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**MOTHERS' AND FATHERS' COMMUNICATION WITH THEIR  
PRESCHOOL-AGED CHILDREN IN EXPERIMENTAL SESSIONS**

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## ABSTRACT

The present study examines the communication of parents and their four-year-old child with a sample of 48 Finnish families. The purpose of the study was to investigate the effects of parental education, the sex of parent and child, the presence and absence of another parent, the activity undertaken by the participants and the familiarity of the context (the first vs the second stage of the study, home vs laboratory). The families were divided into equal groups of lower and higher parental education. The experiments were carried out in two stages: the first in the laboratory setting and the second in the laboratory setting or at home. The videotaped situations consisted of different cooperative tasks. Measures of communication were based on sequential data: Basic social skills of interaction (initiatives, acknowledgements, nonverbal reactions) and exchanges in communication (question-, demand-, suggestion- and statement exchanges). The results indicated that parental education and parent's sex are not of central importance in parent-child communication. The purpose of interaction and the type of the task had the clearest influence on the basic social skills of interaction and the exchanges of communication. In addition, the task appeared to exert differential effects on the communication of different parent-child groups.

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## 1. Introduction

### 1.1. Verbal and nonverbal communication between adults and children

A child acquires the knowledge and values of his community mainly through interaction with other members of his culture, particularly his family members. Both verbal and nonverbal communication are essential forms of this interaction.

Traditionally, communicative abilities have been considered primarily from either linguistic, cognitive or social perspective. Nowadays, there are in linguistics many theoretical emphases, the most important of which, from the point of view of family interaction, are those based on communication or interaction. Those views on the acquisition of language that argue for the importance of environment point out that in interaction through language the production of well-formed sentences is not an end in itself, rather that persons want to establish relationships with others, to communicate information and to engage in joint activities (Wells, 1985a). Through interacting with those in his environment, the child both acquires the language of his community and learns how to make use of those resources in order to achieve a variety of purposes in relation to different people in different situations.

A number of studies of early mother-infant interaction have dealt with particular categories of communication such as the exchange of gazes, vocalizations, or smiles. The investigations on the prelinguistic child and his parent show that infants are treated from early on as communicative partners who have communicative intentions and express them. For example, Snow (1984)

described how parents search for communicative responses in the behavior of children. The mother of a 3-month-old infant responded to his vocalizations in the same way as she would to speech and used short, grammatically simple and highly repetitive utterances. Further, Snow illustrated how the mother provided a label for both the event and the child's experience. This way parents tell children or indicate to them what they should do, think and feel in different situations. Gleason (1973) has called this speech the language of socialization.

Many studies (e.g. Cherry, 1979) have showed that mothers adjust their requests to the children's level of language development. While during the early stages of language acquisition, children seemed to benefit from adult interactions which were contingent on and responsive to children's utterances, Snow (1984) speculated that after the early stages of language development children's language and cognitive development might be better facilitated by parental behaviors which are more than simply responding to, accepting and extending the child's own intentions. For example, exploratory talk that can accompany reading a story provides an opportunity for the child to relate the characters and events of the imaginary world to their own experience, but at the same time the child may realize the potential that language has to create alternative possible worlds through words (Wells, 1985a). In later childhood it is important for children to be exposed to new information about how the world is organized and to be encouraged to reflect on language. In so far as the child and the adult share some interests in events or objects, the adult may help the child to take it further. Wells (1985a) stated that adults can enable children to encounter new knowledge and skills and to make them their own.

Conversations between adults and children are situations in which children participate in the roles of speaker and listener. As Cherry (1979) noted, the direct information about language use is available to the child, for example, in request sequences (adults' use of request for clarification, adults' use of the

request for known information). The immediate opportunity to produce language may be important for the process of language development. The roles of speaker and listener engage the person in a number of interrelated processes: "translating between personal experience and the semantic structure of their common language, encoding and decoding meaning intentions, through lexical items in grammatical structure, and integrating the phonological, prosodic and gestural patterns by means of which the message is given physical realisation" (Wells, 1981, p. 73).

