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Preschoolers' Use of Eye Contact While Speaking: The Influence of Sex, Age, and Conversational Partner

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The influences of sex, age, and conversational partner (mother vs. stranger) on eye contact during verbalizations were examined in a longitudinal study of 33 children at 2 and 4 years of age. A free-play sample was obtained of each child interacting with mother and with a male or female experimenter. The amount of eye contact in conjunction with verbalization was analyzed. Significant main effects were found for sex (females engaged in a higher percent of eye contact than males) and conversational partner (more eye contact while speaking exhibited to experimenter than to mother). There was an interaction between age and conversational partner, in that mother received more and experimenter relatively less percent of eye contact during verbalizations as children got older. Notably, there was no main effect for age. These results revealed sex differences at an age (2–2 1/2 years) and in a context (free-play setting) not previously studied, demonstrating the robustness of the effect. Further, age findings seem indicative of unique developmental trends for eye contact during verbalizations for the ages between 2 and 4 years.

Eye contact is one of the most fundamental semilingual communicative behaviors employed by human beings (Wolff, 1963; Duncan, 1969; Robson, Pedersen, & Moss, 1969). It has been implicated in adults as a sign of liking (Kleinke, Meeker, & LaFong, 1974) and in influencing the reactions of people to each other (Imada & Hakel, 1977). Perhaps its most important function is that its use in a social situation unequivocally indicates that the speaker intends to make social contact with the listener

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(Goffman, 1963). Recent findings in the language acquisition literature point to the importance of considering eye contact not only as a primary nonverbal communicative behavior but also as a variable related to aspects of verbal communication. For example, in a study designed to test hypothesized differences between social speech in general (of which eye contact is one indication) and private speech, Furrow (1984) showed that the functions of language differ depending on whether or not a child is making eye contact during an utterance.

In the past, researchers have examined variables that might influence the development and expression of eye contact (Russo, 1975; Hittelman & Dickes, 1979; Muirhead & Goldman, 1979), though few have looked at these during vocalizations (Ashear & Snortum, 1971; Levine & Sutton-Smith, 1973). Sex, age, and situation have been most often studied. In the latter studies, sex differences have been shown from the earliest ages studied (4, 5, and 6 years), with females producing a greater percentage of vocalizations that were accompanied by eye contact than males (Ashear & Snortum, 1971; Levine & Sutton-Smith, 1973). Age trends have been evident as well. In a question-and-answer session with an unfamiliar adult female, the amount of eye contact increased with age from preschool until grade 5, where it took a significant drop that was maintained through grade 8 (Ashear & Snortum, 1971). A similar trend was apparent for children interacting with their peers (Levine & Sutton-Smith, 1973). In a conversational task, 4- to 6-year-old children made eye contact with about 30% of vocalizations. These percentages increased with age through adulthood, though a significant drop occurred for 10- to 12-year-olds.

These findings may be considered in conjunction with studies of eye contact in general, though the more general developments may or may not extend to eye contact while speaking. The latter point is illustrated in Ashear and Snortum (1971), who found no main effect for sex when examining eye contact while listening, though the difference was there while speaking. Sex differences in eye contact are evident in neonates 24 to 60 hours old, with female infants spending more time in, but showing no difference in the frequency of, eye contact (Hittelman & Dickes, 1979). This sex difference no longer obtains, however, in infants around 5 months of age (Lasky & Klein, 1979). Sex differences in children's eye contact generally seem to reappear in preschoolers (Ashear & Snortum, 1971), again with females exhibiting more eye contact than males. There is some question, however, regarding the age at which sex differences observed in neonates are again seen in children between kindergarten and grade 6; Russo (1975) did not find any significant sex differences in

kindergarten children interacting with peers. The differences were observed in grade 3 children, however, and the amount of eye contact increased steadily from kindergarten through grade 6. Consistent results have been obtained throughout adulthood, in that females exhibit more eye contact than males in verbal exchanges, with the amounts of eye contact being related to the age, sex, and proximity and relative position of the interacting adults (Muirhead & Goldman, 1979).

