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by

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Abstract

THE DEVELOPMENT OF TURN TAKING IN
CHILDREN'S CONVERSATIONS

by

Linda Madison Levey

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The development of turn taking in children's conversations was studied in the context of communicative competence and social cognition. The ability to coordinate the smooth exchange of speaker/listener turns was linked theoretically to children's perspective taking and the ability to infer another's intentions. Evidence from developmental studies of children's ability to adapt their verbal messages to the informational needs of listeners and from developmental research in nonverbal communication suggested that the regulation of conversational turns was a developmental task related to children's knowledge and instrumental use of turn signals.

Measures of these signals were from studies of adult communication and included speaker and listener nonverbal and verbal behaviors.

Ages chosen for study corresponded to ages normally associated with preoperational, concrete operational, and

formal operational thought. Nonverbal signals, except touch, and listener verbal behaviors were expected to increase between kindergarteners, third-, and sixth-graders.

Other factors in the design were sex, communicative context, and for the nonverbal measures, role as speaker or listener. Based on previous findings, gaze aversion was the only measure expected to differ between sexes. Communicative context, a source of unexplained variability among adult studies, was controlled in the present study by having each dyad engage in two conversations differing in degree of structure. Role was expected to interact with communicative context and grade.

Children's violations of the turn-taking convention were measured by two types of errors, simultaneous speaking turns and simultaneous listening turns. These measures were regarded as indices of communicative competence and were expected to decrease with age, occur more often in structured conversations than in unstructured, and be negatively related to the display of turn signals.

Subjects were 30 previously acquainted, same sex dyads. Both conversations were videotaped in a single session at the children's schools during school hours. After establishing the reliability of the measures, a team

of adults coded the behaviors from the videotapes with the aid of transcripts. The first twelve speaking turns from each conversation constituted a coded segment.

Developmental differences occurred for gesticulations and head nods and, in the structured conversation, for gaze aversion and forward leans. Mean variances tended to be large and, along with small ranges and high numbers of zero scores, contributed to a lack of significance for other variables. Contrary to expectations, girls averted their gaze more than boys, and age was not a factor in girls' gaze behavior. The sexes differed in the lengths of their conversations. Longer conversations for girls were associated with higher scores on several measures, although girls did not commit more turn-taking errors than boys. The effects of communicative context revealed that more speaking turn errors and interruptions occurred in the structured conversation than in the unstructured, despite more turn signals being displayed in the structured conversation. This finding raised the question of the function of the turn signals. Role was a significant factor for four behaviors, and interactions of role and communicative context with grade and sex were found. Only one type of error, simultaneous listening turns, decreased with age and only in the structured conversation. No negative correlations occurred between

turn signals and error measures, again leading to questions concerning the function of the turn signals and validity of the error measures.

Intraclass correlation of the dependent measures revealed patterns of congruence between and within communicative contexts and roles for several measures.

Results were discussed in terms of methodological and conceptual problems, particularly the adequacy of the external variable approach in understanding turn taking. The relationship of the results to those for adults and implications for future research were also mentioned.

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Mrs. Robert Lentfer prepared the typed manuscript.

My family provided me the fortitude that any doctoral candidate must surely have to endure.

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CHAPTER I

INTRODUCTION

Children's communicative competence is one of the major approaches to studying the development of social cognition, yet the role of nonverbal communication in the total interpersonal communication process, which is widely recognized in social psychological, sociological, and anthropological studies of adult communication, has been relatively unexplored in children. Research with children has focused on the communication of verbal messages, particularly with regard to how children, as encoders, adapt their communications to the informational requirements of their listener. The impetus for this research is attributable largely to Piaget's (1926) investigation of the relationship between the thought and language of the child. In that study Piaget readily conceded neglect of the role of nonverbal factors in communication. He was impressed, though, by how well young children understood each other in action-oriented conversations which were characterized as lacking explicit reasoning and as being

> accompanied by gestures, by demonstration with the finger and not with words . . .

> Were it not entirely outside the scope of this study, the connexion should also be established between these "acted" conversations and the language by gesture and mime--language in movement, one might say--which is, after all, the real social language of the child. (p. 94)

More recently, Higgins (1976) observed that the study of children's communicative competence is severely restricted by the overwhelming reliance on verbal measures. Alternative measures of communicative competence, such as code switching, turn taking, alternation and co-occurrence rules, and sequencing rules, have not been considered. The study of the turn-taking mechanism in children's conversations is the aim of the present research.

Turn taking in face-to-face conversation is the communication mechanism by which participants manage the exchange of speaker and listener roles. Wiemann and Knapp (1975) defined it as "the phenomenon by which one interactant stops talking and another starts in a smooth, synchronized manner" (p. 75). Goffman (1959) placed the concept in a social context.

> In any society, whenever the physical possibility of spoken interaction exists, it seems that a system of practices, conventions, and procedural rules comes into play which functions as a means of guiding and organizing the flow of messages. (p. 226)

Duncan (1973) sought the "signals . . . which serve to organize and to direct the stream of communication; and

rules . . . which govern the appropriate display of these signals by one participant and response to them by the other" (p. 29).

The theoretical rationale for studying turn taking developmentally is based on its rule-governed nature and the assumption that knowledge of these rules is not present at birth and must therefore be acquired in the course of children's transactions with their social world. As will be shown, empirical evidence from developmental studies of children's verbal communicative competence and from studies of children's encoding and decoding of nonverbal behavior suggests that turn taking is a developmental phenomenon.

The following questions have guided the design of this research:

1. Which verbal and nonverbal behaviors function as turn signals in children's conversations and what is their interrelationship?
2. What qualitative and quantitative changes occur in the display of turn-taking behaviors with age?
3. What is the effect of the communicative context on turn taking?
4. Are there sex differences in conversational turn taking?

5. How is the display of turn signals in children's conversations related to communicative competence, which is operationally defined in terms of smooth exchanges in the speaker and listener roles?

Rationale for the Study

Conceptually, turn taking in adult communication is regarded as a culturally determined rule-governed process in which both verbal and nonverbal behaviors are associated with the smooth exchange of speaker/listener roles in face-to-face conversation. Failure of the dyadic unit to achieve a smooth exchange is regarded as evidence of a breakdown in the turn-taking mechanism.

The most comprehensive work on turn taking in terms of the number of behaviors studied was done by Duncan (1972; 1973), Wiemann (1973), and Wiemann and Knapp (1975). Others looked only at a small number of behaviors or only at speech events. That nonspeech events are important components of the regulation of conversation has been demonstrated by Dittman (1972), Duncan (1972; 1973), Jaffe and Feldstein (1970), Kendon (1967; 1970; 1972), Knapp, Hart, Friedrich, and Schulman (1973), Scheflen (1964), Wiemann and Knapp (1975), and Wiemann (Note 2).

The observance of turn-taking rules defines an important aspect of the social organization of a group

and is also a measure of an individual's communicative competence within that group. Wiemann (1977) summarized five regulatory principles of face-to-face interaction which sociologists and anthropologists have used as a key to understanding the dynamics of social organization.

> Of the many rules at work in encounters, those that seem more pertinent to communicative competence are: (1) interruptions of the speaker are not permitted . . .; (2) one person talks at a time . . .; (3) speaker turns must interchange . . .; (4) frequent and lengthy pauses should be avoided . . .; and (5) an actor in an encounter must be perceived as devoting full attention to the encounter. . . . (p. 9)

Turn taking as a major factor in adults' communicative competence was demonstrated by Wiemann (1977). He found that the manipulation of the interaction management skill level of an actress in a filmed conversation with another actress was a significant factor in judges' ratings of her communicative competence, $F(3,235) = 76.15$, $p < 001$. Interaction management skill was operationalized by varying the number of turn-taking errors per minute committed by the actress in four otherwise identical films (0, 1, 3, and 5). In a post hoc analysis all four means differed significantly from one another. These findings support the rationale of the present study for extending the work on communicative competence in children to include the regulation of speaker/listener turns.

How children acquire knowledge of their social environment, including knowledge of other persons, has been approached, as noted earlier, through studies of verbal communication. In this approach one assumption has been that effective interpersonal communication is based on the participants' abilities to coordinate speaker and listener perspectives in the verbal channel of communication. Children's ability to adapt their verbally encoded messages to the informational needs of a listener, or decoder, has been hypothesized by Piaget (1926) to be related to a decline in their egocentric thinking and the concomitant development of concrete operational structures. As these develop they enable children to recognize that their listeners may have thoughts, feelings, perceptions, or intentions which differ from their own and that in order to make themselves understood they must accommodate their messages to those requirements. Prior to this development, children's language in interpersonal situations is characterized by ambiguity in specifying to what or to whom they are referring, by an inability to give clear explanations or to recount correctly the order of events in a story, and by their thinking that they understand one another when in fact they do not. For Piaget (1926) this last point typifies the nature of egocentric thought and describes the child in the role of listener as

well as speaker. That lack of perspective taking is related to ineffective verbal encoding has been confirmed by Flavell, Botkin, Fry, Wright, and Jarvis (1968), Krauss and Glucksberg (1969), Krauss and Rotter (1968), Bearison and Cassel (1975), and Rubin (1972) and to ineffective verbal decoding by Asher (1976) and Bearison and Levey (1977).

The study of children's conversational turn taking offers the opportunity to examine a process by which children acquire knowledge of their social environment through other than purely verbal channels of communication by extending the concept of communicative competence to include nonverbal behaviors. Turn-taking behaviors are both verbal and nonverbal, and there is mounting evidence that children do not use nonverbal behavior to communicate in the same way adults use it, nor do they respond to it as adults do, and that, in fact, the display and recognition of nonverbal behavior changes with age. Dittman (1972) found that younger children in conversation with an adult gave fewer listener responses (defined as back channel communication) than older children and adults. An increase in listener responses associated with grade among first, third, and fifth graders was observed. Dittman speculated that the relative infrequency of the response in the younger children was an indication that

either the children were not keeping up with the conversation or they were unaware of the need to provide feedback to the speaker. That they may not discriminate the nonverbal cues in others associated with requests for feedback may be the factor contributing to these results as the study by Peterson, Danner, and Flavell (1972) showed.

There is other evidence that nonverbal communication has developmental features. Studies of children's encoding of nonverbal communication have found that increased complexity of meaning is expressed in children's hand and arm movements across the age span of four to eighteen years (Jancovic, Devoe, & Wiener, 1975); that in four- and five-year-olds increased kinesic activity is associated with the termination of utterances, but not, as is usual in adults, with their initiation (DeLong, 1974); that in conversation with an adult neither a three-year-old nor a four-year-old regularly accompanied their speaking turns with nonverbal signals (Hurlich, 1973); that there is a progression with age among two-, three-, and four-year-olds in the manifestation of an upper smile in social situations (Cheyne, 1976); that fifth graders were able to produce more accurate facial expressions upon request than kindergarteners (Odom & Lemond, 1972); and that intra-individual pauses, a measure of conversational congruence presumed to be related to socialization, were more

congruent in dyads of older subjects (6.4 - 7.2 years old) than in dyads of younger subjects (5.4 - 6.1 years old) (Welkowitz, Cariffe, & Feldstein, 1976).

Studies of children's decoding of nonverbal communication have found age-related changes in their ability to infer attitudes of adults from still photographs of body postures (Fineberg, 1975); in their ability to discriminate facial expressions of emotion from photographs (Odom & Lemond, 1972); in their ability to judge the emotional content of speech (McCluskey, Albas, Niemi, Cuevas, & Ferrer, 1975); and in the salience of the visual channel in interpersonal communication compared to verbal and vocal channels (Bugental, Kaswan, Love, & Fox, 1970).

These studies represent a modest beginning to the developmental investigation of nonverbal communication. Only one of them (Welkowitz et al., 1976), however, looked at nonverbal communication within the context of a naturalistic conversation between children, and none of them studied more than one nonverbal channel of behavior. The design of the present study remedies both these shortcomings by having pairs of children speak to one another on prescribed topics in a naturalistic setting--their own public schools--and by the inclusion of several nonverbal behaviors as well as verbal measures.

The Turn Taking Mechanism

Duncan (1972) posited three rules which operate during successful exchanges of the speaking turn. The first rule is that speakers, when they are concluding their remarks, give turn-yielding cues to their listeners, such as the cessation of a hand gesticulation. He found that the greater the number of turn-yielding cues emitted by a speaker, the greater the likelihood the listener would attempt to take the speaking turn and the lesser the likelihood of both participants simultaneously claiming the speaking turn, which would be an unsuccessful exchange. Duncan reported that when no yielding cues were displayed there occurred 12 simultaneous speaking turns and no smooth exchanges, but when one or more yielding cues were displayed there were 81 smooth exchanges and only 7 simultaneous speaking turns. Wiemann and Knapp (1975) also studied gesticulations but found that the incidence of this behavior in their subjects was too small to draw meaningful conclusions. Their results indicated that turn-yielding behaviors were in the verbal categories of declaratives, interrogative requests, and buffers and in the nonverbal category of other-directed gaze. These behaviors, with some modification in the other-directed gaze category, were incorporated into this research and expected to be used by children in the same way.

The second rule of turn taking is that speakers are able to maintain their turn, even though exhibiting turn-yielding cues, by using an attempt-suppressing signal, the upraised hand. Duncan found that listeners rarely attempted to take their turn in the face of this attempt-suppressing signal. The subjects in the Wiemann and Knapp research did not use this signal.

The third rule of turn taking concerns the display of back channel communication by the listener to indicate that he or she does not wish to claim the speaking turn, although the speaker may be giving turn-yielding cues. Examples of back channel communication are head nods and vocalizations such as "uh huh," "yeh," and "I see." As noted above, a developmental study of back channel communication by Dittman (1972) indicated that there was an increase in this variety of listener response in children with age. It was expected that these results would be replicated.

A fourth rule, turn requesting, was posited by Wiemann and Knapp (1975). It acknowledges the fact that listeners are not entirely at the mercy of long winded speakers. If operating according to rule, speakers should yield the floor when listeners give turn-requesting cues, such as steadily increasing other-directed gaze. Since they found that listeners used more behaviors and used

them more often, they concluded that the burden of responsibility for initiating exchanges in the speaker/ listener role in normal conversation falls upon the listener. Duncan (1972), in contrast, found the speakers' turn-yielding cues were sufficient to account for most successful exchanges.

This discrepancy points out one problem in the comparability of studies on turn taking. The problem is related to the fact that behaviors associated with turn taking are descriptive rather than prescriptive, as noted by Wiemann and Knapp (1975) and tend to vary between studies partly as a function of the transcription system of the investigator. Since an assumption of this research is that children use nonverbal behavior differently than adults, by incorporating the behaviors found to be of relevance in adult studies, behaviors characteristically used by children but not adults may inadvertantly be missed. One such behavior, touch, was included here although its function as a turn signal for adults has not been established. However, there is evidence from studies of status and power relationships in adults that touch functions to regulate and define the relationship between individuals (see Henley, 1977 for a review of this research) and may operate similarly in children's interpersonal relations. Touch was used by kindergarten-aged children

in the pilot study to this research often enough to suggest that it may be a regulatory behaivor in turn taking. The fact that touching in adults' conversations was not evidenced may reflect a taboo on this behavior in Western society. Therefore, touching may play a greater role in younger children's conversations than in those of older children. This hypothesis was tested in the present research.

A related problem is that the adult turn-taking paradigm basically assumes subjects are rule abiding and empirical evidence is sought to confirm these rules. Theoretically, the failure of interactants in a conversation to observe turn-taking rules results in an unsuccessful exchange in which there is a lack of turn-taking synchronization. It was noted above that one form of behavior that characterizes an unsuccessful exchange is when both parties simultaneously claim the speaking turn. Another form of unsuccessful exchange is when both parties simultaneously reject the speaking turn, that is, both claim the listening turn, which results in silence. Duncan (1972) did not find any incidents of this latter behavior. Wiemann and Knapp (1975), on the other hand, did not look at unsuccessful exchanges in the turn-taking mechanism, assuming that their subjects were rule abiding. They inferred that the occurrence of a behavior which fell

within one of their coding categories was prima facie evidence of its regulatory function. In this study the question was asked whether children as young as kindergarten age are, in fact, rule abiding. When they managed the successful exchange of speaking turns was it because they either gave or perceived one or more of the behavioral cues associated with successful turn taking in adults? When they failed to effect a smooth exchange was it because no turn-taking cues were displayed? To answer the latter question measures of turn-taking errors having to do with unsuccessful exchanges of the speaking turn were developed. These measures were expected to be affected by the independent variables to be described and to be related to children's failure to display nonverbal turn-taking behaviors.

The problem of comparability between studies of turn-taking is not only compounded by the variability in the transcription systems of investigators (that is, the behaviors actually coded) but by the small number of subjects studied and by differences in the conversational contexts. Duncan (1972), for example, analyzed only two conversations, one between a prospective client and a clinical therapist and the other between two therapists. Wiemann (Note 2) and Wiemann and Knapp (1975) sampled exchanges from nine conversations between same sex and

mixed sex dyads of college students who were previously acquainted. Topics discussed were of mutual interest to the members of the dyads. The present study expands the number of dyads observed in order to test developmental hypotheses cross-sectionally and further controls and manipulates the conversational topics.

Factors Affecting Turn Taking

Age levels chosen for study in this research correspond with three of Piaget's major periods of intellectual development (preoperational, concrete operational, and formal operational) in which children's social cognitive development in verbal communicative contexts, as well as in role playing (Flavell et al., 1968; Selman, 1971), social inference (Flavell, 1974), and moral development (Kohlberg, 1969) has been found to undergo qualitative changes in perspective taking.

It is recognized that several investigators of verbal communication in children (Menig-Peterson, 1975; Shatz and Gelman, 1973; Starr, Note 1) found evidence of perspective taking at ages when Piagetian theory would characterize their mode of thought as preoperational and which would suggest the possibility that knowledge of turn-taking rules might be a developmentally earlier achievement than hypothesized. This prediction is not

defensible, however. First, Piaget (1926) did not say that preoperational children are incapable of socially adapting their communication, just that they often did not do so in their spontaneous conversations with one another. He found that the ratio of egocentric language to the sum total of spoken language in a month's observation of two subjects, ages 6.5, was .44 and .47, which, of course, is less than half of their verbal production. Secondly, Flavell's (1970) production deficiency hypothesis may account to some extent for age discrepancies among studies on interpersonal communication since children probably have verbal and nonverbal skills that they do not apply instrumentally in communication situations. Peterson et al. (1972), for example, found that neither four-year-olds nor seven-year-olds responded appropriately to nonverbal requests (facial gestures) from an adult for more information needed by the adult to understand the child's communication. In contrast, seven-year-olds gave additional information when the adult verbally implied that more information was needed, and both four- and seven-year-olds were responsive under an explicit verbal request condition. By studying children as young as kindergarten in the present research, it was believed that the age at which children's full cognizance of turn taking is established was not exceeded.

