = 3.14$), $F(1, 21) = 5.57$, $p = .03$, while maturefaced and babyfaced children did not differ in perceived attractiveness ($Ms = 2.00$ and 2.29 for maturefaced and babyfaced photos, respectively, $F < 1$). Children believed to be maturefaced and babyfaced also did not differ in perceived age ($Ms = 56.87$ months and 55.93 months for children assigned maturefaced and babyfaced photos, respectively) or in actual age ($Ms = 48.93$ and 49.71 months for children assigned maturefaced and babyfaced photos, respectively), both $Fs < 1$.[3]

Teacher Linguistic Behaviors

The reliability of the linguistic measures, as assessed by interrater agreement for that portion of the data coded by two judges, proved acceptably high, averaging .84. Therefore, indices of Clarification, Simplification, Attention Maintenance, and Timing, matching those identified by DePaulo and Coleman (1986), were constructed by z-scoring all of the measures that comprised each a priori factor, reversing signs when appropriate, and then computing the mean of the z-scored measures. The babyface and matureface means for each of these indices are presented in Table 1.

Clarification and Simplification indices achieved acceptable levels of internal consistency (coefficient alpha = .76 for each index), and the ba-

TABLE 1

Speech Directed toward Babyfaced and Maturefaced Children

Teacher behavior	Child facial maturity	
	Babyface	Matureface
Linguistic babytalk composite	.63	−.71
Clarification	.09	−.04
Simplification	.13	−.14
Attention maintenance	.12	−.20
Timing	.29	−.33
Paralinguistic babytalk composite	.27	−.27
Global speech style	.12	−.12

byface and matureface means for each of these indices were in the predicted direction. However, the facial maturity effects were not significant, both $Fs < 1$. The index of Attention Maintenance did not achieve acceptable internal consistency (coefficient alpha = .50), and the facial maturity effect was not significant, although the means were in the predicted direction, $F < 1$.[4]

Although the Timing index did not achieve acceptable internal consistency (coefficient alpha = .04), the predicted facial maturity effect was marginally significant, $F(1, 20) = 3.88$, $p = .06$. Since this index was comprised of only two measures - rate and average pause length - separate analyses of variance were performed on each measure to determine which contributed to the overall trend. The results revealed a significant effect of facial maturity on the slowness of the teachers' speech ($Ms = .42$ and −.37 for babyfaced and maturefaced children, respectively), $F(1, 20) = 5.00$, $p = .04$, but no significant effect on average pause length ($Ms = .06$ and −.05 for babyfaced and maturefaced children, respectively), $F < 1$.

Since the single significant effect for speech rate could have occurred by chance, another, more conservative, test of the hypothesis was conducted by summing the four indices encompassing all measures to form an overall Linguistic Baby Talk Composite (coefficient alpha = .70). As shown in Table 1, this composite measure revealed significantly more baby talk to babyfaced than to maturefaced children, $F(1, 20) = 5.00$, $p = .04$. There were no significant effects involving adult or child sex on

any of the indices of linguistic behavior, although men ($M = .32$) showed a marginally significant tendency toward higher Clarification than women ($M = -.27$), $F(1, 20) = 3.97$, $p = .06$.

Teacher Paralinguistic Behaviors

High reliability was obtained for the paralinguistic measures rated from the taped excerpts by 12 judges, with alphas of .91 and .92 for pitch and intonation, respectively. The values for each measure were averaged across judges for subsequent analysis. Since pitch and intonation were highly correlated, $r(26) = .73$, a Paralinguistic Babytalk Composite was constructed by averaging the z-scored ratings of these two hallmark prosodic qualities of babytalk. Consistent with predictions, this composite variable revealed a marginally significant tendency for speech to babyfaced children to be higher in pitch and more variable in intonation than that to their maturefaced peers, $F(1, 20) = 3.24$, $p = .09$ (see Table 1). There was also a significant effect for adult sex, revealing higher pitch and more variable intonation in the speech of women than men ($Ms = .37$ and $-.42$ for women and men, respectively), $F(1, 20) = 6.50$, $p = .02$.

Global Ratings of Teacher Speech Style

Acceptable reliability was obtained for global speech style ratings by the 12 judges, with alphas of .80, .86, and .88 for the extent to which the teacher talked down to the child, used unsophisticated speech, or baby talk, respectively. The values for each of these three ratings were averaged across judges for subsequent analysis. Since the resultant measures were highly correlated, a composite was created by computing the mean of the z scores of the three global ratings (coefficient alpha = .89). Although, as shown in Table 1, the means were in the predicted direction, this trend was not significant, $F < 1$.