The importance of eye contact while verbalizing in understanding children's language use demands that more be known about its development and its influencing variables. In the present study, we examined eye contact coincident with verbalizations in 2- to 4-year-old children in a free-play situation. Its development and the existence of sex differences were explored, so that the following questions could be addressed: (1) Are previous findings of sex differences in the preschool years sufficiently robust to be found in a more unstructured situation, as opposed to structured conversational or specific task situations? (2) Do sex differences exist prior to the preschool years? Given that no sex differences on a general measure of eye contact were found at 5 months, there is some question about whether or not previous findings can be generalized downwards. (3) Are developmental trends evident in this period? Previous findings (Ashear & Snortum, 1971; Levine & Sutton-Smith, 1973) would suggest an increase in eye contact with age, though the absence of a monotonic increase from age 4 to adulthood leaves some doubt.

In addition to examining age and sex as variables, the relative amount of eye contact between children and their mothers or a stranger was examined.

METHOD

Subjects

Thirty-three children (21 male and 12 female) served as subjects. They were participants in a larger study of early development, carried out in Devonshire Parish, Bermuda. The larger study sampled all residents of the parish aged 2 years to 2 years 6 months, 60 children in total. The children in the present study are a random subsample of these children. Bermuda is a British dependency and its residents are predominantly unilingual English-speaking.

Procedure

The children were videotaped at 2 years to 2 years 6 months and again at 3 years 6 months to 4 years in free-play sessions with their

mother and then with either a male or a female experimenter.[2] The sessions were conducted in their own homes in a well-lighted area that was indicated by the mother to be a desirable play setting, usually the living room floor. The sessions were 15 minutes long for both the mother and the experimenter, 13 minutes of which were free play and task-free and the final 2 minutes of which involved the child in the task of packing up the materials and putting them away. A JVC SU-100 color camera and a JVC HR 22000 portable cassette recorder were utilized to record the sessions.

Informal interactions took place with the mother and child prior to taping. At this time the mother was informed of the session's format, with the experimenter emphasizing the importance of getting a sample of the child's everyday speech and that the mother need not do anything special to get the child to speak. Taping began when the child became willing to talk and interact, at which time the mother was handed a Fisher-Price "play family house" (cat. # 952; in the 3 years 6 months to 4 years session, for reasons unrelated to the purposes of this study, animals and vehicles from a Fisher-Price "play family farm" were added to those included in the "play family house") and was asked to play as usual with her child. When 13 minutes of mother-child play had elapsed, the mother was asked, "Would you have [child's name] put the toy back in the box?" and taping continued until the mother considered the task completed or for 2 minutes, whichever was shortest.

The mother was then asked not to participate while the experimenter played with the child, although she did remain in the room or in an adjacent area as a nonparticipant to avoid any anxiety response on the part of the child. The materials described above were used for this part of the session as well. Throughout the sessions the experimenter assumed the

[2]The male or female experimenter was randomly assigned to each session. Random assignment is theoretically defensible (we were not interested in sex of experimenter effects), though, in truth, it was done for practical, scheduling reasons. We nonetheless performed several analyses on the data to ensure that there were no confounding effects of experimenter's sex. The results of these multiple ANOVAs confirmed that the sex of the experimenter did not have any effect on children's use of eye contact, either as a main effect or in interaction with any other variable. These results do not rule out the possibility of other studies' finding effects of experimenter's sex, given that we employed only one male and one female experimenter. As Vlietstra and Manske (1981) noted, under these conditions differences (or, in our case, no differences) could be attributed to characteristics of the individual experimenters and not to their sex. Using two male and two female experimenters in a structured toy-play task, Vlietstra and Manske (1981) did find sex of experimenter effects in children's looks to adults, though these did not interact with the sex of the child.

role of a socially responsive and active participant in the child's activities. The child was primarily in control of the play and any utterances that occurred; the experimenter did not initiate play or verbal interactions unless silence of greater than 1 minute in duration occurred. After 13 minutes the experimenter initiated the child's putting away of the toys, and this continued for the final 2 minutes or until the task was completed.