Predictions of sex differences in conversational turn taking were derived from several sources, including studies of verbal communication in children, social development in children, and nonverbal communication in adults and children. According to Maccoby and Jacklin (1974), the findings from research on verbal ability, which included studies of verbal communication as well as studies employing measures of vocabulary, reading comprehension, anagrams, etc., tended to favor girls. But none of the verbal communication studies cited found sex differences (Baldwin, McFarlane, & Garvey, 1971; Cohen & Klein, 1968; Hoemann, 1972; and Koen, 1966). Main effects of sex were also not obtained by Asher (1976), Asher and Parke (1975), Bearison and Cassel (1975), Bearison and Levey (1977), Chandler, Greenspan, and Barenboim (1974), Heider (1971), and Whitehurst (1976). Only Bearison and Cassel (1975) and Heider (1971) reported interaction effects. On the basis of these findings alone no sex differences in conversational turn taking would be predicted. But, as noted earlier, it is an assumption of this study that the skills which constitute interpersonal communicative competence cannot be defined solely in terms of verbal communicative competence.

Turning to studies of social development in children, the belief that girls are more "social" than boys

might have led to a hypothesis favoring girls in the social graces of conversation. However, as Maccoby and Jacklin (1974) concluded, the belief in the socialibility of girls is unfounded. Their review revealed that

1. the sexes are equally interested in social (as compared with nonsocial) stimuli, and equally able to learn by modeling;
2. in childhood, girls are not more dependent on their caretakers than boys, not more afraid to stay alone, not more highly motivated to achieve social rewards, and not more responsive to social reinforcement;
3. girls do not spend more time interacting with playmates than boys and at certain ages the opposite is true; and
4. the sexes do not differ in empathy.

This latter finding is particularly salient in light of the high correlation between judges' ratings of empathy and communicative competence reported by Wiemann (1977). Again, on the basis of these findings no sex differences in turn-taking behavior were predicted.

Sex differences also were not predicted from studies of nonverbal communication in children, since five of the six studies which looked at the effects of sex found none (Buck, 1973; Brooks, Brandt, & Wiener, 1969;

Bugental, Kaswan, Love, & Fox, 1970; Fineberg, 1975; Sokoloff, 1975). The sixth study (Kashinsky & Wiener, 1969) found a three-way intereaction of sex, social class, and total linear trend in children's responses to tone of voice in verbally presented instructions. The linear trend over trials differed significantly only for lower and middle class girls, but not for lower and middle class boys.

There are, however, significant findings in the literature on nonverbal communication in adults which would suggest a hypothesis of sex differences in turn taking. In same sex pairs Exline and his collaborators (reported in Duncan, 1969) found that women made more eye contact than men in aversive interactions and in positively toned interactions. Similar results were reported by Mehrabian (1969) who found that men showed greater variability in their eye contact with their addressees than women. Since gaze direction is an important component of turn taking according to Duncan (1973) and Wiemann and Knapp (1975), and since it is not known at what ages these sex-typed differences appear, a tenable hypothesis was that visual interaction is more pronounced in older girls than in younger girls. This would result in an interaction of sex with age if the size of the effect is

greater than the expected increases in this behavior with age in both sexes.

In addition to age and sex as factors which can influence children's adherence to turn-taking rules, communicative context was held to be an important input variable. Although none of the studies of turn taking in adults manipulated the communicative context, differences between them in the behaviors found to serve as turn signals may have been due to this factor. In Duncan's (1973) study, the two conversations--one an intake interview between a patient and therapist and the other a discussion between therapists--did, in effect, differ in context because of the nature of the relationships among dyad members, but the results of the two conversations were combined in the analysis. Wiemann and Knapp (1975), although they controlled the relationship between subjects, did not systematically manipulate the topics of conversation in their dyads of previously acquainted college students. Looking at differences in turn signals across studies, then, gesticulations played a greater role in the turn mechanism in the Duncan study than in the Wiemann and Knapp study, and the display of postural shifts, which were not studied by Duncan, differed between the Wiemann and Knapp study and a study by Kendon (1972). Wiemann and Knapp attributed these behavioral differences to a

contextual factor, the relationship between members of the dyadic units, which, in effect, defined the conversations that transpired. In the present study these relationships were controlled by using same sex pairs of previously acquainted children while the topics of conversation were manipulated. The pilot study to this research revealed differences within dyads when the children engaged in conversations on two topics proposed by the experimenter. One topic was more structured and competitive than the other, which was a less structured attempt to have the interactants learn something new about one another. Using the same communicative contexts in this research, it was hypothesized that there would be differences in the display of turn signals between the two contexts and that smoother exchanges would be less frequent in the structured conversation.

Design of the Study

The study was designed to answer empirical and theoretical questions concerning children's use of regulatory nonverbal and verbal behaviors in their conversations with one another. Empirically, it was not known whether children as young as kindergarten age encode turn signals in the same way as adults. The question was asked whether behaviors which function as regulatory turn

signals in adult conversation are present in the repertoire of children and to what extent. Further, it was recognized that children's display of the behaviors considered to be turn signals in adults' conversations is not prima facie evidence of their regulatory role in children's conversations, since it is not known whether children as young as kindergarten age abide by adult rules of social encounters. Theoretically, knowledge of these rules is related to communicative competence which, in turn, is seen as a function of the ability to take perspectives other than one's own.

Since perspective taking is believed to be a developmental phenomenon, it was hypothesized that the display of turn-taking behaviors would be affected by changes in the grade levels under study. Sex, communicative context, and the role of an individual as either speaker or listener were regarded as other independent factors which would influence the display of turn signals.

Dependent measures were derived from the categories of turn signals used by Wiemann and Knapp (1975) and from children's errors in effecting the smooth exchange of speaking turns. Turn-related behaviors were classified as 1. nonverbal (gaze aversion, gesticulations, forward leans, backward leans, head nods, and touch), 2. listener verbal (back channel communications and interruptions),

and 3. speaker verbal (declaratives, questions, and buffers). These behaviors comprised the signals for turn yielding, turn requesting, and back channel communication. Measures of turn-taking errors were included in the design to address questions concerning the function of observed behaviors by studying the correlation of errors with turn signals, as well as how errors vary as a function of the independent factors.

The design of the study is shown in Table 1. There were six groups of subjects formed by the combination of three grade levels (kindergarten, third, and sixth) and two sexes. Within each group there were five dyads, or ten children. Each dyad performed in two communicative contexts (unstructured and structured), and in each dyad the individuals took the speaker and listener roles an equal number of times. The six nonverbal behaviors were analyzed within the framework of this four-factor design. Role was not a factor, however, in the analysis of the remaining variables, which were analyzed by a three-factor design consisting of grade, sex, and communicative context.

Specific hypotheses tested for the four-factor and three-factor designs are summarized in Tables 2 and 3 and discussed below.

Table 1

Design of the Study

Between Subject Factors: Grade, Sex	Within Subject Factors: Communicative Context, Role			
	Unstructured		Structured	
	Speaker	Listener	Speaker	Listener
Kindergarten				
Male	G_1	G_1	G_1	G_1
Female	G_2	G_2	G_2	G_2
Third				
Male	G_3	G_3	G_3	G_3
Female	G_4	G_4	G_4	G_4
Sixth				
Male	G_5	G_5	G_5	G_5
Female	G_6	G_6	G_6	G_6

Note. G = Group; n = 5 dyads for each group.

Questions concerning the interrelationship of the verbal and nonverbal turn-taking behaviors and their relationship to the indices of communicative competence, the error measures, were addressed by means of correlational analysis. The hypothesis tested was that the display of turn-yielding behaviors, back channel communication, and turn-requesting behavior is negatively related

Table 2

Summary of Hypotheses

Four-Factor Design

Nonverbal Behaviors	Grade[a]	Sex[b]	Communicative Context (CC)[c]	Role[d]	CC X Role	Grade X Role
Gaze Aversion	K<3<6	M>F	A>B	S>L	S A>B L A=B	S K<3<6 L K=3=6
Gesticulation	K<3<6	M=F	A>B	S>L	S A>B L A=B	S K<3<6 L K=3=6
Forward Leans	K<3<6	M=F	A>B	S>L	S A>B L A=B	S K<3<6 L K=3=6
Backward Leans	K<3<6	M=F	A>B	S>L	S A>B L A=B	S K<3<6 L K=3=6
Head Nods	K<3<6	M=F	A>B	S<L	S A=B L A<B	S K=3=6 L K<3<6
Touch	K>3>6	M=F	A≠B	S≠L	-----	-------

[a]Grade: K=Kindergarten; 3=third grade; 6=sixth grade

[b]Sex: M=Male; F=Female

[c]Communicative Context: A=Unstructured; B=Structured

[d]Role: S=Speaker; L=Listener

Table 3

Summary of Hypotheses

Three-Factor Design

	Grade	Sex	Communicative Context
Listener Verbal Behaviors			
Back Channel	K<3<6	M=F	A>B
Interruptions	K=3=6	M=F	A<B
Speaker Verbal Behaviors			
Declarations	K=3=6	M=F	A<B
Questions	K=3=6	M=F	A>B
Buffers	K=3=6	M=F	A=B
SST Errors	K>3>6	M=F	A<B
SLT Errors	K>3>6	M=F	A<B
Elapsed Time	K=3=6	M=F	A=B

to errors. No specific hypotheses were formulated concerning interrelationships in the corpus of turn behaviors because Duncan (1973) found "no unique combination of cues . . . to comprise a signal" (p. 43).

Specific Hypotheses

Developmental Effects

It was hypothesized that there would be developmental, or age-related, differences for the nonverbal categories, for listener verbal behaviors and for error measures, whereas no such predictions were made for speaker verbal behaviors or elapsed time. Of the nonverbal measures, all but touch were expected to increase with age. However, since each behavior was associated more with one role than the other, age-related changes were considered more likely to occur in the associated role than in the nonassociated role. For example, gesticulations and head nods had been reported (Jancovic et al., 1975; Dittman, 1972) to increase with age over the span included in the present study. However, gesticulations were associated with speaker behavior in the Jancovic et al. (1975) study and head nods were only looked at for listeners in the Dittman (1972) study. There was no reason to expect that gesticulations by listeners or head nods by speakers would increase with age. Similarly, forward leans,

backward leans, and gaze aversion were identified more with the speaker role than with the listener role in Wiemann and Knapp's (1975) study of adults' conversations. Although developmental changes might occur in these behaviors irrespective of role, an interaction hypothesis seemed plausible for each. Touch, on the other hand, has been described as having a regulatory function in adult interaction, but has not been linked specifically with either speaker or listener roles. The present study explored the possible interaction of grade and role for touch, predicting that touch scores between groups would decrease with age.

A developmental hypothesis was postulated for only one of the two listener verbal behaviors; back channel communication was expected to increase with age, which would replicate Dittman's (1972) findings.

For the second listener behavior, interruptions, it was reasoned at first that they would decline with age, since older children would know better than younger children that interruptions are socially unacceptable. In this sense, interruptions are regarded negatively. However, the status accorded by Wiemann and Knapp (1975) to interruptions is that of a socially accepted rule of face-to-face interaction by virtue of their being a signal for turn requesting. The conditions under which the

turn-requesting rule applies, though, were not clearly specified by Wiemann and Knapp. After what length of time is a listener justified in interrupting the speaker? Unless this limit can be specified, which is an interesting question but beyond the scope of this study, there is no reason to expect turn-requesting behavior to change simply as a function of age. The rule of face-to-face interaction that turns must exchange has to be accompanied by norms of acceptable turn lengths beyond which the turn-requesting rule may be applied.

A developmental hypothesis for interruptions was also not justified in the present study because it would have been inconsistent to predict, on one hand, that interruptions, in the negative sense, and turn-taking errors decrease with age while, on the other hand, predicting that turn-taking errors decrease when there is an increase in the display of turn signals, if interruptions are regarded as turn-requesting signals.

Developmental changes in the commission of turn-taking errors were expected to be reflected in successively lower means for both types of errors as age increased. Lower error scores for older children would indicate that in their conversations speaking turns were exchanging more smoothly than in the conversation of younger children.

Sex Effects

The only specific hypotheses concerning the effect of sex on the dependent measures were for gaze aversion measures. Since adult females reportedly gaze more in both positively and negatively toned interactions, male gaze aversion scores in the present study were expected to be higher than those for females across communicative contexts. It was further hypothesized that grade and sex would interact for gaze aversion with older females averting their gaze less than younger females, while for males, due to their greater overall variability, no mean differences would exist. This prediction also was based on findings of sex-typed differences in gaze for adults, cited earlier.

Effects of Communicative Context

Communicative context was hypothesized to effect all measures of turn-taking behavior and error. The demands of the two communicative contexts were such that in one, the structured conversation, egocentric forms of communicative behavior were more likely to prevail for all participants than socialized forms, whereas in the unstructured conversation the reverse was true. Stated differently, children in the structured context, which was aversive in nature, were expected to be less rule abiding

than in the unstructured encounter in which nothing was at stake. By this reasoning children would give fewer turn signals in the structured conversation than in the unstructured, have less back channel communication and more turn-requesting, and commit more errors.

Again, since the nonverbal behaviors, except touch, are associated more with one role than the other, interactions of communicative context and role were also considered likely. In cases where an act is primarily identified as speaker turn-yielding behavior, such as a gesticulation, speakers' scores were expected to be higher in the unstructured than in the structured conversation, whereas listener scores between conversations would be similar. For the one nonverbal behavior more closely associated with listeners, head nods, higher listener scores were predicted in the unstructured than in the structured conversation, but no difference between conversations was expected for speakers.

Following the same reasoning, verbal back channel communication by the listener was expected to be higher in the unstructured communicative context than in the structured context, and interruptions were expected to be higher in the structured context than in the unstructured.

The speaker verbal behavior, questions, was expected to be higher in the unstructured conversation,

which invited the children to learn something new about one another, than in the structured conversation, which challenged the children to give reasons why they and not their partners should win a mutually prized object.

Role Effects

Main effects of role, although hypothesized, are of lesser interest than the interactions of role and grade and role and communicative context. The overall effects of role are less important than the interactions because they can only reveal what is already known to some degree for adults. Each nonverbal behavior, with the exception of touch, has been found in adults to be a signal for turn-yielding, turn-requesting, or back channel communication, and therefore associated, by definition, with either the speaking or the listening role; only speakers can give turn-yielding signals, and only listeners can request the turn or communicate in the back channel. In contrast, interactions will indicate whether speakers and listeners use the nonverbal behaviors differentially in the three age groups and two communicative contexts. The interaction hypotheses were elaborated in the sections on developmental effects and effects of communicative context and are not repeated in this section.

CHAPTER II

METHOD

Subjects

Thirty same sex dyads, five of each sex at three grade levels (kindergarten, third, and sixth) were participants in the study. The main criterion for the selection of the dyads was that the children be classmates of the same sex who, in their teacher's judgment, were compatible with one another. A further criterion was that the children had to be at the appropriate grade level for their age. The school system's cutoff date for kindergarten entrance was November 30th, so all kindergarteners were between the ages of 5.5 and 6.5 when the study was done (May/June 1977), third graders were between 8.5 and 9.5 and sixth graders were between 11.5 and 12.5. Subjects were from two schools in a predominantly middle class suburb in New Jersey, an elementary school housing grades K-3 and a middle school housing grades 5-8. Parental permission notices from the principal of each school were sent home explaining the general purpose of the study and the amount of time involved. Subjects were chosen from the pool of those children wishing to be in the study and whose parents did not object (see Appendix).

Facilities and Equipment

The conversations were videotaped in an unused room in the children's respective schools. In the elementary school the room was an empty classroom with a cloak room, and in the middle school it was a small vestibule. Neither room was ideal in being free of distractions, interruptions, and outside noises, but had the advantage of being a naturalistic, familiar setting. Each room was equipped with two chairs for the children, placed at a comfortable distance apart from one another and in line with a video camera mounted on a tripod about 5 feet away. The video tape recorder was hidden behind a teacher's desk in one setting and behind a screen in the other. Students from a high school class in video production, which provided the equipment, served as crew. A chair for the investigator was placed diagonally from the children's chairs, out of the line of the camera. Microphones were placed as unobtrusively as possible near the children.

Materials for the Structured Conversation

Materials for the structured conversation, in which the children vied for a mutually prized object, were sets of mounted pictures taken from a popular merchandising catalogue. There were two considerations in selecting the pictures; one was that the items or group of items

depicted be highly valued by the children, and the second was that they fit neatly on 6" x 9" construction paper. The experimenter, using her experience with children of the ages and sexes involved in the study as a guide, made up three sets of pictures, each set containing six pictures. Set 1, for girls in kindergarten and third grade, contained pictures of a Winnie-the-Pooh record player, a kitten, a child-sized typewriter, a girl's bicycle, a Barbie doll with accessory beauty salon, and a four-piece, child-sized kitchen. Set 2, for boys in kindergarten and third grade, contained a football, a set of drums, a G.I. Joe with accessory helicopter, motorcycle and land vehicle, a boy's bicycle, a child-sized work bench outfitted with tools, and a drag strip speedway outfit. Set 3, for sixth-grade boys and girls, consisted of an air hockey table, a ten-speed bicycle, a stereo phonograph with speakers, a pool table, binoculars, and a color television set.

Procedure in Videosessions

The videosessions took place over a one month period in the Spring, 1977. Before a videosession each child was asked in private to choose the three items he or she would most like to have from one of the sets described above. The children then chose seats, which they were free

to move to a comfortable distance apart, as long as they both stayed within the camera's field. The investigator chatted with the children, asked them their names and birthdays, gave them a brief explanation of the purpose of the study, and answered questions. Directions for the conversations were standard and given orally. The order of presentation of the two conversations was counterbalanced between dyads.