There are very few studies concerning conversational experiences in childhood in which the child is seen as an active participant (e.g. Howe, 1981; Wells, 1981). The starting point of a study by Howe (1981) was that conversations consist of exchanges where one speaker addresses another speaker with a remark that requests or provides information and that the other speaker addresses the first speaker with a remark that gives a minimal or extended reply. Each of these exchanges can be initiated by a remark from either the adult or the child.

The study by Howe (1981) focused on verbal interaction of mother-child pairs (mean age of children 17 months). The results showed three distinct patterns of mother-child conversations. The first pattern consisted of mother-initiated exchanges which began with the mother providing information and ended with the child giving minimal replies. Replies were regarded as extended if they fulfilled the minimal requirements and requested or provided new information about the same subjects, or old information about a new subject. Minimal replies provided requested information or gave evaluative or/and corrective feedback on the information provided. The child-initiated exchanges began with information provided by the child, but ended with both minimal and extended replies given by the mothers. The second pattern began in mother-initiated exchanges either with information provided or requested by the mothers. These exchanges nearly always ended with minimal replies given by the children. Children began their exchanges nearly always by providing information and mothers

ended by giving minimal replies. The third pattern began with information provided or requested by the mothers in mother-initiated exchanges and ended with minimal replies given by the children. The child-initiated exchanges usually began with information provided by the children, but ended with both minimal and extended replies given by the mothers. The role of the child as a participant was different in different patterns of conversations. Most of the group differences were replicated in the follow-up study.

The longitudinal studies by Wells and his colleagues (Wells, Montgomery & MacLure, 1979; Wells, 1981; Wells, 1985b) were concerned with the analysis of interactions between adults and children and attempted to identify styles of interaction. Further, they investigated the impact of interactional contexts on the development of the resources of linguistic communication in children and on the use of these resources to learn about the world in which they live.

In a comparison of two conversations between the mothers and their two-year-olds (Wells et al., 1979) one mother was found to adopt a 'supportive' style, while another mother adopted a 'leading' style. The first mother encouraged her child to adopt a predominantly initiating role by making acknowledgments and requesting further information, the second mother made mainly initiating moves herself which cast the child in the role of respondent. The resulting conversations were quite different in these two cases. While the first conversation contained features that served to create and maintain the intersubjectivity of perspective (cohesion, ellipsis, rising tone), in the second the mother seemed to insist on her own perspective as the only relevant one throughout the session. The first child's contributions to the conversation were richer and linguistically more mature. The extent to which children are allowed to have an active role in conversations would be the most significant factor in determining desirability in the linguistic environment (e.g. Howe, 1981).

The focus of the above studies has been on verbal interaction, although acts of speaking are often accompanied by movements of the arms and hands. Recently, many authors (e.g. Kendon, 1983; Rutter, 1984; McNeill, 1985) have argued that the gestural modality is as fundamental as the verbal one as an instrument for conveying meaning. Referential and discourse-oriented gestures are considered overt products of the same internal processes that produce another overt product, viz. speech. Thus, gestures and speech are parts of the same psychological structure. One of the arguments used is concerned with the developmental parallels between speech and gestures. Children's use of gestures increases with age. In addition, there is a shift toward a more precise coordination between these two modalities (Kendon, 1983; McNeill, 1985). Language and nonverbal communication do more than just act in parallel, namely, they are integrated together.

#### 1.2. External effects on family interaction

The socialization process works on language, of which speech is one form. As the family is embedded in larger networks of social systems, general conditions of society affect the way parents carry out their parenting functions and have an impact on the nature of parent-child interaction (Takala, 1979, 1984, 1986). According to Bernstein (e.g., 1961, 1975) the network of social relationships in which the individual interacts and the communicative tasks which these relationships entail shape one's linguistic potential. The language that the child hears and that he uses shapes his view of reality.