Transcripts of the children's and adults' speech were made from the videotapes of the 2 years to 2 years 6 months and 3 years 6 months to 4 years sessions. All comprehensible and incomprehensible spontaneous child utterances (those that did not occur within 2 seconds after a question by an adult) were sampled for analysis. When an utterance was sequentially repeated, only the first two repetitions were included. An utterance was defined as a word or group of words that were spoken together with little hesitation between them. Words or groups of words were considered as separate utterances if any period of silence of more than 1 second occurred between them, if utterances were separated as breath groups (Vaissiere, 1983), or if prosodic and anaphoric quality considerations (cf. Menn & Boyce, 1982) led to the determination that they were separate utterances.

Whether or not eye contact was made in conjunction with each utterance was determined following the rules specified by Furrow (1984, p. 357). Those rules are an operationalization of the criteria that observers seem to be using when they judge eye contact to be associated with an utterance. The inclusion criterion is that eye contact is considered to be concomitant with an utterance if eye contact occurs during the child's production of an utterance or in the preceding or following 2 seconds. There are, however, three exclusion criteria. Eye contact is not considered to occur in conjunction with an utterance if (1) the eye contact was completely encompassed by another utterance, (2) the eye contact was made just after the utterance and was begun in conjunction with a subsequent utterance, and (3) the eye contact ceased before the beginning of the utterance and had been a continuation of a sustained eye contact from the previous utterance. In all other cases an utterance was considered not to be accompanied by eye contact.

RESULTS

Second-observer judgments of eye contact were made for 150 randomly selected utterances. The two observers agreed on 98.7% of observations. Cohen's Kappa (Cohen, 1968), which corrects for chance agreement, was .94.

The mean percentage of utterances with eye contact in each of the eight sex × age × conversational partner groupings are presented in Table I. A 2 × 2 × 2 mixed model ANOVA was computed on these percentages. Significant main effects for sex ($F(1, 31) = 4.68, p < .05$) and conversational partner ($F(1, 31) = 65.86, p < .001$) were obtained. Female children engaged in a higher percentage of eye contact than males ($x = 21.48$ vs. $x = 15.07$, respectively), while overall the children engaged in a higher percentage of eye contact with the experimenter/stranger than with the mother ($x = 25.23$ vs. $x = 11.24$, respectively). There was no main effect for age ($F(1, 31) = .56, p > .45$). A significant age X conversational partner interaction was obtained ($F(1, 31) = 5.67$, $p < .05$). As the children got older, the percentage of utterances accompanied by eye contact with mother increased (from 9.69 to 12.81%), while that with the experimenter/stranger decreased (from 28.52 to 22.08%).

DISCUSSION

Our results show that 2- to 4-year-old children's use of eye contact during verbalizations is influenced by sex and with whom the children are interacting. The sex effect, that girls engaged in a higher percentage of verbalizations with eye contact than their male peers, is consistent with findings for eye contact in general for neonates (Hittelman & Dickes, 1979), for preschoolers (Kleinke, Desautels, & Knapp, 1977), and for children in preschool through grade 8 (Ashear & Snortum, 1971). This finding was obtained despite the fact that we examined children in nonstructured, free-play interactions, while previous studies (Ashear & Snortum, 1971; Levine & Sutton-Smith, 1973) observed children in more constrained situations. Ours is the first study to examine these aspects of children's communicative behaviors at 2 years; it indicates that even if the

Table I. Mean Percent of Utterances with Eye Contact by Sex, Age, and Interactor

	Sex			
	Male		Female	
Age (years/months)	Mother	Experimenter	Mother	Experimenter
2/0–2/6	9.23	24.64	10.14	32.40
3/6–4/0	9.56	16.86	16.06	27.30

sex difference observed in neonates is not apparent at around 5 months of age (Lasky & Klein, 1979), it certainly is extant during verbalizations at the age of 2 years and remains relatively stable to 4 years of age. Russo (1975) did not find sex differences appearing until grade 3 (approximately 8 years of age), though she studied children under different conditions (e.g., in a more task-specific situation, using peer interactions, over various distances, and not specifically during verbalizations).