Directions for the unstructured conversation were:

> I'd like you both to take a few minutes to get to know each other a little better. I know you are both in (teacher's name) class, but I'm sure there are some new things you can learn about one another. Try to learn something new about one another that you didn't know before.

Directions for the structured conversation were:

> You both chose (item) as one of the things you would most like to have. (Show them the picture.) Now I'd like you to imagine that you could win this (item) as a prize. But there's only one of them. Only one of you can win the prize. Try to convince each other that you, and not your partner, should be the one to win the (item).

The item was one that both children had preselected from the set of pictures. If more than one item in common was chosen, the investigator decided which one to use. Only one dyad had to be disqualified and replaced in the sample because they did not choose a picture in common.

Conversations were limited to five minutes, but were terminated earlier at the discretion of the experimenter after at least twelve exchanges in the speaking turn

transpired or at the request of the children. In the latter case, if the conversation did not last the minimal length of twelve speaking turns the dyad would have been replaced in the sample, but no dyad had to be replaced for this reason.

Units of Analysis

The speaking turn was the basic unit of analysis. A speaking turn began when a member of the dyad claimed it. The first one to initiate the conversation was said to have the first speaking turn. Subsequent claims could, by definition, only be made by the listener, since a speaker could not logically succeed him/herself as speaker. Back channel communication by the listener did not constitute a claim on the speaking turn, nor did interruptions, which were unsuccessful attempts by the listener to gain the speaking turn. The coding and scoring criteria for these two behavioral categories are elaborated below. There were 720 speaking turns in the study.

The coded segment of conversation was a larger unit of analysis. For each conversation the coded segment consisted of twelve speaking turns, which meant that each interactant held the speaking turn six times. There were 60 coded segments of conversation, 2 for each dyad in the sample.

The dyad was another unit of analysis. The dyadic unit was comprised of two children among whom the roles of speaker and listener interchanged. In scoring the nonverbal behaviors described below, each category had a listener score and a speaker score which combined the scores of both interactants. In this sense the method of scoring the nonverbal categories was dyadic and not based on the individual. Inferences drawn from statistical analyses of these behaviors were limited to the dyad.

Reliability of Ratings

The verbal and nonverbal behavioral categories used in the present study were selected, as mentioned, because of the role they have been found to play in studies of conversational turn taking in adults (Wiemann & Knapp, 1975; Duncan, 1973), or, as in the case of touch, because of its possible role in children's turn taking. Although the behavioral categories of Wiemann and Knapp (1975) formed the major part of the corpus of behaviors studied here, their coding criteria required elaboration and refinement in order to achieve reliability, and their coding procedures were modified for efficiency and economy. Reliability of judges' ratings for verbal and nonverbal behaviors in this study were accomplished by the method described here.

Nonverbal Behaviors and Speaking Turns

Coders. In the Fall of 1977 six coders, three male and three female, were recruited at the University of Iowa. All were students, except one female who was a graduate. One female did not continue in the study after the middle of the semester when she left school. Of the five remaining, one male and one female were available in the Spring, 1978, to complete the reliability ratings. At that time, two additional male coders, both graduate students, joined the coding team.

Facilities and Equipment. Facilities of the Department of Television and Drama at the University were used in the Fall 1977. In the Spring 1978 the Medical Media Department of the Veterans' Administration Hospital in Iowa City made available its video equipment and a room.

The nonverbal behavioral categories and speaking turns were transcribed from the videotapes onto an 8-channel Rustrak 292-8 event recorder which produced a running record of coded events on type WEE chart paper. The event recorder was equipped with a 60 RPM motor and a #12 gear assembly to drive the chart paper at the rate of 8 seconds per inch. Each channel, when actuated, deflected a stylus pen on the pressure sensitive paper. The actuators were push button devices mounted in pairs

on wooden dowels, 7/8" in diameter, and wired through a step-down transformer to reduce potential shock hazard. The actuators were initially standard doorbell buttons, similar to those used by Wiemann. However, they proved to be unreliable and were replaced with more sensitive switches which were easier to depress. Mounting the switches on wooden dowels also made them easier to operate and eliminated some wiring problems. With the dowel held in both hands, coders operated the pushbuttons by using a finger on their left and right hands for the left and right buttons, respectively. Wiemann's coders held an unmounted doorbell in each hand.

Procedure. The general procedure for establishing reliability was to have all nonverbal categories and speaking turns coded by all judges for a selection of subjects' conversations from three dyads. (A fourth dyad was added when no instances of touching behavior were observed in the first three.) Conversations for training and reliability rating were chosen to represent the independent variables under study: sex, grade level, and communicative context. Although it would have been desirable to train the coders on dyads that were not part of the study sample, this was not possible. Three dyads were from the study sample, the fourth was an extra pair.

At an orientation meeting with the coders the general purpose of the study was explained, but not the hypotheses to be tested. Coders were told the grade levels of the children, the nature of the two conversational tasks, descriptions of the coding categories, and how the behaviors were to be transcribed on the event recorder. A videotaped conversation was shown to give the flavor of the tasks, but was not coded.

During subsequent sessions, which lasted up to two hours and at which a minimum of two coders plus the experimenter were present, the elaboration of coding categories took place, along with practice in coding. Much discussion took place, and the tapes were replayed as many times as needed until consensus among the judges was reached on the criteria for coding each behavioral category. Instances and noninstances of the behaviors were recognized. The criteria are presented in the next section of the chapter.

For the actual coding of events each coder was assigned two channels on the event recorder, one to code the behavior for the subject appearing on the left of the monitor screen and one for the subject on the right side. An early attempt was made to begin coding at the start of the fifth speaking turn, but this being too difficult, the procedure was changed so that coding commenced with

the first speaker and was terminated after at least twelve speaking turns. It should be noted that the chart paper on the event recorder could not be rewound and played over; therefore, once the recorder was turned on, neither it nor the videotape were stopped or interrupted until the termination point in the conversation was reached. Another note is that the videotape recorder and the event recorder operated independently. In future research of this type the possibility of synchronizing them should be explored. This would allow greater flexibility in coding, especially if the videotape recorder were equipped with slow motion playback.

The coding of nonverbal behavior for the four conversations was completed by four judges and the experimenter in the Spring, 1978. Two of the original group of judges were not available at that time and were replaced by two new male graduate students. The ratings of these four coders were used to establish intrarater reliability. The procedure during these sessions was essentially the same as in the Fall, except that there were no lengthy discussions concerning criteria for coding and typed transcripts of the conversations were available to read before and during, if desired, the preview of the videotape. As before, the coders previewed a conversation for the particular category to be coded before actually

coding it and were allowed any questions for clarification. In view of her possible role as substitute coder, the experimenter emphasized that the coding was a matter of judgment within the guidelines set down. Therefore, she did not attempt to arbitrate or decide the codability of ambiguous events. The criteria for each category were considered not subject to change unless reliable ratings could not be established.

Individual Scoring Method for Reliability. The scoring method for reliability of the nonverbal behavioral categories and speaking turns differed from later scoring based on the dyadic unit. This was necessary because the dyadic method of scoring depended on the reliability of the speaking turn category which, as noted, was established at the same time and by the same procedural methods described above as the nonverbal categories.

The nonverbal behavioral categories and speaking turns were scored according to the ways in which they were recorded, either as frequencies of occurrence or as number of seconds duration (see Coding and Scoring section). The method of scoring each category was based upon the performance of the individual subjects in the dyad. That is, each child, irrespective of his or her role as speaker or listener, received a score for every

behavioral category from every judge. This method of scoring the reliability of ratings was valid because the objective was simply to ascertain that the judges were able to code the behavioral categories according to the prescribed criteria.

Results. The reliability of judges' ratings was derived from Eble's (1951) intraclass formula. The reliability coefficient for ratings is drawn from an analysis of variance model and is represented in the formula

$$r = \frac{MS_s - MS_e}{MS_s + (k-1)MS_e}$$

where MS_s = Mean square for subjects

MS_e = Mean square for error

k = Number of raters

$k-1$ = Degrees of freedom for raters

According to Eble (1951), when comparisons are to be made ultimately between single raw scores assigned to different subjects by different raters, as is the case in the present study, the reliability of individual ratings rather than group ratings is the appropriate choice. In this formulation, between-raters variance is not subtracted from the total sum of squares. However, including between-raters variance in the total sum of squares has the effect of somewhat lowering the reliability co-efficient.

Table 4 shows the reliability co-efficients for the nonverbal behavioral categories and speaking turns derived from an analysis of variance for each behavior. In each case the number of judges was five. The number of subjects in each analysis is shown in the table. When the number of subjects equalled six, the behavior was observed in the three dyads originally chosen for study. The fourth dyad was coded only for touch and only after no instances of touch were found in the original three dyads. When the number of subjects was less than six, fewer than three

Table 4

Intrarater Reliability of Ratings for Nonverbal Behaviors and Speaking Turns

Behavioral Category	Number of Subjects	Reliability Co-Efficient
Speaking Turns	6	.81
Gesticulations	6	.91
Gaze Aversions	6	.76
Forward Leans	4	.80
Backward Leans	2	.98
Head Nods	4	.97
Touch	2	.98

dyads were included in the analysis because the behavior was not observed in either member of the dyad. Had these dyads been included in the analyses the number of subjects would have equalled six for forward and backward leans and head nods, and eight for touch, and the resultant reliability co-efficients would have been higher. The co-efficients in Table 4, then, for forward and backward leans, head nods, and touch are conservative estimates of reliability.

Verbal Behaviors for Speakers

Reliability of ratings for the verbal behaviors for speakers was established by having two judges independently decide in which of the three verbal categories a speaking turn belonged: declarative statement, question, or buffer. Ratings of 612 of the 720 speaking turns from 51 of the 60 coded segments of conversation were made from the typed transcripts. The judges, one of whom was the experimenter, agreed on 583, or 95%, of the ratings. The remaining nine conversations, comprising 108 speaking turns were subsequently coded only by the experimenter.

The verbal behavioral categories for speakers were unchanged from those of Wiemann and Knapp (1975) who reported (personal communication) separate interrater reliabilities for each category of .93 for declarations, .97 for interrogative requests and .95 for buffers.

Coding and Scoring the Nonverbal Behavioral Categories and Speaking Turns

Coders

The four member team that completed the reliability of ratings for nonverbal behaviors and speaking turns coded the full sample of 60 conversations from 30 dyads in the Spring, 1978.

Facilities and Equipment

Facilities of the Medical Media Department of the Veterans' Administration Hospital in Iowa City were used for coding those behavioral categories which could be done right from the videotapes. The recording equipment was the same as that described in the section on reliability of ratings.

Procedure

Since there were more categories to be coded than could be accommodated at once on the event recorder, two runs (a run being defined as the playing through of the coded segment of conversation on the videotape) were made. On each run three nonverbal categories and the speaking turn category were coded. Four judges worked at one time on coding. Unlike the reliability procedure, each judge was assigned a different category, and, as before, coded

that category for both members of the dyad. Category assignments were rotated among judges for successive dyads.

Dyadic Scoring of Nonverbal Behaviors

A dyadic scoring method based on the dyadic unit described above was used to code the nonverbal behavioral categories. A dyadic score for each nonverbal behavioral category included a contribution by both subjects, since each subject held the speaker role six times and the listener role six times for any given coded segment of conversation. To obtain a dyadic score for a nonverbal behavioral category from the record of events, the speaking turn category was used to identify whether an instance of the nonverbal behavior was associated with the speaker or listener role. That is, every manifestation of a nonverbal behavior had to be located on the record of speaking turns, which explains why speaking turns were recorded on both runs.

Speaking Turns and Associated Measures

Speaking turns were recorded for several reasons. First, they identified the 12 exchanges in a conversation which comprised the coded segment and, as noted, the location of other behavioral categories with respect to them. For the 12 exchanges, each subject in the dyad assumed the speaking and the listening role 6 times, so

that there were a total of 12 speaker turns and 12 listener turns for the dyad. The coder recorded whoever was speaking at any given moment in the conversation. The listener was identified on the record as the nonspeaker; that is, the coder did not actually record anything for a listener.

Speaking turns were also recorded so that the elapsed time of the conversational segment being coded could be calculated. The elapsed time measure was the number of seconds of conversation over the 12 exchanges in speaking turns.

Turn-taking errors were also obtained from the record of speaking turns. A turn-taking error occurred when the smooth exchange of speaker/listener turns was disrupted. This happened either when both members of the dyad claimed the speaking turn simultaneously or when both members of the dyad rejected the speaking turn simultaneously, that is, both were silent. A simultaneous speaking turn (SST) error could occur in two ways:

1. S_1 is the speaker and S_2, the listener, begins speaking one second or more before S_1 concludes his/her turn.

For example, Cathy and Kathy, third graders, had the following exchange (conversation 6 - 3B) in which bracketed words were spoken simultaneously.

K: All right. So you already have a cat. Now I need [a cat].

C: [But I like] that one. I like that one.

2. Both S_1 and S_2 begin speaking simultaneously for at least one second and one of them relinquishes the floor, or, both begin speaking simultaneously and neither relinquishes the floor, in which case a verbal battle for floor dominance may ensue, as in the case of third graders Lisa and Stacey's conversation.

L: It's my brother's kitty.
[
S: I should . . .

L: I should get the kitten.
[repeated three times
S: I should get the prize.

L: . . . because I . . . because the kitten is mostly my brother's and I want a kitten all to myself.

A SST error did not involve the clear interruption of the speaker by the listener, in which case the speaker maintained the speaking role.

A simultaneous listening turn (SLT) error was scored when a silence of at least two seconds occurred in the conversation, regardless of who next claimed the speaker role. Any codable nonverbal behaviors occurring during the silence were credited to the corresponding

listener score. For purposes of analysis it was decided that if the correlation between the two types of errors was significant they would be combined to form a single turn-taking error score.

Nonverbal Behavioral Categories

Gaze aversion occurred when the individual being observed turned his/her head away from that perpendicular line which could be drawn between the faces of both members of the dyad when they were looking at one another. This line is sometimes referred to as the line of gaze. Although eye contact is often considered a necessary condition for establishing the line of gaze, the breech of eye contact without an accompanying movement of the head was not a sufficient criterion of gaze aversion, since reliable coding of eye contact of both members of the dyad from the videotape was difficult to achieve. On the other hand, head movements in which eye contact was not broken were coded in the category of head nods (defined below) rather than gaze aversion. In recording gaze aversion, the coder recorded the entire time the subject's head was averted from the line of gaze.

Gaze aversion scores were calculated separately for the speaking and listening roles. The speaker gaze aversion score was the percentage of time gaze aversion

occurred for speakers over the total elapsed time for the conversational segment. Similarly, the listener gaze aversion score was the percentage of time listeners engaged in gaze aversion. If a member of the dyad averted his or her gaze while changing roles, the gaze aversion score, which was a timed measure, was split between the two roles if the total incident exceeded 1.5 seconds. Of 71 occurrences of this phenomenon, 44 reflected changes from listener to speaker and 27 from speaker to listener. For gaze aversion of 1.5 seconds or less occurring at the moment of role exchange, the time was attributed to the listener score if the subject was changing roles from listener to speaker, and to the speaker score if the subject was changing from the speaker to the listener role.

Gesticulations were arm movements by the subject that involved his/her elbows or shoulders. Wrist or finger movements unaccompanied by a distinct movement in the elbows or shoulders were not coded. A gesticulation was either unilateral or bilateral. In a unilateral gesticulation the subject executed the movement with one arm while the other was at rest. A bilateral gesticulation was characterized by its symmetry and the simultaneous movement of both arms. The coder recorded each distinct gesticulation without regard to type as a single event. Arm movements that specifically served as self-adapters

were not coded. Self-adapters, as defined by Ekman and Friesan (1969), are behaviors which are not intrinsically related to speech, have no intent to communicate, occur out of the individual's awareness, and are usually not responded to by the other person in the dyad. Operationally defined, they include such self-directed movements as scratching or rubbing, smoothing, pulling or rearranging the hair or clothes, and covering the mouth to hide a giggle or laugh. An arm movement that resulted in touching the other members of the dyad was coded as a touch (defined below). Gesticulation scores were computed separately for the speaker and listener roles and were the respective sums of gesticulations over the coded segment of conversation.

Forward leans were movements by the subject away from what is commonly regarded as an upright seated position. According to Wiemann and Knapp (1975), a forward leaning angle is "when that plane defined by a line from the communicator's shoulders to his hips is away from the vertical plane, such that the communicator is bending forward at the waist" (p. 83). More precisely, a forward lean is also from the hips. The coder recorded each distinct movement by the subject from an upright position as a single event. A distinct forward lean from an already forward position was not coded. The subject

must have returned first to an upright position before another forward lean could be coded. Forward lean scores were tabulated from the coded segment of conversation for the speaker and listener roles separately and were the sum of this behavior for each role.

Backward leans were defined, coded, and scored similarly to forward leans, except that the subject leaned backward from the vertical plane. The backward lean might have involved the movement of the chair in which the subject was seated. In this case the perpendicularity of the subject's body to the seat of the chair was maintained, but the chair was tilted back from the vertical plane.

Head nods were the cyclical up and down movements of the head that occurred while the subject kept his or her head oriented in the direction of the other dyad member's face. The nod began when the individual either raised or lowered the head from the midline, then moved it in the opposite direction past the midline, and finally returned it to the midline. Each distinct cycle (either up-down-up-to-midline or down-up-down-to-midline) constituted a single event and was so recorded. Side-to-side head motion commonly associated with the verbal equivalent of "no" was not coded as a head nod. Speaker and listener head nod scores were computed as the respective frequencies of head nods over the coded segment of conversation.

Touch was physical contact between members of the dyad involving hands and head. It was attributed to and coded when a subject used either hands or head to effect contact with any part of the other dyad member. Other types of touches were observed (for example, legs) but were not included in this coding category. Contact must have been broken by either member of the pair before another touch could be coded. A touch in which the subject's arms bilaterally extended and the hands made simultaneous contact with the other was counted as a single touch. If an individual touched the other with both hand and head at any given moment, it was counted as two events. These events were recorded by the coder as closely together in time as possible, since two events cannot be recorded simultaneously for an individual within a single behavioral category. A head-to-head touch is commonly a mutual act and therefore was coded as a single event for both individuals, unless the act was clearly initiated by one member and avoided by the other. In the same way mutual touching with the hands was coded for both individuals, unless, again, one was clearly the initiator and the other shunned or avoided the contact. Touch scores, computed separately for the speaker and the listener roles, were the sum of the recorded touches within a conversational segment.