Teacher Perceptions of the Child's Competence

Teachers' ratings of the child's ability to follow complicated instructions, need for simplified instructions, ability to relay phone messages, and ability to follow the instructions that were given were significantly correlated, and these measures were therefore summed (after reversing need for simplification) to form a composite index of perceived competence (coefficient alpha = .84). This index failed to yield a significant effect of the child's perceived facial maturity, $F < 1$. However, it did reveal a mar-

ginally significant interaction between child sex and child facial maturity, $F(1, 21) = 3.68$, $p = .07$. Competence ratings were marginally higher for maturefaced boys ($M = 22.71$) than for babyfaced boys ($M = 18.00$), $t(11) = 1.90$, $p < .10$, whereas this trend was nonsignificantly reversed for girls ($Ms = 18.63$ and 20.25 for maturefaced and babyfaced girls, respectively, $t < 1$.[5]

Since maturefaced boys were perceived as somewhat more competent than the babyfaced, it may be that the effects of a babyface on babytalk were mediated by perceived competence. To investigate this possibility, zero order correlations between manipulated babyfaceness and baby talk were examined as well as partial correlations, controlling for perceived competence. The results provided no support for a mediational hypothesis. As shown in Table 2, the zero order correlations between babyfaceness and the Linguistic and Paralinguistic Babytalk Composites were no higher than the partial correlations.

Child Performance

The number of steps on the dowel task correctly matched to the teacher's instructions, the number of times directions were not followed (scored in a negative direction), and the number of rule violations (scored in a negative direction) were significantly correlated, and z scores of these measures were consequently averaged to form a composite index of dowel task performance (coefficient alpha $= .78$). The analysis of this index revealed no significant effect for facial maturity ($Ms = -.35$ and $.32$ for babyfaced and maturefaced, respectively), $F < 1$. The analysis of the number of correct responses on the card recognition task also revealed no sig-

TABLE 2

Correlations between Babyfaceness and Baby Talk Controlling for Perceived Competence

Babytalk measure	Boys ($n = 13$)		Girls ($n = 15$)	
	Zero	Partial	Zero	Partial
Linguistic composite	.42	.42	.45	.53
Paralinguistic composite	.22	.23	.36	.32

nificant effect for facial maturity (Ms = 2.14 and 1.60 for babyfaced and maturefaced, respectively), $F(1, 21)$ = 1.57, p = .22. Whereas performance was not affected by the facial maturity manipulation, evidence for the validity of the performance measures was provided by the finding that each was related to the child's actual age, $rs(27)$ = .33 and .44 for the dowel and card tasks, respectively, ps < .10 and .05.[6]

Card performance was related not only to age, but also to the Linguistic Babytalk Composite, $r(26)$ = .61, p < .001, revealing better performance among children who received higher levels of babytalk, as predicted, regardless of their experimental condition. This suggests that babyfaceness might have an indirect effect on card performance by virtue of its impact on linguistic babytalk, $r(26)$ = .45, p = .02. Although the mediational hypothesis could not be confirmed because the effect of facial maturity was itself not significant, $r(27)$ = .25, p = .19, it may be noted that this effect was reduced to zero when linguistic babytalk was statistically controlled, $r(25)$ = .02, p = .90.

Discussion

The results of the present study reveal that adults use more baby talk when instructing children who are portrayed as babyfaced than when instructing equally attractive children of the same age who are portrayed as maturefaced. This effect was manifested in linguistic indicators of baby talk, and it paralleled the differences in speech to children versus adults observed by DePaulo and Coleman (1986). The effect of a babyface was also evident in the paralinguistic indicators of higher pitch and more changing intonation in speech to babyfaced children.

Although both linguistic and paralinguistic measures differentiated speech to babyfaced and maturefaced children, global ratings of the teacher's speech style yielded no significant differences. This negative result may reflect the minimal information on which these ratings were based - three 15 second clips of the teacher's speech. While this was sufficient to pick up differences in pitch and intonation, more content may be required to affect global ratings of style like "unsophisticated," "talks down," and "babytalk."