The speech that parents employ has often been thought to be defined by social class (Bernstein, 1961, 1975). The studies based on Bernstein's description of linguistic codes (e.g., Hess & Shipman, 1965; Henderson, 1970; Edwards, 1976; Higgins, 1976; Johnston, 1977; Poole, 1979) have contained contradictory fin-

dings, which might indicate that the original distinctions were overly simplified. In particular, attention has been paid to the fact that the immediate context in which language is used is more important than the grammatical structure of a message (Bruner, 1971; Hall & Freedle, 1975; Dittmar, 1976; Edwards, 1976; Higgins, 1976).

A number of studies have centered on mother-child interaction to examine how the parents' speech behavior is transmitted to their children during the process of socialization (e.g. Hess & Shipman, 1965, 1968; Bee, 1971). Both socioeconomic status and education level of mothers have been found to be related to the use of inquiry strategies (Bee, 1971; Steward & Steward, 1974; Laosa, 1978; Sigel, 1982). Middle-class mothers were also reported to give more praise and positive feedback (Bee, 1971) than lower-class mothers. Lower-class mothers used modeling and demonstration techniques (Laosa, 1978) in teaching their five-year-old children.

Although teaching is only one of the many ways that parents transmit their expectations, beliefs and knowledge, the teaching strategies might lead to different modes of thinking in children. Sigel and his colleagues (McGillicuddy-deLisi, Sigel & Johnson, 1979; McGillicuddy-deLisi, 1982a,b; Sigel, 1982, 1986) assumed teaching strategies, conceptualized as distancing strategies, to have major influences on children's representational thinking. Children whose parents used distancing strategies (an inquiry approach that places a demand on the child to represent objects) were found to perform at higher levels in tasks involving memory, categorization, and transformation. Both parental teaching behaviors and children's representational ability scores varied with social class (Sigel, 1982).

Even the amount of speech directed toward the child has been claimed to be significant as regards children's linguistic competence (e.g. Lytton, 1980). Lytton reported that parents in the higher education groups engaged in more verbal interaction (rate of speech per unit of time) than the parents in the lower educa-

tion groups. A similar finding was revealed for children, too. The rate of child's speech was related to the rating of the maturity of the child's speech.

Earlier Finnish data (Rasku-Puttonen, 1983, 1987) indicated that educational background was not essential for linguistic aspects of speech nor for most interactional measures either. There were, however, a few differences: The higher education group presented cues for terminating their conversational turns more regularly and explained the rules of the game more precisely than the lower education group (Rasku-Puttonen, 1983). Similarly, the higher education parents used more mental operational demands than the lower educational parents in teaching their child (Rasku-Puttonen, 1987). These results indicated that the differences of verbal and nonverbal style are revealed in particular situations and tasks.

The differing control methods and differing use of language have been suggested to be due to the cumulative social experiences to which different social classes have been exposed. According to Hoffman (1984) the lower-class parents are subject to unexplained rules and authority both on the job and in relation to other institutions in society and this is reflected in their authority relations (use of power assertive techniques, no reasons for requirements) with their children. Hoffman states that the effects of the lower-class style of parental influence techniques are a sense of inefficiency in the child, an inability to communicate rationality in life and the lack of verbal enrichment. Thus, it is the social life of children rather than social class per se that is critical.

### 1.3. Sex differences in family interaction

Besides the social class or educational background the interest of family interaction studies focused on language has been in the differences of mothers' and fathers' speech behavior.

Many studies have reported parental differences in verbal interaction. The mothers are reported to be involved in more verbal interchanges with their children (Clarke-Stewart, 1980; Lytton, 1980; Stoneman & Brody, 1981) than the fathers. The fathers have been found to use more directly controlling language (imperatives, direct suggestions, and prompting questions) with their five-year-old children (McLaughlin, Schutz & White, 1980), and to use and request the actual names of car parts when helping their child to play (Masur & Gleason, 1980).