Coding and Scoring the Verbal Behavioral Categories

Unlike the nonverbal behaviors which were coded for both the speaker and the listener roles, the verbal behavioral categories applied to either the speaker or the listener role. The measures derived are still dyadic in that both subjects in conversation assumed the roles of speaker and listener. There were three verbal measures for the speaker and two for the listener role. All the verbal measures were coded by the experimenter from typed transcripts of the conversations, with the exception of interruptions which were coded from the record of speaking turns.

The verbal categories for the speaker encompass alternate ways in which the speakers concluded their turns. (a) A declaration was coded when a speaker ended his or her turn with a declarative statement. If the speaker ended the turn with a question directed toward the other member of the dyad, it was coded as (b) a question. The speaking turn ending with (c) a buffer was characterized by the use of a stereotyped word or phrase, such as "but uh," "you know," "or something," "um," "well," and "uh well," which left an unfinished quality to a speaker's remarks. The verbal categories for speakers are mutually exclusive and exhaustive; therefore, the 720 speaking turns, when coded, could be analyzed without further scoring.

The verbal categories for the listener were interruptions and back channel communication. Interruptions, a measure of turn requesting, were unsuccessful verbal attempts by the listener to gain the speaking role. An interruption was coded only if it occurred during a speaker's turn. The key distinction between an interruption and SST error is that an interruption was an unsuccessful venture to gain the speaking turn, while a SST error in which a listener began speaking before the speaker had concluded his or her remarks resulted in a successful take-over of the speaker role. That is, the listener-turned-speaker succeeded in dominating the floor by forcing the speaker to yield. An interruption was not counted as a speaking turn and any codable nonverbal behavior exhibited by the interruptor in conjunction with the interruption was coded and scored as listener behavior. Each interruption had a score value of one, and the sum of interruptions for both listeners over the coded segment of conversation was the interruption score.

Back channel communication consisted of verbalizations by the listener that did not make a claim on the speaking turn. Back channel communication, according to Dittman (1972), serves either as feedback to the speaker that the listener is keeping up with the conversation or as an aid to the listener's decoding. Short words

or phrases, such as "uh-hun," "yeh," and "I see," called reinforcers, were one form of back channel communication. Another form was completions, which were single words or a few words that finished the speaker's sentence, but did not constitute a claim by the listener on the speaking turn. Each reinforcer and completion received a score of one and their combined total for both members of the dyad in their role as listener was the back channel communication score.

Analysis of the Data

The analysis of the data was in three parts: description of the data; inferential analysis of the experimental designs; and a correlational analysis.

The descriptive part of the analysis included norms, standard deviations, ranges, and number of zero scores for each criterion measure in both communicative contexts and, where appropriate, for both roles.

Tests of hypotheses comprised the inferential analysis. Hypotheses concerning the effects of grade, sex, communicative context, and role were tested by means of analysis of variance and χ^2 tests. To analyze the six nonverbal behavioral measures a four-factor repeated measures design was used in which grade and sex, the between subject factors, were crossed with communicative

context and role, the within subject factors. Dyads were nested under the between subject factors. Separate tests were conducted on each nonverbal measure.

For the remaining dependent measures the three-factor nested design sufficed, since the measures were not repeated between roles. Grade and sex, the between subject factors, were crossed with communicative context, and dyads were nested under the between subject factors. Tested by analysis of variance were the two listener verbal behaviors (back channel communication and interruptions), the two error measures, elapsed time, and the speaker verbal measure of questions. Again, separate tests were done on each measure.

All three speaker verbal measures were not tested by analysis of variance because, as defined earlier, they were not independent of one another, their sum being 12 for any given coded segment of conversation. They formed an exhaustive and mutually exclusive classification of the ways in which speakers ended their remarks. Chi-square tests of the 720 speaking turns according to this tripartite classification scheme were done for each independent variable, grade, sex, and communicative context.

To test the hypothesis on the relation between turn-taking errors and the turn signals, a correlational

analysis was done between each error measure and the nonverbal and listener verbal categories, collapsed across grade and sex. This analysis was part of an intraclass correlation of all the dependent measures across grade and sex which was done in an exploratory effort to find patterns in the data.

CHAPTER III

RESULTS

Description of the Data

The aim in this part of the analysis was to look at the data for the study sample as a whole. For each criterion measure the mean, standard deviation, range, and number of zero scores are presented for the 30 dyads in the sample.

For the nonverbal category of gaze aversion, the extent of gaze aversion was included along with the percentage measure used in later inferential analyses. Extent of gaze aversion formed the numerator of percentage scores and was simply the amount of time, in seconds, that a speaker or listener averted his or her gaze during a coded segment of conversation. Although the extent and percentage scores were correlated, it was regarded as informative to show both in this section.

The two types of turn-taking errors, simultaneous speaking turns (SST) and simultaneous listening turns (SLT) were examined separately after it was found they were uncorrelated. The coefficient for the Spearman rank-order correlation was -.14 ($\underline{t}$ = 1.11, $CV_{\underline{t}(.95)}$ = 2.00).

Data for the unstructured and structured conversations are in Tables 5 and 6, respectively. Means are based on 30 dyadic scores for a coded segment of conversation which, to recall, was 12 speaking/listening turns. Characteristics of the data point to marked skewness in the distributions of most measures. There are large standard deviations relative to mean values, small ranges for certain measures, and several measures with large numbers of zero scores.

With the exception of listener gaze aversion in the unstructured context, the minimum value of the ranges was zero. The smallest range was for the listener verbal measure of interruptions in the unstructured conversation, with a value of one. Ranges of two were found for speaker backward leans, listener touch, and SST errors in the unstructured conversation. Measures with a range of three were SLT errors in the unstructured conversation and speaker backward leans, listener head nods, both listener verbal measures, and SLT errors in the structured conversation.

Zero scores were generally more common in the unstructured conversation than in the structured, the extreme case being the measure of interruptions for which 28 dyads had zero scores. Measures which did not follow this pattern were speaker forward leans, listener gaze

Table 5

Descriptive Statistics for Dependent Measures

in the Unstructured Conversation

Category of Behavior	Mean Score	Standard Deviation	Minimum Value	Maximum Value	Number of Zeroes
Nonverbal-Speakers					
Gaze Aversion-Extent	10.03	10.23	0	48.50	1
Gaze Aversion-%	.18	.13	0	.53	1
Gesticulation	7.63	6.53	0	26	3
Forward Lean	1.63	1.15	0	4	6
Backward Lean	.43	.62	0	2	19
Head Nod	1.03	1.37	0	5	16
Touch	.63	1.27	0	6	20
Nonverbal-Listeners					
Gaze Aversion-Extent	9.17	9.76	0.50	37.00	0
Gaze Aversion-%	.17	.15	.01	.54	0
Gesticulation	1.73	1.99	0	9	10
Forward Lean	.80	1.44	0	6	20
Backward Lean	.70	1.60	0	7	22
Head Nod	1.83	2.91	0	14	14
Touch	.20	.55	0	2	26

Table 5 (Continued)

Category of Behavior	Mean Score	Standard Deviation	Minimum Value	Maximum Value	Number of Zeroes
Verbal-Listeners					
Interruptions	.06	.25	0	1	28
Back Channel	.86	1.52	0	6	20
Errors					
SST	.40	.62	0	2	20
SLT	.90	1.06	0	3	14
Elapsed Time	53.26	29.01	19.50	130.50	--

Note. n = 30 dyads.

Table 6

Descriptive Statistics for Dependent Measures

in the Structured Conversation

Category of Behavior	Mean Score	Standard Deviation	Minimum Value	Maximum Value	Number of Zeroes
Nonverbal-Speakers					
Gaze Aversion-Extent	8.05	7.20	0	24.5	1
Gaze Aversion-%	.16	.15	0	.66	1
Gesticulation	12.03	9.82	0	43	1
Forward Lean	3.20	3.12	0	12	7
Backward Lean	.70	.98	0	3	17
Head Nod	1.80	2.35	0	9	14
Touch	1.70	2.92	0	11	15
Nonverbal-Listeners					
Gaze Aversion-Extent	5.51	5.00	0	17.0	2
Gaze Aversion-%	.12	.13	0	.56	2
Gesticulation	1.73	1.59	0	7	5
Forward Lean	.80	1.27	0	6	16
Backward Lean	.76	1.25	0	5	18
Head Nod	.60	.85	0	3	18
Touch	.53	1.43	0	7	24

Table 6 (Continued)

Category of Behavior	Mean Score	Standard Deviation	Minimum Value	Maximum Value	Number of Zeroes
Verbal-Listener					
Interruptions	.40	.77	0	3	22
Back Channel	.26	.69	0	3	25
Errors					
SST	.90	.99	0	4	12
SLT	.56	.89	0	3	19
Elapsed Time	49.65	27.30	10.0	158.0	--

Note. n = 30 dyads.

aversion, listener head nods, back channel communication and SLT errors which had a greater number of zero scores in the structured conversation than in the unstructured.

Inferential Analysis

Chi-Square Tests of Speaker Verbal Measures

The results of three χ^2 tests for grade, sex, and communicative context on the distribution of the three speaker verbal measures, declaratives, questions, and buffers supported the hypotheses. As expected, no differences between grades or between sexes were found in the way speakers ended their turns, and the differences between the unstructured and structured communicative contexts were as predicted for all three measures, $\chi^2(5) = 57.10$, $p<.05$. Table 7 shows that in the unstructured conversation there were fewer declaratives and more questions than in the structured conversation and no difference between conversations in the use of buffers.

Because the incidence of buffers was nearly identical (9%) in both communicative contexts, the distributions of declaratives and questions were dependent upon one another. To see whether there were any interactions of the independent factors which would not be evident from the separate χ^2 analyses, it was decided to test the measure of questions by analysis of variance

Table 7

Distribution of Verbal Turn Endings for Speakers, by Communicative Context

Communicative Context	Speaker Verbal Behavior					
	Declarative	Percentage	Question	Percentage	Buffer	Percentage
Unstructured	187	52	142	39	31	9
Structured	274	76	53	15	33	9

Note. n = 720 speaking turns.

using the three-factor design. Results are reported below.

Homogeneity of Variance

Before undertaking the analyses of variance, the assumption of homogeneity of variance for group means in the dependent variables was tested using the Hartley method (Winer, 1971). Several measures failed to meet this assumption and appropriate transformations were sought.

For the gaze aversion measure an arcsin transformation and weighted analysis were done. The arcsin transformation of the scores, which were proportions, was done to stabilize their variances. In addition to the need to stabilize the variances, the total lengths of time for coded segments of conversation, which comprised the denominators of the proportions, varied widely. In this case Snedecor and Cochran (1967) recommend assigning weights to the proportions in the angular scale by the formula:

$$w_{ijkl} = n_{ijkl}/p_{ijkl}q_{ijkl}$$

where w_{ijkl} is the weight of a single score

n_{ijkl} is the elapsed time of a particular conversation

p_{ijkl} is the proportion of time spent averting gaze to the elapsed time

q_{ijkl} is the proportion of time not spent averting gaze to the elapsed time

Homogeneity of variance was accomplished by this method for gaze aversion.

Again using the Hartley test for homogeneity of variance, the following measures were found to exceed the critical values (where the total number of observations equalled 60, F_{Max} = 1.93, p = .01 and where N = 40, F_{Max} = 2.73, p = .01): gesticulations, forward leans, backward leans, head nods, touch, and questions. Logarithmic transformations on these measures were successful in achieving homogeneity of variance. Because of the presence of zero scores, log(X + 1) was employed.

No transformations were made on measures of SST and SLT errors, back channel communication, interruptions, and elapsed time.

Developmental Effects

The results do not lend strong support to the developmental hypothesis of grade level differences in the display of turn-taking behavior. Only two of the nonverbal behaviors reached even moderate levels of significance; gesticulations, $F(2,24) = 2.90$, $p<.07$, and head nods, $F(2,24) = 2.65$, $p<.09$. None of the predicted interactions of grade and role were significant and the interaction of grade and sex for gaze aversion was not significant.

The mean scores for gesticulations were 3.70, 6.25, and 7.45 for kindergarten, third grade, and sixth grade, respectively. Post hoc comparisons of the means were significant for the kindergarten-sixth grade difference, $C.V._{Tukey,q_{.95}}(3,117) = 3.35$. Head nod means for kindergarten, third grade, and sixth grade were .63, 1.68, and 1.65, respectively, but none of the pairwise comparisons was significant.

Not predicted, but significant, were interactions of grade and communicative context for gaze aversion $F(2,24) = 3.57$, $p = .04$, and for forward leans $F(2,24) = 2.75$, $p.<09$ (see Figures 1 and 2). There was also a three-way interaction of grade, communicative and role for forward leans as seen in Figure 3, $F(2,24) = 4.49$, $p = .02$. The cell means for these interactions, shown in Tables 8, 9, and 10, indicate that the two-way

Table 8

Grade Differences in Means for Gaze Aversion, by Communicative Context

	Unstructured Conversation	Structured Conversation
Kindergarten	.16	.13
Third Grade	.15	.29
Sixth Grade	.16	.14

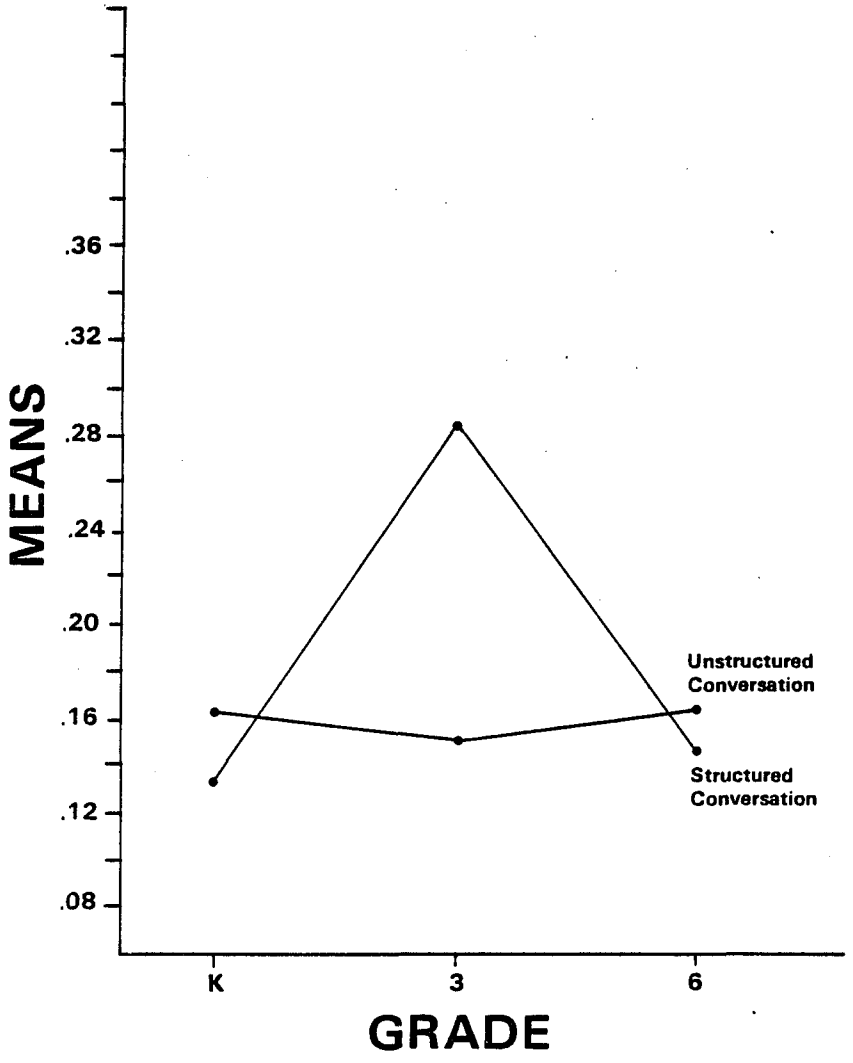


Figure 1: The effect of grade and communicative context on gaze aversion.

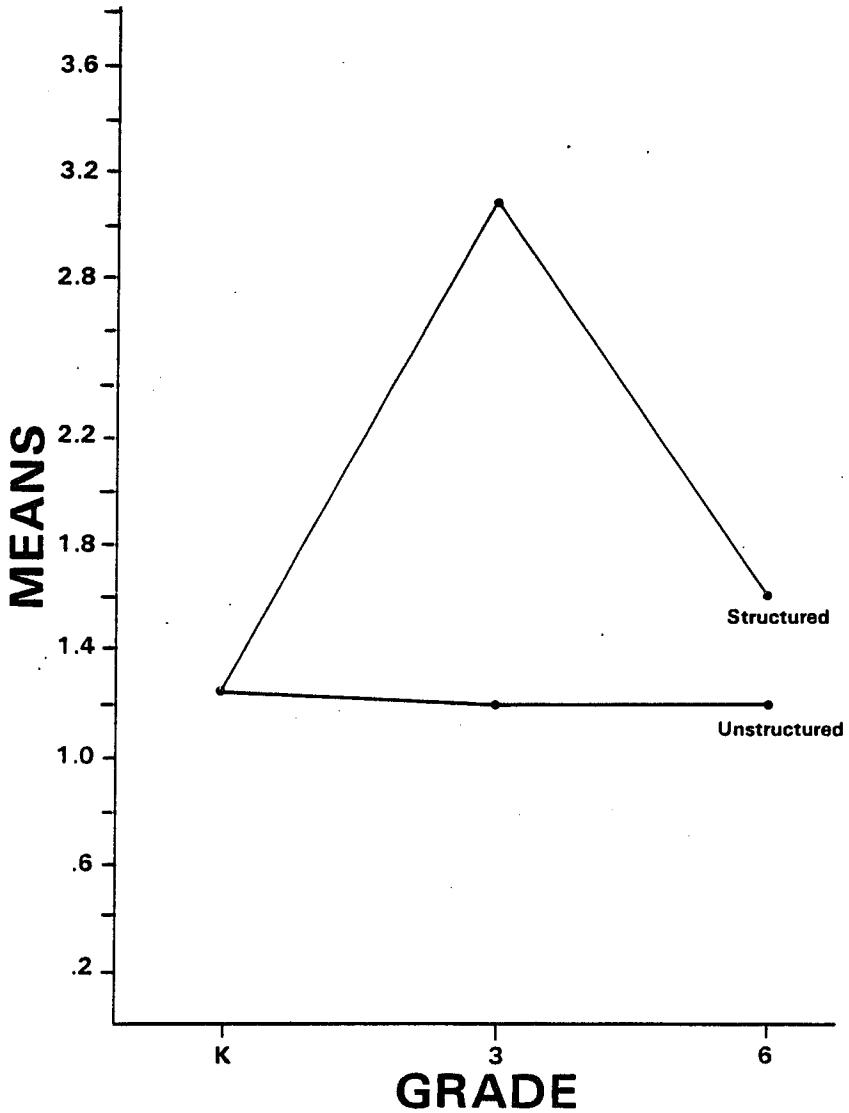


Figure 2: The effect of grade and communicative context on forward leans.