Because children in the present study were randomly assigned to be perceived as babyfaced or maturefaced, it can be assumed that actual cognitive sophistication did not vary with facial maturity. *Perceived* competence, on the other hand, did vary with facial maturity, at least for boys. Like past research, which found higher competence judgments for ma-

turefaced children when only their photograph was presented, the present study found such an effect even after a telephone conversation with an average duration of 13 minutes. Maturefaced boys were rated as marginally more competent than babyfaced boys, despite equivalent task performance during this conversation. However, partial correlation analyses revealed that the effect of the facial maturity manipulation on babytalk was not mediated by these differences in perceived competence. A babyface elicited more baby talk from teachers regardless of their assessment of the child's competence. This finding parallels the results of DePaulo and Coleman (1986), who found that variations in children's linguistic and cognitive sophistication had no effect on the amount of baby talk they received.

Differences in the amount of baby talk to children who vary in facial babyishness even when their age, attractiveness, and perceived competence are equated suggests that a small approximation to the craniofacial qualities that distinguish infants from adults may in and of itself be sufficient to elicit this speech register. The differences in facial roundness, eye size, eyebrow thickness, and nose size of the babyfaced and maturefaced children in the present study had effects paralleling the much larger facial differences between children and adults. Of course the children in the present study were of an age when receipt of baby talk is common. Whether or not babyfaced adults would elicit more "secondary baby talk" than their maturefaced peers remains to be seen.

The tendency to respond to a babyish facial configuration with baby talk may have adaptive value, as suggested by the positive relationship between baby talk and children's performance on the card task. Whereas manipulated facial appearance was not powerful enough to affect performance, the use of linguistic babytalk, whatever its impetus, did seem to have an effect. Although the observed relationship was only correlational, it is unlikely that the causal influence went from performance to baby talk. For one thing, the measure of linguistic babytalk was based on the entire conversation, much of which preceded the card task. Second, the teachers did not know whether the child chose the correct card on each of the four trials, and they would therefore be unable to change their linguistic style in response to the child's performance. Finally, it would be difficult to explain how children who performed better would elicit more baby talk.

Additional research exploring the link between a babyface, baby talk, and performance would clearly be worthwhile as would research exploring communicative consequences of a babyface among adults. Any advantageous effect of baby talk to four-year-olds will not necessarily generalize to babyfaced older targets, who may perceive such speech as patronizing

(Caporael, Lukaszewski, & Culbertson, 1983; Ryan, Bourhis, & Knops, 1991).

Notes

1. After each game was completed, the children rated their enjoyment and their confidence in learning the next game. These measures will not be discussed further, since a ceiling effect resulted in no significant effects (70% of the children indicated the highest possible enjoyment and confidence).
2. They also rated the teacher's speech rate (fast/slow) and loudness (loud/soft). However, these measures will not be discussed because the former is redundant with the rate measure in the linguistic Timing factor, and there were no clear predictions for the latter.
3. The only other significant finding for the manipulation check variables was an unexpected interaction for perceived age between adult sex and child sex, $F(1, 21) = 7.78$, $p = .01$, which was qualified by a triple order interaction of adult sex, child sex, and child facial maturity, $F(1, 21) = 9.95$, $p = .005$. Whereas men and women rated maturefaced boys and girls similarly, men perceived babyfaced girls to be younger than women did and women perceived babyfaced boys to be younger than men did.
4. A more internally consistent version of the Attention Maintenance Index (alpha coefficient = .66) was created by dropping the measure with the lowest inter-item correlations, child's name use. However, this measure also failed to yield a significant effect of facial maturity ($Ms = .07$ and $-.09$ for baby and maturefaced children, respectively), $F < 1$.
5. There was also a significant interaction between adult sex and child sex, $F(1, 21) = 4.90$, $p = .04$, reflecting a same-sex chauvinism effect. Men tended to rate the competence of boys ($M = 21.67$) higher than that of girls ($M = 17.00$), $t(12) = 1.94$, $p < .10$, while women showed a nonsignificant trend in the opposite direction ($Ms = 21.88$ and 19.57 for women's ratings of girls and boys, respectively, $t = 1$).
6. Partial correlations were computed between facial maturity and task performance, controlling for age, to determine whether the effects of facial maturity would attain significance when age effects were partialled out. These partial correlations were not significant, both $ps > .20$, which is not surprising given that the facial maturity manipulation was unrelated to the child's age, $p > .50$.

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