Research on sex differences in family interaction is voluminous and it is rather difficult to organize what is known about differences in treatment of boys and girls. Furthermore, the findings are not consistent (Huston, 1983). The sex of the child has been argued to be an important determinant of parents' communication with their children. Mothers has been found to stimulate their sons verbally more than their daughters (e.g. Masur & Gleason, 1980; Weitzman, Birns & Friend, 1985). Weitzman et al. reported differences in teaching, action verbs, numbers, questioning, explicitness and directives. Fathers have been argued to use directly controlling language more with sons than with daughters (McLaughlin, Shutz & White, 1980), although there are findings which indicate that fathers tend to treat boys and girls in the same manner (e.g. Masur & Gleason, 1980; Stoneman & Brody, 1981).

It is assumed that parents speak differently to the same-sex offspring. At least, the findings on the amount of talking indicate that mothers make more utterances to daughters and fathers more to sons in dyadic situations (Stoneman & Brody, 1981). Further, fathers took more conversational turns with their sons than

did mothers. However, fathers did not speak more to sons than to daughters in these situations. On the other hand, verbal interaction has been claimed to be more complex in cross-sex pairs (McLaughlin et al., 1980).

Studies comparing the nature of interactions involving two-person and three-person interactions (e.g., Lamb, 1976; Clarke-Stewart, 1978, 1980; Pedersen, Anderson & Cain, 1980; Stoneman & Brody, 1981) are consistent with the finding that less interaction takes place for any particular pair when a third person is present. The studies do not necessarily imply that the child interacts less in a triad than in a dyad. The study by Stoneman & Brody (1981) showed that the parents reduced their language output to accommodate an additional speaker in the conversation, whereas children remained remarkably consistent across situations. In triadic situations, mothers were reported to speak significantly more frequently than the fathers did. The fathers decreased their speaking, conversational turns and the use of questions.

The above studies reported differences by gender in parent-child communication with greater differences in parent behavior than in child behavior. The studies of verbal interaction in the family have been concerned with discrete observable behaviors. In spite of the fact that they have been based on cross-sectional designs, verbal differences are assumed to have implications for the sex role socialization and for the development of sex differences in cognitive skills (e.g. Block, 1983; Weitzman et al., 1985).

## 2. Problems

On the basis of earlier findings of Finnish data (Rasku-Puttonen, 1983, 1987) it was assumed that neither the educational background nor the sex of the parent would be decisive for communication with the child in ordinary interaction. However, it was hypothesized that differences would emerge in special activities or in special contexts. More specifically, it was expected that dyadic and triadic situations would be different for mothers and fathers and the differences between laboratory and home settings would be different for mothers and fathers. At the least it was expected, on the basis of other investigations (e.g., Clarke-Stewart, 1980; Pedersen et al., 1980) that there would occur changes when any third person is added to the dyadic situation.

Other issues were also addressed. First, it was asked whether there were differences in communication between parents and their daughters and parents and their sons in dyadic and triadic situations. Former studies (Masur & Gleason, 1980; Weitzman et al., 1985) have reported differences according to the sex of the child. Second, it was asked how the type of activity engaged in during a social exchange influences the way parents and children use language and whether this influence is similar across both dyadic and triadic contexts. On the basis of earlier studies (Aragona & Eyberg, 1981; Jones & Adamson, 1987; Rasku-Puttonen, 1983, 1987) it was expected that the type of activity would influence parent-child communication.

In summary, the primary focus in this paper was on the communication of parents and their child and how it was influenced by parental education, the sex of the parent and child, the presence and absence of another parent, the activity undertaken by the participants and the familiarity of the context (the first stage vs the second stage of the study, home vs laboratory).