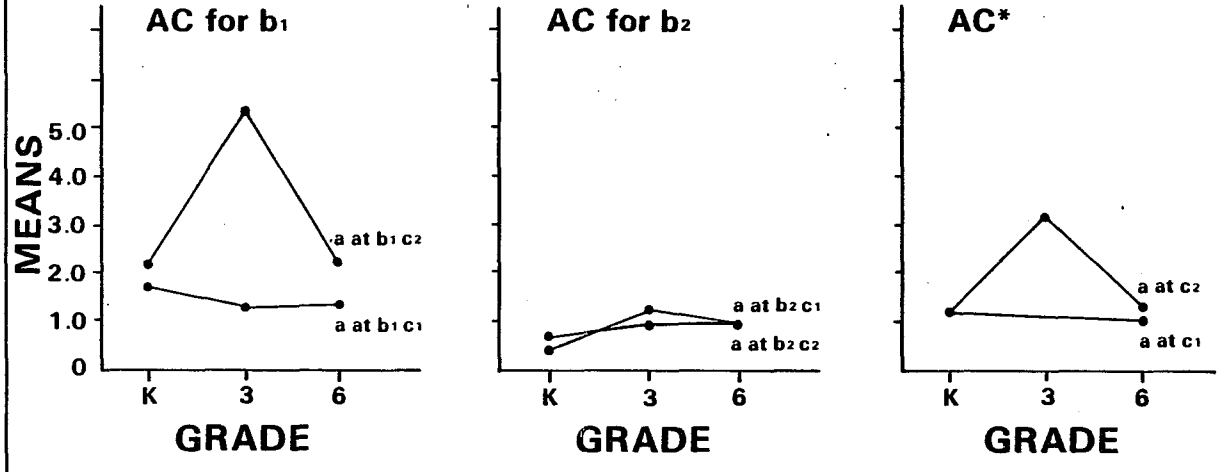


Figure 3: The effect of grade, communicative context and role on forward leans.

A = GRADE (K, 3, 6)
B = ROLE
  1 = Speaker
  2 = Listener
C = COMMUNICATIVE CONTEXT
  1 = Unstructured
  2 = Structured
*p < .05

Table 9

Grade Differences in Means for Forward Lean Scores, by Communicative Context

	Unstructured Conversation	Structured Conversation
Kindergarten	1.25	1.25
Third Grade	1.20	3.15
Sixth Grade	1.20	1.60

Table 10

Forward Lean Score Means for the Three-Way Interaction of Grade, Communicative Context, and Role

	Unstructured Conversation		Structured Conversation	
	Speaker	Listener	Speaker	Listener
Kindergarten	2.10	.40	1.90	.60
Third Grade	1.30	1.10	5.40	.90
Sixth Grade	1.50	.90	2.30	.90

interactions were both due to higher third grade means in the structured conversation. Third graders, when engaged in the structured conversation, averted their gaze and leaned forward more than either kindergarteners or sixth graders, yet there were no differences between grade levels

in the unstructured conversation. Post hoc tests of gaze aversion means in the structured context were significant for comparisons of kindergarten-third grade and third grade-sixth grade, $C.V._{Tukey}$, $q_{.95}(3,87) = .0973$. Similarly for forward leans, kindergarten-third grade and third grade-sixth grade comparisons differed significantly, $C.V._{Tukey}, q_{.95}(3,57) = 1.07$. The latter finding must be qualified, however, because of the three-way interaction of grade, communicative context, and role. Although third grade dyads leaned forward more than dyads of either kindergarteners or sixth graders in the structured conversation, this was only true for the speaker role. Listeners in the structured conversation did not differ between grade levels for forward leans.

The hypothesis concerning the effect of grade on the listener verbal behavior of back channel communication was not supported. Back channel communication means were in the predicted direction, however, and were .25, .60 and .85 for kindergarten, third grade and sixth grade, respectively. These low means reflected the fact that 75% of all listener back channel communication scores were zero. When both forms of back channel communication in a dyad, nonverbal head nods by listeners and listener verbal back channel communication, were combined into a single score, the percentage of zero scores was reduced to 46

and grade means became .75, 1.85 and 2.65 for kindergarten, third grade, and sixth grade, respectively, which, at face, represents somewhat stronger support for the developmental hypothesis.

Interruptions, the other form of listener verbal behavior, occurred in only 17% of the conversations. Of 20 interruption scores at each grade level, two were nonzero in kindergarten dyads, three were nonzero in third grade dyads, and five were nonzero in sixth grade dyads. Interruptions did not differ significantly between grade levels.

Of the two measures of turn-taking error, the effect of grade was significant for SLTs, but not SSTs, and that was in interaction with communicative context, $F(2,24) = 3.36$, $p<.05$. Both types of error were expected to decrease with age, irrespective of communicative context. Cell totals in Table 11 show that with age there is an

Table 11

Grade Differences in Cell Totals for SLT Errors, by Communicative Context

	Unstructured Conversation	Structured Conversation
Kindergarten	4	9
Third Grade	12	6
Sixth Grade	11	2

increase in SLTs in the unstructured conversation and a decrease in the structured conversation, despite there being no significant pairwise comparisons. The developmental hypothesis for SLTs, then is minimally supported in the structured conversation and contradicted in the unstructured conversation. Why SLT errors in the unstructured conversation increase with age in unclear.

To summarize the effects of development on the display of turn-taking behaviors and error measures, there is evidence that some behaviors differ with age. Older sixth grade children used more gesticulations, head nods and back channel communication than younger children. SLT errors decreased with age in the structured conversation, but not the unstructured conversation. Gaze aversion and forward lean measures did not conform to the anticipated pattern and were complicated by interactions with communicative context and role. Third graders were more likely to avert their gaze and lean forward than either older or younger dyads, but only in the structured conversation, and for forward leans this was true for speakers but not listeners. Hypotheses of grade level differences for backward leans, touch, and SST errors were not supported to any degree. No differences between grades were expected for interruptions, speaker verbal behavior or elapsed time, and none were found.

Sex Differences

There were only two specific hypotheses concerning the effect of sex on the act variables. It was indicated earlier that one of them, the interaction of grade and sex for gaze aversion, was untenable. Older female dyads did not have lower gaze aversion means than younger female dyads. The second hypothesis was that males would avert their gaze more than females across grade levels, communicative context, and roles. This hypothesis was not only supported, but the opposite was true. To a highly significant degree females averted their gaze for a greater percentage of time than males, $F(1,24) = 10.32$, $p = .003$. The means were .23 for females and .12 for males.

This finding is particularly salient in light of the fact that the mean length of time for a coded segment of conversation in which there were 12 speaking turns was over one and a half times greater for females than males, which was reflected in a significant sex effect on elapsed time, $F(1,24) = 8.00$, $p<.01$. Mean elapsed times were 63.02 seconds and 39.90 seconds for females and males, respectively.

There was, in addition, a significant interaction of sex and role for gaze aversion, $F(1,24) = 7.76$, $p<.01$, depicted in Figure 4. The figure reveals that the means for female dyads were higher in the listener role than in

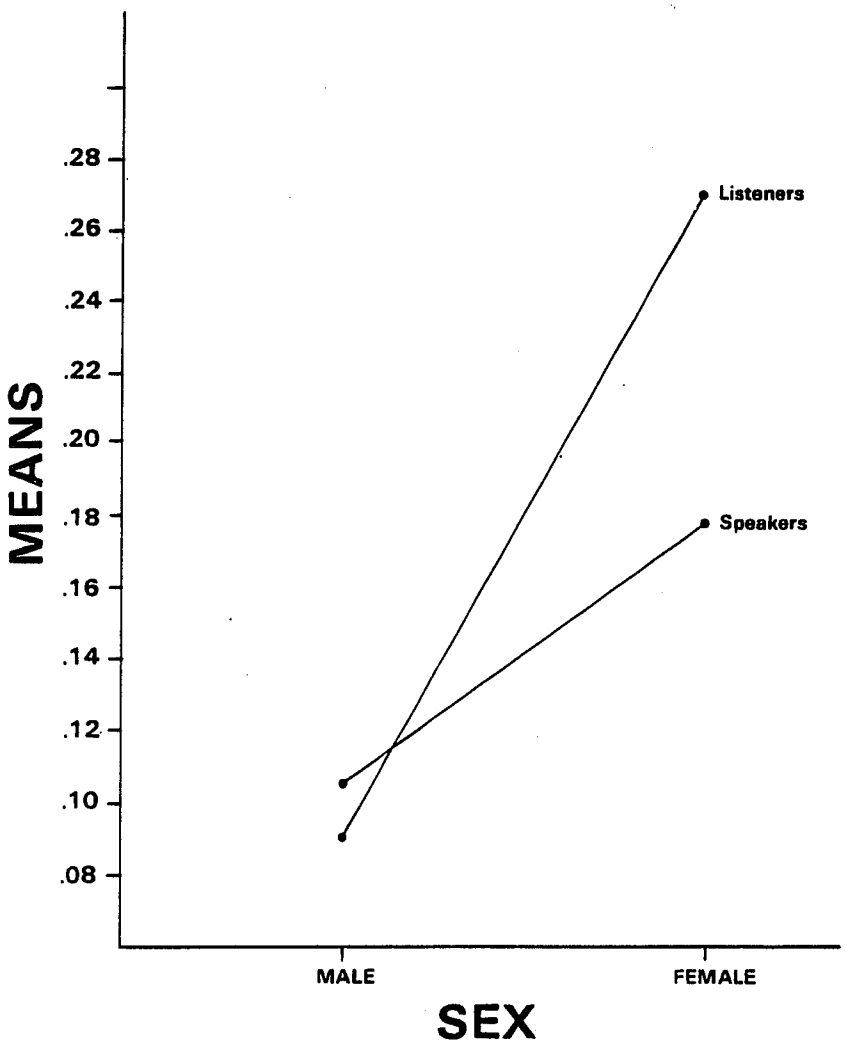


Figure 4: The effect of sex and role on gaze aversion.

the speaker role; female listeners averted their gaze 27.1% of the time compared to 18.0% for female speakers, while the mean for male dyads were about the same in both roles, 12.4% for speakers and 11.6% for listeners.

Although no other sex effects were predicted, females scored significantly higher than males on three nonverbal measures: gesticulations $F(1,24) = 7.71$, $p<.01$; forward leans $F(1,24) = 8.29$, $p<.01$; and head nods, $F(1,24) = 5.06$, $p<.05$. Again, the significant difference in elapsed time between sexes raises questions of interpretation. Since each of these measures was based upon frequency of occurrence over the coded segments of conversation which differed in length of time, females had more time to produce turn signals. It could be argued that this gave them an advantage over males, which, if true, would be reflected in lower error scores for females. However, the apparent advantage of females, as evidenced by higher gesticulation, forward lean, and head nod scores, did not translate into lower error scores, since differences between sexes for SST and SLT errors were not significant.

An alternate argument is that since females had a longer period in which to commit errors, the fact that their error scores were not significantly higher than male error scores supports the view that the nonverbal behaviors were functioning as turn signals, by reducing female errors to the level of male errors.

When considering that the number of speaking turns was constant in each communicative context, the former argument seems more plausible. More turn signals per speaking turn theoretically should have produced smoother exchanges and therefore fewer errors, but did not. This raises the question of whether the nonverbal acts were indeed functioning as turn signals.

Main Effects of Communicative Context

Results of the analyses for communicative context support to some degree the general hypothesis that the display of turn-taking behavior is a function of the type of conversation. Communicative context was expected to produce significant differences in every dependent variable, with the exception of elapsed time and buffers, neither of which were significant. In fact, seven of the eleven hypotheses in which differences were predicted were significant, but for two of the seven, gesticulations and forward leans, mean differences were in the opposite direction to that expected. Table 12 presents this data and shows, as well, trends for the nonsigificant variables.

The interactions of communicative context and role which were predicted for the nonverbal behaviors are taken up in the section following the results for role. Suffice

Table 12

Means and Levels of Significance for All Dependent Variables, by Communicative Context

Dependent Variable	Communicative Context A[a]	Communicative Context B[b]	Predicted Direction	F	p
Gesticulations	4.68 (1.32)	6.88 (1.57)	A>B	3.56	.07
Forward Leans	1.21 (.62)	2.00 (.79)	A>B	5.16	.03
Touch	.42 (.22)	1.12 (.43)	A≠B	4.87	.04
Back Channel	.87	.27	A>B	4.87	.04
Interruptions	.07	.40	A<B	6.06	.02
Questions	4.73	1.76	A>B	46.73	.0001
SST Errors	.40	.90	A<B	4.25	.05
Gaze Aversion	.16	.19	A>B	--	N.S.
Backward Leans	.57 (.29)	.73 (.40)	A>B	--	N.S.
Head Nods	1.43 (.61)	1.20 (.54)	A>B	--	N.S.
SLT Errors	.90	.57	A>B	--	N.S.

Note. df = 1,24. Numbers in parentheses are log means.

[a]A = Mean scores in the unstructured conversation.

[b]B = Mean scores in the structured conversation.

it to say here, in anticipation, that data for the verbal behaviors for speakers and listeners, as well as the error measure for speakers, supported the hypotheses, while that for the nonverbal measures on the whole did not.

Main Effects of Role

The hypothesis that speakers and listeners would differ in their use of nonverbal turn signals was generally supported by the data. There were significant main effects for four of the six nonverbal behaviors; gaze aversion, $F(1,24) = 5.40$, $p = .03$; gesticulations, $F(1,24) = 96.37$, $p<.001$; forward leans, $F(1,24) = 44.74$, $p<.001$; and touch, $F(1,24) = 15.58$, $p<.001$. However, means for gaze aversion were opposite to prediction. The results are summarized in Table 13.

The Interaction of Communicative Context and Role

The interaction of communicative context and role was hypothesized for five of the six nonverbal behaviors. Two of these interactions were significant, gesticulations, $F(1,24) = 6.40$, $p = .02$, and head nods, $F(1,24) = 9.48$, $p = .01$. A three-way interaction of sex, communicative context, and role also occurred for gesticulations, $F(1,24) = 4.19$, $p<.05$.

Table 13

Means and Significance of Role Effects

on Nonverbal Dependent Variables

Variable	Speaker	Listener	Predicted	p
Gaze Aversion	.15	.19	S>L	*
Gesticulations	9.83 (2.07)	1.73 (.82)	S>L	**
Forward Leans	2.42 (1.00)	.80 (.40)	S>L	**
Backward Leans	.57 (.34)	.73 (.35)	S>L	N.S.
Head Nods	1.42 (.62)	1.22 (.53)	S<L	N.S.
Touch	1.67 (.47)	.37 (.18)	S≠L	**

Note. Numbers in parentheses are log means.

*$p<.05$.

**$p<.01$.

Figure 5 shows that in the two-way interaction of communicative context and role for gesticulations there were no differences between communicative contexts for listeners, as expected, with identical means of 1.73, but contrary to what was expected, speakers gesticulated more in the structured conversation than in the unstructured, with means of 12.03 and 7.63, respectively. The three-way intereaction of sex, communicative context and role, plotted in Figure 6, reveals that when sex is considered these findings were upheld for speakers, but not listeners. In the listener role male dyads gesticulated more in the structured context than in the unstructured, while the reverse was true for female dyads. Table 14 shows the means for this interaction.