Various explanations for why young girls are more likely to make eye contact while speaking with an adult interactor are possible. A general explanation invoking the notion that girls are more sociable than boys would be inappropriate given Maccoby and Jacklin's (1974) review showing no empirical support for such a position. More specific hypotheses have been offered that can be used to explain the differences documented in this study. For example, the differences in eye contact may be indicative of differences in the functional uses of language by boys and girls. The girls may be engaged in more information-seeking contacts than the boys, which would be consistent with a position taken by Vlietstra and Manske (1981). Alternatively, the differences may be due to a propensity for female children generally to rely more than males on external interactive cues (Russo, 1975). Or adults may serve a different social-verbal role in contacts with male and with female children, which again could lead to these differences. The result is in agreement with the implication of previous findings indicating that mothers interact verbally and nonverbally in different ways in interactions with daughters and sons (Cherry & Lewis, 1976). Mothers use a higher ratio of social to referential speech and more eye contact with their daughters (Clarke-Stewart, 1973), and they provide girls with more affection and praise than they do boys (Endsley, Hutcherson, Garner, & Martin, 1979). Future research must examine the possible roles of these variables: An important contribution of the present study is that it shows both that sex differences are robust enough to be worthy of attention because of their appearances in various contexts, and that any explanation must account for differences in the early preschool years.

We found no significant age trends in the percentage of verbalizations accompanied by eye contact for children from 2 to 4 years. While there has not been a study of eye contact and verbalizations specifically at 2 years, previous studies have found that there is a steady increase to about 10 years of age in the percentage of eye contact both during verbalizations (Ashear & Snortum, 1971; Levine & Sutton-Smith, 1973) and overall (Russo, 1975), which would lead to the prediction of an increase in the age range we studied. One important difference between

this and other studies is that ours is the first longitudinal investigation of age trends. The cross-sectional results achieved by other studies may be indicative of a cohort effect for increasing eye contact. The results may, however, reflect important differences in socializing influences acting on the children in the early preschool years when compared with the late preschool and school years. At about 5 years of age children enter school, a more formal system of socialization than either the home or day care. This entering of the school system may be the effective agent for the increases observed in the previous studies. This hypothesis needs further investigation.

Our finding of a significant effect for conversational partner (mother vs. stranger/experimenter) for the percentage of eye contact accompanying verbalizations showed that children at both 2 and 4 years engaged in a higher percentage of eye contact with an experimenter than with the mother. This is consistent with the findings of Lasky and Klein (1979) that 5-month-olds spend more time in looking at a stranger than at their mothers. The effect occurs both at 2 and 4 years of age, but the age X conversational partner interaction shows that the older children exhibited proportionally more contact with mother compared with stranger than did the 2-year-olds.

Our finding for conversational partner emphasizes the importance of context in influencing use of eye contact while speaking, which was first shown by Levine and Sutton-Smith (1973) for changes in task. The finding that a child looked more to a stranger who by design "did not initiate play or verbal interactions" and therefore increased the necessity for eye contact to increase social contact is, in itself, no more surprising than Levine and Sutton-Smith's (1973) finding that more eye contact occurred in a conversational than in a construction task. However, the age X conversational partner interaction suggests that there is more to the effect than concurrent behavioral differences between listeners. The difference in eye contact between stranger and mother may be indicative of the relative novelty of the stranger compared with mother, with whom the child would have had considerably more contact. The novelty effect could also explain the decreased differences in percentage of eye contact while speaking exhibited to mother and stranger by the 4-year-olds: With increasing age the children's exposure to strangers increases as well, reducing novelty and thus the percentage of eye contact while speaking. There is also evidence that the primary caregiver and less familiar adults may play different roles in early language development (Tomasello, Farrar, & Dines, 1984), and the observed conversational partner effects may reflect the differing roles of the mother and stranger in the free-play

interactions. This may be, in part, due to the different informational needs of the interacting adults and the children's sensivity to these needs (Tomasello et al., 1984).

To summarize, this study has answered the empirical questions posed in the introduction. Sex differences in the percentage of verbalizations with eye contact can be found in unstructured situations, and they exist as early as age 2. The amount of gaze with vocalizations does not change from 2 to 4. These data provide a beginning to further research, which will choose among the possible explanations of these trends.

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