Table 14

Gesticulation Means for the Three-Way Interaction of Sex, Communicative Content, and Role

	Unstructured		Structured	
	Speaker	Listener	Speaker	Listener
Male	5.13	.87	9.67	1.80
Female	10.13	2.60	14.40	1.67

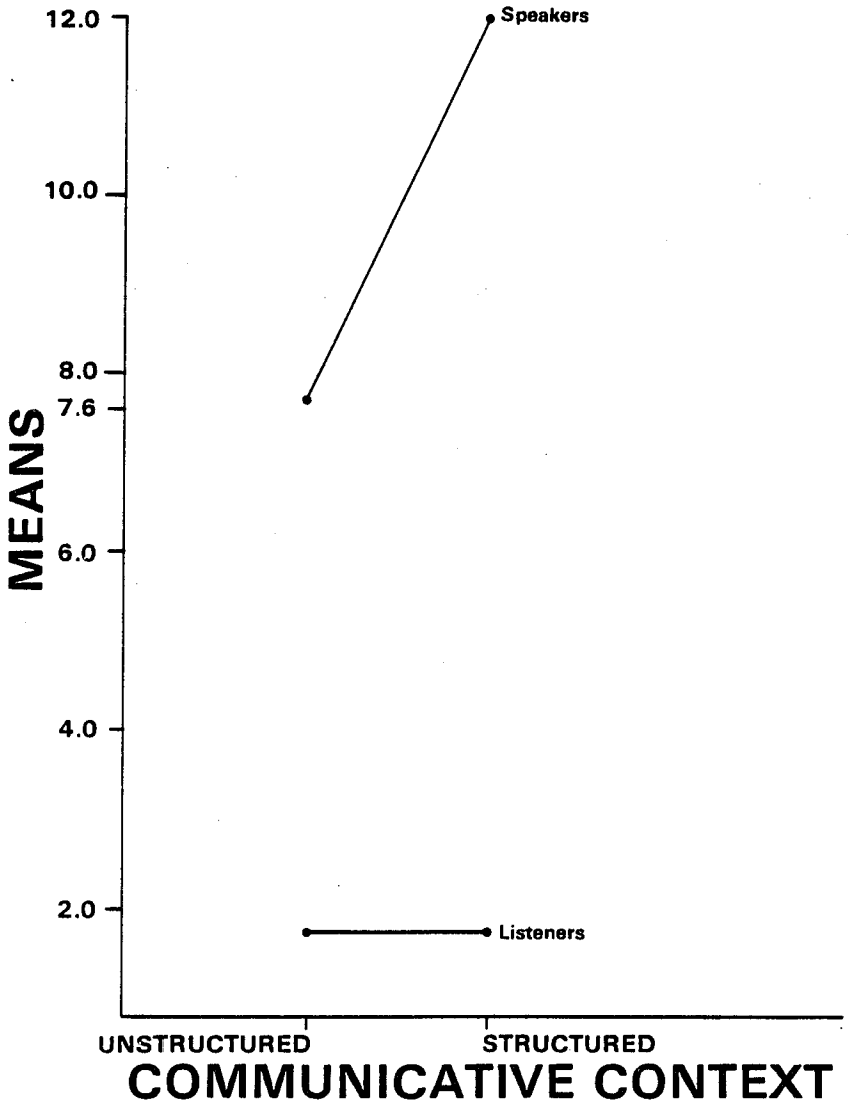
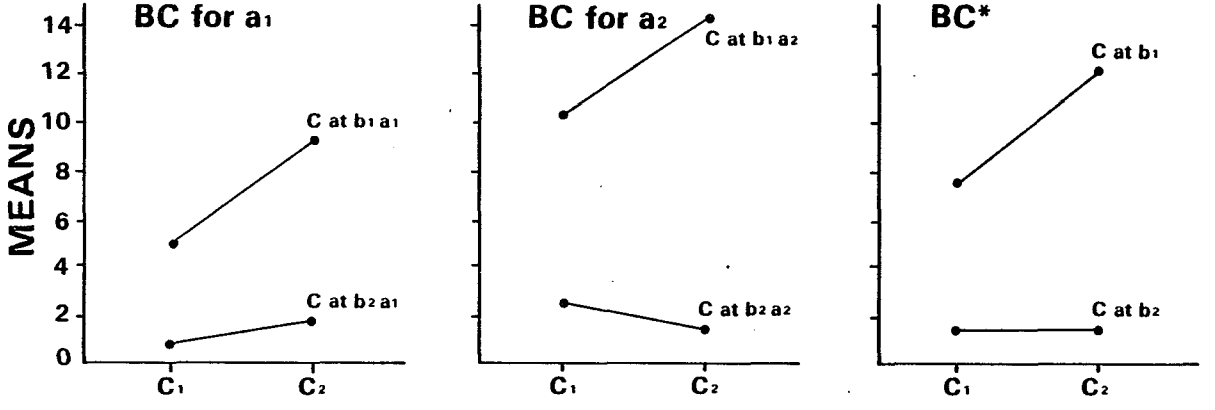


Figure 5: The effect of communicative context and role on gesticulations.



A = SEX
1 = Male
2 = Female
B = ROLE
1 = Speaker
2 = Listener
C = COMMUNICATIVE CONTEXT
1 = Unstructured
2 = Structured
*p < .05

Figure 6: The effect of sex, communicative context and role on gesticulations.

The hypothesis of an interaction of communicative context and role for head nods was supported for listeners, but not speakers. Listener means were in the predicted direction and were .60 and 1.83 for the structured and unstructured conversations, respectively. Means for speaker head nods, which were not expected to differ between conversations, were higher in the structured conversation than in the unstructured, with means of 1.80 and 1.03 for the structured and unstructured conversations, respectively. In other words, as seen in Figure 7, there was an ordinal interaction, whereas a disordinal interaction was predicted.

Although there was no interaction of communicative context and role for forward leans, as postulated, there was, as noted in the analysis of developmental differences, a three-way interaction of grade, communicative context, and role, $F(2,24) = 4.49$, $p = .02$. These data, shown in Figure 3 and Table 10, reveal that listener forward lean scores were lower than speaker scores for all grade levels and in both communicative contexts, as expected. The hypothesis that speaker scores would be higher in the unstructured conversation than in the structured was supported only in kindergarten; however, with means in that grade of 2.10 and 1.90 in the unstructured and structured conversations, respectively, this difference would not be

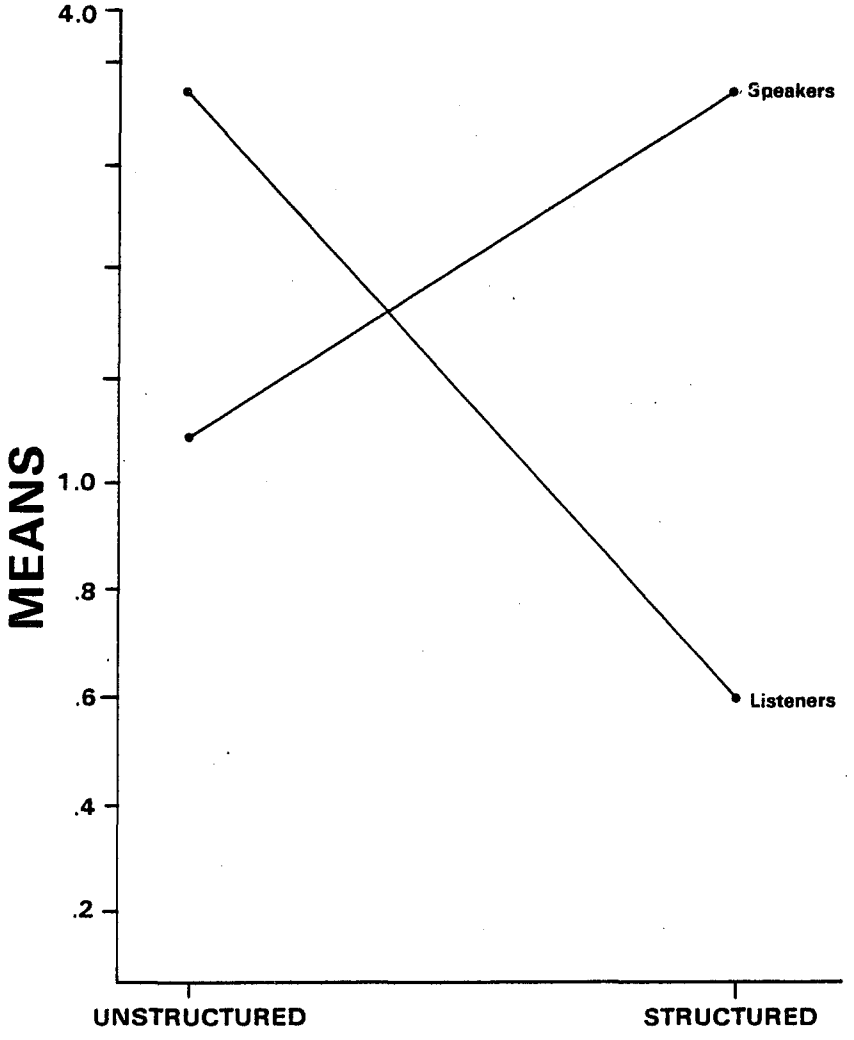


Figure 7: The effect of communicative context and role on head nods.

significant. In third grade and sixth grade, on the other hand, speaker scores were considerably higher in the structured conversation than in the unstructured.

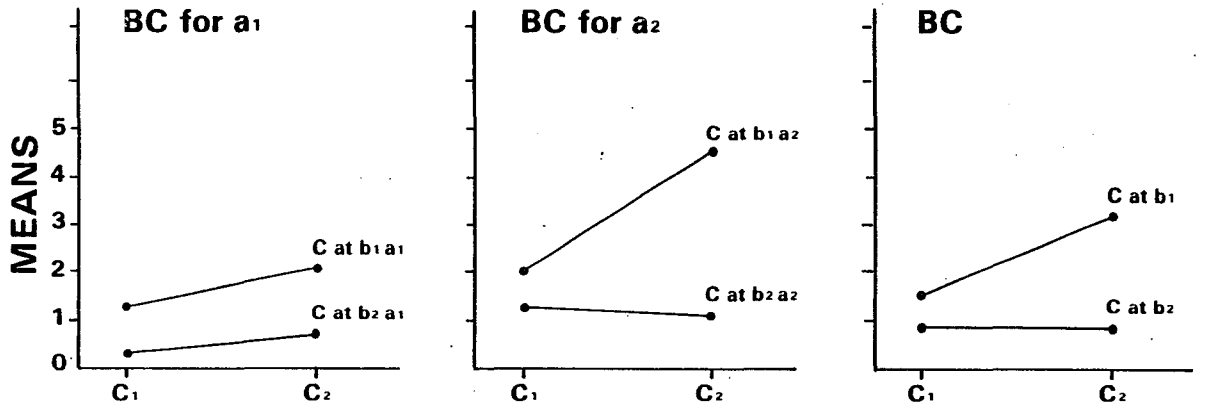
A moderate interaction of sex, communicative context and role for forward leans, $F(1,24) = 3.14$, $p = .09$, was due to the interaction of sex and communicative context for listeners, but not speakers (see Figure 8 and Table 15). Surprisingly, there was no four-way interaction for forward leans!

Table 15

Forward Lean Score Means for the Three-Way Interaction of Sex, Communicative Context, and Role

	Unstructured Conversation		Structured Conversation	
	Speaker	Listener	Speaker	Listener
Male	1.27	.20	2.00	.53
Female	2.00	1.40	4.40	1.07

From this somewhat confusing array of two-way and three-way interactions for gesticulations, head nods and forward leans, two things stand out. First, for all three behaviors, and contrary to expectation, speakers had higher means in the structured context than in the unstructured, the sole exception being kindergarten gesticulation scores. These findings suggest that speakers



A = SEX
1 = Male
2 = Female
B = ROLE
1 = Speaker
2 = Listener
C = COMMUNICATIVE CONTEXT
1 = Unstructured
2 = Structured

Figure 8: The effect of sex, communicative context and role on forward leans.

in the structured conversation were using these behaviors not as turn-yielding signals, but as turn-suppressing signals, that is, to keep listeners from gaining the floor. This argument is supported to some degree by the findings that interruptions, SST errors, and touch were significantly higher in the structured conversation than in the unstructured, although touch was generally higher in speakers than listeners, and by the finding that back channel communication declined in the structured context relative to the unstructured. Somewhat lesser support comes from the finding that gaze aversion was higher in the structured conversation than in the unstructured, although not at a significant level, but contrary to the expected trend.

The second point is that the results for listeners are clear only for head nods and in support of the hypothesis that listeners nod their heads more in an unstructured conversation than in a structured one. The other findings for listeners suggest that male listeners may have used gesticulations and forward leans as turn-requesting signals. Gesticulation and forward lean scores for males were higher in the structured conversation than in the unstructured conversation, while for females the reverse was true (see Tables 14 and 15). Considering the sex differences in elapsed time, which showed that females

had longer turns both as speakers and as listeners, and the higher overall female scores for gesticulations and forward leans gives additional credence to the argument. Of course, another question is why female scores were lower in the structured conversation than in the unstructured when it was hypothesized that there would be no difference. Perhaps it was because they were averting their gaze longer. The significant interaction of sex and role for gaze aversion supports this view, $\underline{F}(1,24) = 7.76$, $p<.01$. Figure 4 showed that female listeners averted their gaze longer than either male listeners or male and female speakers.

In conclusion, the results for the effects of communicative context and role on the turn-taking behaviors indicate that both had a strong impact. In unstructured conversations dyads asked more questions than in structured conversations. They also gesticulated, leaned forward, touched, and interrupted less in the unstructured context, made fewer SST errors, and, as listeners, communicated more in the back channel, both verbally and nonverbally. They tended to avert their gaze and lean back less, but not significantly.

Behavior in general in the structured conversation was more animated than in the unstructured conversation, creating more rather than fewer SST errors, which suggests

that some behaviors in the structured context did not function as expected and may, in fact, have different functions according to role and sex. Gesticulations, forward leans and head nods for speakers in the structured conversations appeared to function as attempt-suppressing signals, and for male listeners, gesticulations and forward leans acted as turn-requesting signals. The higher means in the structured conversation for touch across roles and for interruptions strongly suggest that these behaviors were used by interactants to control access to the speaking turn. Speakers used touch as attempt-suppressing cues, whereas listeners used touch and interruptions as turn-requesting, or possibly turn-demanding, signals.

Intraclass Correlation

Correlations of Turn-Taking Behaviors and Errors

It was noted earlier that the two error measures were analyzed separately because there was not a significant positive correlation between them, $r_S = -.14$, $p>.10$. Within communicative contexts, however, there was a significant negative correlation between error measures in the unstructured conversation, $r = -.36$, $p<.05$.

The hypothesis that measures of turn yielding, back channel communication and turn requesting, as defined,

are negatively related to SST and SLT errors was unsupported. There were virtually no significant negative correlations between the act variables and error measures when looked at across grade and sex for communicative contexts and roles. This finding was foreshadowed earlier by results which raised the question of whether the turn signals were functioning as expected. That they were not is evident not only in the lack of negative correlations, but in the finding of four positive correlations ($p<.05$): in the unstructured conversation, SST errors and speaker gesticulations, .42, SST errors and speaker head nods, .51, and SLT errors and listener forward leans, .37; in the structured conversation, SST errors and speaker backward leans, .39. However, the probability of obtaining four significant correlations at the .05 level for 56 correlations is .47, which is simply chance.

Other Correlations

There were some interesting patterns in the intra-class correlation of dependent measures that were not hypothesized. When scores for each behavior in the unstructured conversation, collapsed across grade and sex, were compared with their corresponding scores in the structured conversation there were four significant

correlations out of 19 at the .05 level: elapsed time, .58; speaker gaze aversion, .54; listener touch, .43; and interruptions, .39. The probability of 4 significant correlations out of 19 occurring at the .05 level is .07. These results, then, indicate that dyads performed similarly from one conversation to the other in the lengths of their conversations and in the percentage of time speakers averted their gaze. Further, listeners who touched and interrupted in one conversation were likely to do the same in the other conversation. These findings suggest a tendency toward behavioral congruence between conversations.

More striking that the limited findings of congruence between communicative contexts were the correlations within communicative contexts between speakers and listeners for the nonverbal behaviors. Table 16 shows that in unstructured conversations speakers and listeners within a dyad had highly correlated scores for five of seven variables: gaze aversion extent, gaze aversion percent, gesticulations, backward leans and head nods. Forward leans and touch were uncorrelated. Table 17 shows that in the structured conversation only forward leans were uncorrelated between speakers and listeners. These findings in multiple nonverbal channels are indirect evidence of interactional synchrony, a concept formulated

Table 16

Correlations Between Speaker and Listener Scores

Within Dyads in the Unstructured Conversation

Speaker Scores	Listener Scores 1	2	3	4	5	6	7
1) Gaze aversion extent	.71						
2) Gaze aversion percent		.54					
3) Gesticulations			.55				
4) Forward leans				N.S.			
5) Backward leans					.41		
6) Head nods						.57	
7) Touch							N.S.

Note. N = 30; for r = .36, p = .05.

Table 17

Correlations Between Speaker and Listener Scores

Within Dyads in the Structured Conversation

Speaker Scores	Listener Scores 1	2	3	4	5	6	7
1) Gaze aversion extent	.59						
2) Gaze aversion percent		.42					
3) Gesticulations			.57				
4) Forward leans				N.S.			
5) Backward leans					.33[a]		
6) Head nods						.64	
7) Touch							.73

Note. N = 30, for r = .36, p = .05.

[a] p = .07.

by Condon and Ogston (1967). The evidence is indirect because of the nature of the data which summarizes movements over the coded segment of conversation, whereas Condon and Ogston did a painstaking frame-by-frame analysis of a 5-second conversation to reveal that the speaker and listener had synchronous changes in body movements. Nonetheless, the finding of significant correlations between speaker and listener behavior is one of the most clear cut and important ones in this study.

CHAPTER IV

DISCUSSION OF RESULTS

In any research the type of data collected and the nature of its analysis are dependent upon the questions which guided the formulation of the research design. The present research was no exception. From the descriptive, correlational and inferential analyses, answers to the five general questions which guided the research emerged, but not without raising new questions. The findings are discussed in terms of methodological and conceptual issues in the study of children's face-to-face interaction and implications for further study of this seemingly mundane activity, particularly those implications relating to a theory of social cognitive development and communicative competence.

The first general question asked which behaviors functioned as turn signals in children's conversations and what was their interrelationship. Behaviors associated with turn taking in adults were adapted for use in the present study, with one new behavior, touch, added. It was neither anticipated nor presumed that the behaviors, to the extent that children used them, would function differently than in adults' conversations. As the question

was interpretted in the design of the research, descriptive and correlational analyses were considered adequate to discover the degree to which the signals were present in the repertoire of the children and their interrelationship. However, problems were encountered in explaining several findings which raised doubts about whether children used the behaviors in the same way as adults.

Among those act variables in which problems were encountered were the nonverbal signals of gesticulations, forward leans, head nods, and to a lesser degree, backward leans and touch, which had unexpectedly higher scores in the structured conversation than in the unstructured. In terms of the rationale advanced that children would be less rule-abiding in the structured conversation than in the unstructured, the nonverbal turn signals, if indeed they were functioning as turn signals, should have had lower means in the structured conversation. Interpretation of the findings for the intercorrelation of the error measures with the turn signals was also a problem. The error measures, according to the rationale that dyads using more turn signals should have made fewer errors than those using less turn signals, should have been negatively correlated with the nonverbal turn signals, but were not. In addition it was found that female dyads had significantly higher means than male dyads for gesticulations, forward

leans and head nods, yet there were no differences between sexes for either error measure. This evidence suggested that either the nonverbal signals were not functioning as expected, that is, based on their functioning in adults, or that the error measures were not valid indices of communicative competence.

However, there was some evidence that at least one of the error measures was valid. More simultaneous speaking turn errors were made in structured conversations, in which children were expected to be less rule-abiding and more egocentric because of the competitive nature of the task, than in unstructured conversations. By default, the argument that the nonverbal behaviors were serving some other purposes besides turn-yielding signals becomes more tenable.

That the nonverbal behaviors did not perform as expected is not that surprising in retrospect and is indicative of the state of the art for research on face-to-face interaction at the time this study was undertaken. The studies on which hypotheses concerning the turn signals were formulated were primarily exploratory and findings between them were not always consistent, as noted in the introduction. The number of subjects studied was also usually small thereby limiting generalization of results. Another factor was the relatively high proportion of

external variable studies, that is, studies of group difference, considered by Duncan and Fiske (1977) to be limited in their usefulness for understanding acts in their interactive context. The strategy used here, which was the same as that of Duncan and Fiske in the earlier stages of their research, implicitly assumed that "our scores would reflect the participants' dispositions to engage in these [turn-related] actions as a whole" (p. 131). Thus each score was taken as determined by the dyad, its developmental level and sex, by the communicative context and role, and by interactions among them. Duncan and Fiske argued that this approach is useful for finding gross relationships before undertaking more intensive analysis, but that relationships or the lack of them among the total scores for a coded segment of conversation tell very little, if anything, about the occurrence or nonoccurrence of any one act at any given moment. While it was important to find, for example, that speaker and listener touch scores were highly correlated (.73) in the structured conversation, it was not the total number of speaker touches which affected the total number of listener touches. The correlation suggests that a convention (which is part of the turn mechanism) was operating in the interaction, but the conditions under which it operated cannot be specified. By the same token it was not the total number of any act

variable that effected the total error score, but what action preceded the occurrence of a particular error.

At the present stage of research on face-to-face interaction in general and turn-taking in particular it is obvious that rules or conventions do operate, but as noted by Duncan and Fiske (1977), they are not well documented in terms of their organizational structure. The analysis of behavioral acts in their interactive context, rather than analysis of group differences, would address the question of function directly. This type of analysis, discussed at greater length below, could not be carried out in the present research because it requires locating the acts along the verbal stream in units representing phonemic clauses, for which the technical capability and resources to code the data in this way were lacking. However, one analysis, based on the speaking turn as the unit of analysis and similar to an analysis by Wiemann and Knapp (1975), was done involving gaze as a turn-yielding signal. Wiemann and Knapp (1975) found that in the final third of a speaking turn the amount of time speakers used other-directed gaze increased to 83%. Children's speaking turns were regarded as too short to divide into segments, but looking at the record of events for gaze aversion by speakers at the moment they yielded the speaking turn, only 27 out of 720 times was the speaker not looking

at the listener. Speakers were looking at the listener 96.25% of the time they yielded the speaking turn. This finding, unlike that which showed that speakers used gaze aversion significantly less than listeners, is more specific in capturing the functional significance of gaze for speakers.

Duncan and Fiske did not mean that the group difference approach used here and in their earlier research was meaningless. They justified summarizing descriptive statistics on the grounds that these data characterize the dyad as it behaved in the interaction as a whole, which is a common way psychologists deal with data. Comparisons between populations are then possible, such as between age groups, sexes, handicapped groups, socio-economic groups, and cultural groups.

Apart from the methodological problems cited, there was a conceptual problem which confounded interpretation of results and had to do with the descriptive versus prescriptive nature of interaction rules. Because it was assumed (Wiemann & Knapp, 1975; Duncan, 1973) that adults were rule abiding in face-to-face conversation, the behaviors they displayed were regarded as descriptive rules which governed the interaction. On the other hand it was reasoned that children had not acquired all the display rules of adults and that the encoding, or display,

of those behaviors found to be turn signals in adult conversation was not a sufficient criterion for judging children's regulation of their conversations. Effectiveness of the turn signals to reduce interaction errors was considered a reasonable performance criterion, thereby linking encoding ability with decoding as it had not been done in communication studies of adults or children, the latter of which have concentrated on either encoding or decoding aspects of communication tasks (See Glucksberg, Mayo & LaFrance, 1978 for reviews of communication studies). In so linking the display of turn signals with performance criteria the display rules became prescriptive, in the sense of predetermined, or ordained, rather than merely descriptive of children's behavior. Prescriptive rules, therefore, can be broken, whereas descriptive rules cannot. That children's turn-taking errors were unrelated to the display of turn signals may not indicate that rules were violated, that is, that the children were not competent communicators, but that the corpus of behaviors studied was inadequate to describe children's turn-related actions.

In terms of social cognitive ability, the developmental task for the children in the present communicative contexts was to infer the intentions of their partner to either hold or relinquish speaker and listener roles. The

performance of conventional turn taking required, in addition, the coordination of mutual expectations. Older dyads were expected to be more aware than younger dyads of their partners' needs for signals which communicated their intentions to retain or yield the speaking turn and to employ signals instrumentally to effect smooth transitions in the conversation between speaker/listener roles. The developmental task also implies that with age children can and do encode and decode turn signals appropriately as they decenter from their own perspective to take into account the perspective of their partner and, in so doing, become cognizant of the conversational conventions that turns must interchange, that one person speaks at a time, that interruption of a speaker by a listener is inappropriate under most circumstances, and that lengthy silences are to be avoided. What is not to be inferred, however, is that the choice of behaviors which constitute a signal is consciously determined.

The difficulty in interpretting the present findings is that, for those display behaviors which changed developmentally, there was not a corresponding improvement in the performance criteria. For the most part speaker/listener turns did interchange smoothly at all age levels, simultaneous speaking turns and interruptions were no more common in kindergarteners than third graders who performed

as well as sixth graders within both communicative contexts, and the error measure of simultaneous listening turns decreased with age in only one communicative context.

In contrast, age-related findings did not strongly support a developmental theory that turn taking in children's conversations is a function of the behaviors studied, although two behaviors found by others to increase with age, gesticulations and back channel communication, clearly followed the same pattern in the present study. The back channel measure combining listener head nods and verbal utterances, akin to Dittman's (1972) measure, increased significantly between kindergarten and grades three and six, and the findings for gesticulations, which increased with age, were similar to those of Jancovic, Devoe, and Wiener (1975).

Of the remaining nonverbal and verbal behavioral turn signals, none showed the expected patterns of developmental differences based on the outcome of the analyses for grade and the interaction of grade and role, which raises two questions. One is whether these behaviors should simply be excluded from further consideration in developmental studies, and the second, as suggested above, is whether the repertoire of children's turn-taking behaviors has been adequately explored before inferring

that turn taking is an established convention in children as young as kindergarten age which does not undergo further changes in the course of development.

Before addressing these questions, in light of the small number of developmental differences in children's turn signalling, a comparison of the findings for children with those for adults is offered in search of a better understanding of the development of turn related behavior. To this end the research of Duncan and Fiske (1977) is especially valuable. Their study of 88 adults, in a conversational context similar to that of the unstructured conversation in the present study, generated quantitative data for several measures comparable to those reported here, and, given the limited degree to which children's behaviors were found to vary as a function of age, provide an opportunity to see likeness and differences between adults and children in their encoding of nonverbal and verbal categories of behavior found in face-to-face interaction.

The Duncan and Fiske research also used an external variable approach, such as that used here, to study, among other things, the effects of sex on the act variables. Their dyads were composed of both same sex and mixed sex partners. Interestingly, there were no significant differences between same sex and mixed sex dyads, which

facilitates a comparison of differences between adults and children in the present study.

Table 18 shows percentage of subjects (i.e., individual adults and child dyads) with zero scores and means for measures common to the studies of Duncan and Fiske (1977) and the present one. Although data from both conversational contexts studied here are included in the table, the data from the Duncan and Fiske study are more comparable to the data from the unstructured conversation since, as noted, the tasks were quite similar. Data from the structured context are offered as contrast.

Several differences between the studies should be noted. First, Duncan and Fiske's subjects were strangers and were instructed to get acquainted or "talk about anything you like." The children, on the other hand, were previously acquainted and told to learn something new about one another. How differences between strangers and friends affect the regulation of speaking turns is undoubtedly one of the more limiting factors in this comparison. In a study comparing adult strangers versus friends, Hedge, Everitt, and Frith (1978) found that gaze played a role in controlling the dialogue of friends, but not strangers.

A second difference between studies was that the adult dyads were composed of same sex and mixed sex pairs, as noted, whereas there were only same sex dyads of

Table 18

Adult and Child Means and Percentages of Zero Scores for Selected Act Variables

Act Variable	Adults[a]		Children			
			Unstructured Conversation		Structured Conversation	
	Means	Per Cent Zero	Means	Per Cent Zero	Means	Per Cent Zero
Speaker Turn Length-Seconds	13.5	--	4.4	--	4.1	--
Gaze Aversion Rate						
While Speaking	.39	0	.18	0	.16	0
While Listening	.13	0	.17	0	.12	0
Gesticulation Rate While Speaking	.128	0	.143	0	.242	0
Head Nod Rate While Listening	.058	9	.034	47	.012	60
All Back Channel Rate	.115	5	.051	37	.017	57
Seat-Number	.500	56	10.025	17	16.495	10
Seat Rate						
While Speaking	.003	63	.039	17	.079	20
While Listening	.001	76	.028	53	.031	37
Interruption Rate	.010	33	.001[b]	93	.008	73
			.009[c]	60	.026	30

[a]From S. Duncan and D. W. Fiske. Face-to-face interaction: Research, methods and theory. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977, pp. 50-53.

[b]Includes only unsuccessful takeovers of speaking turn.

[c]Includes unsuccessful takeovers plus simultaneous speaking turns.

children. However, it was pointed out that there were no differences in the Duncan and Fiske study between same sex and mixed sex dyads, so the summarizing of the data across all pairs was not important here.

Another difference between the studies was in the way data were aggregated. Means in Duncan and Fiske study were based on individual performance over a five minute period of conversation. In contrast the means for the children were based on dyadic performance over 12 speaking turns. These differences are not as troublesome as they may first appear. The aggregation of data across individuals for the act variables meant that a summary of an individual's performance was made irrespective of his or her role as speaker or listener. Realizing that they had lost valuable information by this method, Duncan and Fiske went back to the protocols and created measures such as gesture rate while speaking, which in effect were role differentiated. They did not do this for all variables, to their later regret, but those that were are presented here. So while their data for adults were reported for 88 individuals in their role as either speaker or listener, the children's data were based on 30 dyads with the measures for speaker and listener roles being aggregated for both members of the pair. The variables referred to in the table as seat number and seat rate came from the

Duncan and Fiske study and were essentially a composite of two variables in the present study, forward leans and backward leans. Since the seat measures were not role differentiated by Duncan and Fiske, comparable measures were created for children by adding together the means for speakers and listeners. Comparable rates were computed for the children by using means and elapsed times for the respective communicative contexts.

The first difference between adults and children noted in the table was in the average length of a speaking turn, 13.5 seconds for adults compared with 4.4 seconds for children. Children completed 12 speaking turns on average in about a minute (53.26 seconds) while adults managed only 5.28 speaking turns per minute. (Each adult had an average of 13.2 speaking turns in 5 minutes.) This finding, by itself, was not surprising, but may help account for children's low scores on some of the act variables. The children had less time in which to display signals. On the other hand adults had five times longer to speak but only slightly more than twice as many speaking turns. Had it been feasible to calculate rate per speaking turn for adults their rates would have been considerably higher in relation to children's rates since the variables would have been divided by a factor only 2.2 times greater than that for children instead of 5 times greater. This

did not apply to gaze measures which were proportions in both studies, and directly comparable.

For the gaze measure, Duncan and Fiske used essentially the same criteria as here, line of gaze and head movement rather than eye contact; however they calculated the proportion of time an individual's head was oriented toward the partner rather than away from partner. Their measure was, in effect, the complement to the gaze aversion measure, so their gaze average was subtracted from 1.00, the remainder being the proportion of time the individual was not gazing at partner. The data show that adult speakers averted their gaze for a greater proportion of time than child speakers, .39 for adults compared with .18 (unweighted mean) for children. Argyle and Cook (1976) reported that adults in conversation typically looked away about 30% of the time, a somewhat lower figure than that found by Duncan and Fiske, yet still higher than that observed in children. Argyle and Cook also found this percentage of gaze aversion to occur in speakers separated by a one-way screen from listeners. They explained their findings as avoidance of cognitive overload by speakers. They maintained that gaze, in addition to being a signal, is also a channel for receiving information, and avoidance of gaze closes that channel. Child speakers, then, kept the visual channel

open for a greater percentage of time that adult speakers which could indicate their need for greater information from the listener. The added information received visually would help in the coordination of speaking turns by enabling the speaker to see if and when the listener wanted the floor. It may be that the amount of visual attention paid by the speaker to the listener accounts for the low incidence of simultaneous speaking turn errors in children's conversations, a point which is elaborated below.

Unlike speaker gaze aversion, listener gaze aversion in adults and children was quite similar; the proportions were .17 for children compared to .13 for adults. Whether this difference is statistically significant is not known. Errors in measurement could account for the difference since gaze measures had the lowest reliabilities in both studies, .77 in the Duncan and Fiske study and .76 in the present study. It is not unreasonable to speculate, though, that for children, speaker gaze probably played a greater role in coordinating speaking turns than listener gaze.

Gesticulation scores, in contrast to gaze, had high reliabilities in the Duncan and Fiske study and the present study, .99 and .91, respectively, yet rates for speakers were quite similar, .128 gesticulations per second for

adults and .143 for children. The rate for children, however, obscures the fact that their gesticulations differed significantly between grades, as well as between roles and communicative contexts. Although there was not a significant interaction of grade, communicative context and role, gesticulation rates were calculated for child speakers by grade and communicative context to see comparable differences between adults and children at different grade levels in the speaker role. It can be seen in Table 19 that gesticulation rates for adult speakers exceeded only those of the kindergarten children in the unstructured conversation. Again, whether these differences are significant is unknown. Note that in the

Table 19

Adult and Child Gesticulation Rates for Speakers, by Communicative Context

Grade	Unstructured Conversation	Structured Conversation
Kindergarten	.119	.191
Third	.148	.225
Sixth	.157	.301
Adults[a]	.128	--

[a]From S. Duncan and D. W. Fiske. Face-to-face interaction: Research, methods and theory. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977, p. 51.

structured conversation children's gesticulation rates while speaking almost doubled those in the unstructured conversation which explains why there was no interaction between grade and communicative context.

Head nods occurring in the listener role differed between adults and children in a direction that was predictable based on Dittman's (1972) results. Adults, on average, nodded at a rate of ,058 times per second compared to .034 times for children. A more striking difference occurred in the percentage of zero scores Only 9% of adults compared to 47% of children in the unstructured conversation did not nod at all.

A measure of all back channel communication included listener head nods and verbal utterances. The rate for this measure was twice as great for adults as for children in the unstructured conversation with 37% of children not displaying any back channel communication compared to 5% of adults. In the structured conversation the children's rate dropped by two-thirds of the rate in the unstructured conversation with 57% zero scores. Since, like gesticulations, the combined measure of back channel communication showed developmental increments, rates by grade and communicative context were calculated for comparison with adult rates. Table 20

reveals that group differences in back channel communication are linear from kindergarten through adulthood.

Table 20

Adult and Child All Back Channel Communication Rates, by Communicative Context

Grade	Unstructured Conversation	Structured Conversation
Kindergarten	.027	.008
Third	.051	.014
Sixth	.068	.025
Adults[a]	.115	--

[a]From S. Duncan and D. W. Fiske. Face-to-face interaction: Research, methods and theory. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977, p. 50.

Neither Duncan and Fiske nor Dittman measured head nods by adults speakers, but, not only was the behavior found to occur in child speakers, their head nod mean did not differ significantly from that for listener head nods across communicative contexts, which was an unexpected result. It was found, though, that head nodding behavior was a function of both role and communicative context, with listeners having higher scores than speakers in the unstructured conversation. That pattern was reversed in the structured conversation in which speakers nodded three times more than listeners. This finding more clearly

than the others suggests that head nods do not only function as back channel communication, which is described solely in terms of listener behavior. What function head nods have for speakers, though, can only be conjectured. Speakers in the structured context seemed to use head nods to keep the floor, that is, as an attempt suppressing signal similar to that reported by Duncan and Fiske for an upraised hand. However, since speakers also used head nods in the unstructured conversation and this behavior either did not occur or was not reported in the adult studies cited, the function of speaker head nods and its importance in children's conversation is left for future study.

Comparison of the seat variables for adults with the composite measure of forward and backward leans for children reveals that children were considerably more active than adults. In their 5-minute conversations the average number of seat movements for adults was .5 with 56% of the scores being zero. For all 60 children the combined average of forward and backward leans in an average unstructured conversation, which lasted less than a minute (53.26 seconds) was 1.78, or prorated for five minutes, 10.025. The percentage of zero scores for the children's composite score, based on the number of children who neither leaned forward nor backward, was one

quarter that of adult, or 17%. In the structured conversation only 10% of the children had no seat movement.

The rate measure for seat movements also supports the view that the children were more active in their seats than adults. Looking at seat rate by role, child speakers in the unstructured conversation experienced a rate 13 times greater than that for adults, while child listeners were 28 times more active than adults. In the structured conversation seat rate for child speakers doubled the rate in the unstructured conversation, yet the rate for child listeners was nearly the same in both communicative contexts.

In summary, when measures of nonverbal turn signals for children and adults in a similar type of unstructured conversation were compared it was seen that for child speakers the length of a speaking turn and the rate of gaze aversion averaged less than half that of adult speakers. In contrast, adult speakers gesticulated at a rate somewhere between that of kindergartners and third graders and signalled with body movements at a rate one thirteenth that of the average child dyad. Wiemann and Knapp (1975) reported that in their adult subjects the number of gesticulations was too small to be considered a factor in turn taking. As listeners, adults and children

had similar rates for gaze aversion, but back channel communication was a linear function of age with only 5% of adults compared to 37% of children not communicating in the back channel. Body movement in child listeners, as measured by seat number and rate, was 28 times greater than in adults, although about half the children compared to three quarters of the adults made no such movements.

Looking at the structured conversation, the discrepancies between children's and adults' scores on these measures were more pronounced than they were between the comparison of unstructured conversations.

In addition to the above findings, children displayed two behaviors not reported in the adult turn-taking literature: they nodded their heads when speaking and, as both speakers and listeners, they communicated by touch. Although these behaviors were significantly higher in children's structured conversations than in unstructured, nonetheless, they occurred in both contexts, which should make them both candidates for future study.

A verbal measure on which it was possible to compare adults and children was interruption rate. This was a listener measure in both studies; however, in the Duncan and Fiske study the criteria included successful and unsuccessful takeovers of the speaking turn by the

listener whereas in the present study only unsuccessful attempts by the listener were classified as interruptions. A successful take over of the speaking turn by the listener meant that the speaker stopped talking as a result of the listener's verbal turn requesting and that roles were exchanged. In this study listener's action was regarded as an error, a lapse in the smooth exchange of turns. Interruptions in the present study were not considered errors, because no exchange in speaking turns occurred. Wiemann and Knapp (1975) described this type of behavior as turn requesting. An argument can be made, however, for counting any type of interruption as an error. To compare interruptions by adults and children, then, since criteria between studies were not the same, two measures are given for children. The first employed only the unsuccessful criterion. The second combined the first with the average error score for simultaneous speaking turns. Because the error measure also included simultaneous speaking turns at the beginning of a speaking turn as well as simultaneous turns resulting from a successful listener take over, the combined measure overestimated, or overstated, the second interruption measure. One is struck then by the lower rate of interruptions for children on both measures in comparison to adults, and by the fact that only 33% of the

adults did not interrupt at all compared to 53% of children who neither interrupted nor committed a simultaneous speaking turn error. In the structured conversation where children were expected to interrupt more, their rate was two and a half times greater than the adult rate, but still 30% of the children neither interrupted nor committed an error.

Were children, in fact, more rule abiding than adults as suggested by the results for interruptions? Evidence based on the incidence of simultaneous speaking turns from a second study reported by Duncan and Fiske (1977) also supports this paradoxical position. In the second study, which was a replication of Duncan's (1972) earlier study, Duncan and Fiske found that in 1148 conversational units of analysis there occurred 60 simultaneous speaking turns (The authors do not refer to these as errors.), or a simultaneous speaking turn in 5.42% of the units. In contrast, the children in the unstructured conversation made only 12 errors in 360 units of analysis, or in 3.33% of them.

Results from simultaneous listening turns present a different picture though. Although both Wiemann and Knapp and Duncan and Fiske posited a theoretical state in which both interactants in dyadic conversations can simultaneously decline the speaking turn, which, like the

state of simultaneous speaking turns, represents a breakdown in the turn mechanism, either that state did not occur for their adult subjects or they chose not to identify it. In contrast, in children's conversations it occurred 44 times, 27 times in the unstructured context and 17 times in the structured context, opposite to the predicted direction, but not significantly. One reason that simultaneous listening turn errors were found to this extent in children's conversation may have been that the criterion measure of two seconds was shorter than that considered in the adult studies, although neither mentioned a specific criterion. In the present study, if the criterion measure had been one second, there would have been more simultaneous silences recorded. By the same token, if the criterion measure had been three seconds, fewer such silences would have been observed. It is a logical assumption, that in the adult studies a criterion measure greater than two seconds, rather than less, was used; therefore, no instances of this phenomenon were found. Duncan and Fiske reported a measure of filled pauses, which was a count of speech disturbances characterized by the use of sounds such as "ah," "er," and "um." These pauses were undoubtedly quite short, and not like the longer silences measured here. The longer silences were more like what Bruneau (1973) described as interactive

silences, which he regarded as being associated with the decision as to who will assume the speaking turn, but again, he did not specify how long an interactive silence is in comparison to the shorter type of unfilled pause, except to say that it is longer. The 2-second criterion established here was based on the researcher's observation that a 2-second silence was an awkward moment in the conversation and reflected a break in the smooth flow of conversation.

That simultaneous listening turn errors did not differ significantly between communicative contexts and occurred more often in the conversation in which it was expected to be less frequent, raised the question of its validity as a measure of communicative competence. While its validity can be challenged with respect to its occurrence under the same circumstances as simultaneous speaking turns, it has been argued that silences of at least two seconds do indicate a form of error in the operation of the turn mechanism.

The context of a conversation, however, appears capable of determining the type of error made. In the structured conversation, means for simultaneous speaking turn errors were higher in all groups, supporting the original rationale that the provocative and competitive nature of the structured conversation resulted in

children's violation of a basic rule of turn taking. In contrast, the interaction of grade and communicative context for simultaneous listening turns precludes a simple hypothesis of conditions under which these errors occur. Bruneau (1973) speculated that interactive silences can signify caution on the part of the interactants, or an emotionally close relationship between them, or an interpersonal snub. Another reason for this behavior may be cognitive demands of the situation. This explanation could account for the higher number of listening turn errors by younger children in the structured conversation which required children to formulate reasons for claiming a mutually prized object. Kowal, O'Connell, and Sabin (1975) found that in children ranging in grade from kindergarten to high school, younger children paused more and for longer stretches than older children when they had to describe something. Similarly, encoding verbal arguments was probably a more difficult cognitive task for kindergarteners than either third or sixth graders and caused them to pause more in their conversations.

Cognitive difficulty cannot, however, explain the higher levels of simultaneous listening turn errors in third and sixth graders than in kindergarteners for the unstructured conversations. In that context if the same reasoning applied the inference to be drawn would be that

older children found the unstructured task more demanding than younger children, which seems unlikely. Alternative explanations are that the older children were more cautious than younger children, or more self conscious, or that their relationships were closer, or that they were snubbing one another. The most plausible is that the older children's relationships were closer. For many of them their friendships went back to kindergarten. The hypothesis that a closer relationship or one of longer duration produced more simultaneous listening turn errors is supported by the findings for adults, who made no listening turn errors, and for kindergarteners, who made the fewest errors of the three age groups. Kindergarteners and adults were more similar to each other than to third and sixth graders in the sense that kindergarteners had the least developed friendships and the adults were strangers.

To return to the question of whether children in the unstructured conversation were more rule-abiding than adults in unstructured conversation, the evidence is enticing, but not convincing. It was clear that children, irrespective of grade, did commit fewer interruptions and simultaneous speaking turn errors than adults, yet they also made more listening turn errors, especially third and sixth graders.

What evidence in the display of turn signals could support or refute a claim that children were more rule-abiding than adults? The comparative findings between children and adults were suggestive. Children as speakers gazed at their partners for a greater proportion of time and, for third and sixth graders, gesticulated at a greater rate than adult speakers, and children overall shifted their seat position at a considerably higher rate than adults. It appeared that when children used more turn signals than adults they made fewer simultaneous speaking turn errors, which is positive support for the claim, but at the same time they made more listening turn errors, which refutes the claim. Evidence in children that higher turn-taking scores were associated with lower error scores would also have provided indirect support of the claim by showing that the turn signals were functioning as expected. However, there were no significant negative correlations between error measures and the act variables. In sum, a claim that children were more rule abiding than adults in unstructured conversation was not supported and was confounded by a negative relationship between error measures.

Turning to sex differences, the results did not support a hypothesis that girls would avert their gaze less than boys, contrary to findings that in same sex dyads

women in both positively and negatively toned interactions gazed at their partner more than men (Argyle and Cook, 1976; Duncan and Fiske, 1977; Exline, 1963; Mehrabian, 1969). Equally surprising was the finding that girls averted their gaze more than boys under all conditions and significantly more so as listeners than as speakers. The table shows means for this interaction along with data from two adult studies (Argyle and Ingham, 1972, reported in Argyle and Cook, 1976; Duncan and Fiske, 1977).

Table 21

Adult and Child Gaze Aversions Means, by Sex and Role

	Female Dyads		Male Dyads	
Study	Speaker	Listener	Speaker	Listener
Argyle & Ingham	.52	.22	.69	.26
Duncan & Fiske	.34	.10	.44	.16
Levey	.18	.27	.12	.12

The contrast in Table 21 between adults and children is evident. It is also apparent that differences exist between the two adult studies which are not explicable in terms of sex, the nature of these differences being in degree rather than in kind. Adult speakers spent a

considerably higher proportion of time averting their gaze than adult listeners, though, in contrast to child speakers and listeners. In terms of absolute differences between means, however, there was a greater difference between child and adult speakers than between child and adult listeners. As listeners, the girls' mean approached those of adults in the Argyle and Ingham study, the boys' mean were similar to those of adults in the Duncan and Fiske study. As speakers, gaze aversion for both girls and boys was considerably less than in adults. It would not be too far fetched to speculate that role and not sex was the over-riding factor in accounting for differences between adults and children in their use of gaze. This hypothesis is in accord with that made earlier in comparing adults and children across sexes that child speakers kept the visual channel open a greater proportion of time in their conversations than adult speakers.

The fact that girls averted their gaze more than boys yet did not make more errors or interruptions than boys suggests that vocal cues such as pitch may have aided their turn taking.

Differences between girls and boys were also found in the lengths of their conversations with girls engaging in longer talks in both communicative contexts. Mean turn lengths across conversations were 5.25 seconds for

girls compared to 3.33 seconds for boys. It was suggested that this finding could account for girls' higher means for gesticulations, forward leans and head nods. In fact, elapsed time across age/sex groups correlated significantly in the unstructured conversation with speaker gesticulations, backward leans and head nods and listener gesticulations, forward leans, head nods and back channel communication and, in the structured conversation, with both speaker and listener gesticulations, forward leans, and head nods. Similarly, significantly longer speaking turns by male dyads in the Duncan and Fiske study (14.7 seconds for males compared to 11.2 seconds for females) may have accounted for their greater number of changes in seat position which, to recall, included forward leans and backward leans. On the other hand, there were no sex differences in adults for either gesture scores or head nod scores.

That the explanatory power of elapsed time for sex differences in nonverbal categories did not encompass children's interruptions or errors suggests that the speaking turn as the unit of analysis is a more viable approach than time in understanding the turn mechanism and children's communicative competence with respect to their use of the mechanism.

Implications of Findings

The problem remains of whether the corpus of behavioral measures was adequate or sufficient to distinguish differences between child dyads in their underlying ability to coordinate speaker/listener roles. Between sexes, there was evidence that girls may have been relying on vocal rather than visual cues to a greater extent than boys in inferring what their partners intended to do. This is a testable hypothesis for future study which might include the nonverbal behavior of vocal pitch.

Between grade levels, which spanned the ages normally associated with preoperational, concrete operational and formal operational thought, implications of the findings for future research are more complex. The main problem is deciding on the basis of present results whether the social cognitive ability to infer intentions, as measured by the development of children's turn taking, was achieved at a younger age than expected and at a younger age that comparable inferential skills, such as the ability to infer what another sees or feels, or even other measures of the same skill to infer intentions; for example, as measured in studies of moral judgement (See Shantz, 1975, for a review of social cognitive development).

As in the case of sex differences, there was evidence from grade level differences that the corpus of behaviors studied was inadequate. Results for gaze aversion and forward leans indicated that there may be nonlinear development in the display of some turn signals. Third-grade scores in the structured conversation were significantly higher than those of other children. One explanation is that the appeal of the task in the structured context was different for third graders than for either kindergarten or sixth graders. Qualitatively the conversations of third graders seemed livelier in the structured conversation than those of either kindergarten children or sixth graders, but whether the findings were due to the appeal of the task to one age group of children rather than another or simply to an artifact in sampling third graders is left for future study.

In addition to some signals failing to be significant developmentally because of nonlinearity, other signals may not have differed between grade levels because of the relative infrequency of their occurrence. The low incidence of backward leans was one example. Means for this behavior were .275, .700, and .975 for kindergarten, third grade and sixth grade, respectively, in the predicted direction. Nonsignificant developmental trends

were also noted for the verbal measures of back channel communication and interruptions.

Given that neither of the turn signals which were significant developmentally were related to either error measure, and the likelihood that other turn measures were inadequate indices of developmental change, a conclusion that children as young as kindergarten have reached a level of communicative competence equal to that of sixth graders is premature. On the other hand, it could be argued that even if other nonverbal behaviors, such as vocal pitch, were found to change with age, what would that imply if they were not related to measures of communicative competence, as the developmentally significant behaviors in the present study were not?

What is needed is an approach that does not make artificial distinctions between encoding and decoding and that does not exclude any regulatory signal or cue on the basis of low frequency of occurrence or nonlinear development. The approach advocated by Duncan and Fiske (1977) recognizes these problems, among others, in the structural study of acts in their interactive context. In particular, their model of face-to-face interaction recognizes that "no convention rigidly constrains every detail of the actions to which it applies. . . . To behave in accordance with a convention is not to be deprived of individual

choice and initiative" (p. 278). They observed several sources of variation in the performance of convention, including "permissible variation in the display of signals, . . . response alternatives deriving from optional sequences of action provided for by the convention, and outright violation of the convention" (p. 326).

According to their exposition, variation in the display of signals is permissible

> in the repertoires of cues and signals used in the interaction, drawn from larger sets of cues and of signals available within the convention . . .
>
> in the use of cues and signals in characteristic sequences or simultaneous clusters . . . (and)
>
> in the relative frequency or extent of use of cues or signals. (p. 280)

Within the framework of the turn system, they regarded variation in response alternatives of the interactants as being based on the notion that turn signals are "permissive, not coercive" (p. 280). An individual may choose whether to respond or not respond to his or her partner's display of a signal. In the case of children, for whom it is not known whether they are rule abiding, that is to say, behaving in accordance with convention, the lack of response may not be one of choice, but of

cognitive deficit. This distinction is important in formulating developmental hypotheses and decision criteria.

Of the two types of violation of convention mentioned by Duncan and Fiske, both were addressed in the present study, in varying degrees. The measures of simultaneous speaking turns and simultaneous listening turns related to violation of the interaction rule that turns must exchange smoothly. The other type of violation, exceeding permissible limits on variation in the performance of convention, was considered herein as the measure of interruptions. However, it was noted in the introduction that it was unclear when an interruption was to be regarded as a legitimate turn signal, as proposed by Wiemann and Knapp (1975), and when it was a violation of convention. In the former case Wiemann and Knapp maintained that a listener is not at the mercy of an unyielding speaker and so has the option of requesting the turn by interrupting the speaker, but they did not specify the permissible length of a speaking turn beyond which an interruption is a justifiable turn signal. Lacking such information it is difficult to see on what basis they concluded that an interruption was a turn signal and not an error, or violation of convention. In the present study the fact that turn signals were uncorrelated with either type of violation was a strong

indication that the approach used did not adequately address the final question of how the display of turn signals in children's conversations was related to communicative competence, as measured by their adherence to the interaction rule that turns must exchange smoothly.

The Duncan and Fiske paradigm has the power to address this question directly without making arbitrary distinctions between encoding and decoding. Any action is conceptualized as being part of a sequence and capable of being simultaneously an individual response and initiative: "a response in the sense of taking into account (or failing to do so) the preceding actions of the partner, and an initiative in the sense of representing a positive choice in the presence of alternatives" (p. 315).

In this model it would be possible to determine how the behavioral cues function in the microcosm of interactive space and which action sequences result in smooth exchanges and which do not. In terms of perspective taking and children's ability to make inferences about their partners' intentions with respect to taking or yielding speaker and listener roles, the study of action sequences would enable the researcher to make decisions

on the basis of overt behavior by formulating action-sequence variables and testing them statistically.

One example of an action-sequence variable suggested by Duncan and Fiske was: "Rate of auditor attempts to take the speaking turn, given the activation of x turn cues by the speaker, when the gesticulation [attempt-suppressing] signal is not concurrently activated" (p. 318). This variable views the situation from the listener's perspective, considering the speaker's behavior as an independent action and the listener's response as a dependent action. The same action sequence might also be considered from the speaker's point of view by positing the listener's response as independent and the speaker's behavior as dependent. The action-sequence variable would then be formulated to answer the question: "Does a high rate of auditor attempts [to take over the speaking turn] tend to affect the number of turn cues subsequently activated by the speaker" (p. 318)? This question is relevant to understanding the findings of differences between communicative contexts in which the problem of the functional significance of the turn signals was unresolved.

From the results of the correlational analyses in the present study which revealed congruences between speakers and listeners in their use of nonverbal behaviors,

raw material for other types of structural analysis is available. In the unstructured conversation there were potential action-sequence variables for the measures of gaze, gesticulations, backward leans, and head nods. In the structured conversation, in addition to high correlations between speakers and listeners for the same behaviors, there was a high correlation for touch. A simple action-sequence variable based on the correlation for touch, for example, might be rate of individual's touching response to, and during, partner's touching. This variable, unlike the correlation measures, provides a direct index of the effects of one participant's touching behavior on the other. As expressed this variable does not relate precisely to the turn system; the approach, as noted, is applicable to the general study of face-to-face interaction. However, the tendency toward response matching noted in the correlational statistics and by others (Argyle & Cook, 1976; Condon & Ogston, 1967; Welkowitz, Cariffe & Feldstein, 1976) may be indicative of stylistic differences among dyads in the regulation of speaking turns. Argyle and Cook (1976) suggested the possibility "that the early appearance of mutual gaze, and shared attentiveness, marks the beginning of 'inter-subjectivity', i.e. awareness of the thoughts or intentions of another" (p. 14). Their review of studies of

gaze and mutual gaze revealed a gap between the infancy literature showing linkages between visual behavior and social development, particularly attachment, and adult studies relating gaze and normative social behavior in dyads.

Gaps in the literature between infant studies and adult studies in the area of communicative competence based on nonverbal measures are still large and are why the present study was undertaken. Future studies using the type of approach discussed, which does not do justice to the richness of Duncan and Fiske's ideas, would accomplish a great deal towards reducing that gap and advancing knowledge of children's communicative competence and social cognitive development.

APPENDIX

INFORMED CONSENT FORM

Dear Parents,

Your permission is requested for your child to participate in a study being conducted by Mrs. Linda Madison Levey, a doctoral candidate in the Educational Psychology Program at the City University of New York, with the assistance of the video production class at the School of Performing Arts, under the supervision of Ms. Ava Grodner. The study is of children's ability to converse with other children their own age and how their conversational ability improves with age. Pairs of children will be asked to converse with one another for about ten minutes on topics appropriate to their age and interests. The conversations will be videotaped in a room in your child's school.

In addition to your permission, each child will be asked individually if he or she would like to participate. The children will be free to leave the video session at any time they wish. Classes participating in the study will have the opportunity to see themselves on closed circuit television.

If you do not want your child to be in the study, or have any questions regarding the study, please contact my office.

Signed by School Principal

(telephone number)

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