### 3. Method

#### Subjects

The experiments were conducted in two stages. Forty-eight families of firstborn and secondborn 4-year-old children participated in the study. The subjects were divided into two groups on the basis of parents' education, lower education (LE)(24) and higher education (HE)(24): 12 mother-child dyads (6 girls and 6 boys) and 12 father-child dyads (6 girls and 6 boys) were examined for each. The LE group consisted of parents with only the basic compulsory education or some professional training (9 - 12 years of schooling) and the HE parents had a university degree or professional training at the college level (14 - 17 years of schooling). Approximately 55 % of those contacted agreed to participate.

The second stage involved half of these families; The sample was again balanced according to the parents' educational background and sex of the child. All the families in the first stage agreed to be contacted again in the second phase.

#### Material and procedures

The first stage of the study was conducted at the Department of Psychology at the University of Jyväskylä. First the parents were briefly interviewed as to parental education and family configurations and simultaneously the child performed a picture-vocabulary test. Then each mother-child and father-child dyad was given two kinds of cooperative task (a problem-solving task and a planning-task, both with two similar themes) and the sessions were videotaped (30 min in total). To control for possible order effects, order of the dyads and order of the task variations were randomized across families. Each parent was inter-

viewed individually after the parent-child sessions. Also the questionnaire was completed by both parents. The procedure is presented in Table 1.

The second stage was administered (Table 1) to half the families at home (n = 12) and to half in the laboratory setting (n = 12). First each parent-child dyad performed a problem-solving task and then parents were interviewed independently. Again, order of the dyads and order of the task variations were randomized across families. Finally, mother, father and the child participated in two free play tasks. The sessions were videotaped (30 min in total).

#### Tasks in recording sessions

There was a total of four tasks used in the first stage of the study, one problem-solving task for each parent and one planning-task for each parent to perform with the child. The problem-solving task consisted of model-building with blocks. The two sets of models were equally difficult and the parent-child dyads were asked to build them in cooperation. The theme of the two planning-tasks was similar, i.e., 'to plan together which places you want to visit and try to remember your earlier experiences from similar places'. The dyads were given either a map of a zoo or a picture of a playground.

The second stage of the study also consisted of four tasks, one problem-solving task for each parent to do with the child and two free play tasks for the triad of mother, father and the child. The problem-solving task was a paper-folding task, which involved constructing either a hat or a dog. Free play sessions for triads consisted of clay-modelling and of play with dolls and toy animals, trees, dishes and flowers.

#### Coding and analysis

The aim of the data analysis was to achieve a multilevel descrip-

TABLE 1: Experimental settings.

Stage of the study	Setting	Videotaping of interaction			
		Tasks for dyads	Tasks for triads	Interview and questionnaire	
		Mother-child and father-child	Mother-father-child	Mother and father	Child
I	Laboratory (n = 48)	Problem-solving (model-building with blocks)		Parental education, family configurations	
		Planning task (a zoo or a playground)		Questions about parent-child interaction	Questions about parent-child interaction
				Parents' perceptions of the child under natural conditions	Picture-vocabulary test
II	Laboratory (n = 12) Home (n = 12)	Problem-solving (Paper-folding of a hat or a dog)	Free play tasks: Clay-modelling Construction play	Questions about parent-child interaction	

tion of interaction. The results of this paper are based on sequential data. There have been many efforts to describe the dynamic character of psychological processes by applying methods of sequential analysis, such as Markovian analysis and lag-sequential analysis (e.g., Gottman & Bakeman, 1979; Sackett, 1979) as well as chi-squared and binomial tests which have been applied to parent-child data (e.g., Browne, 1986). The criticism of Markovian analysis is well-known and has focused among other things on ignoring time spans longer than one event back in time. Lag-sequential analysis techniques are criticized for taking out of temporal context the elements of sequence (e.g., Valsiner, 1986). Sequentially organized material has been reduced to time-free accumulated data, and then the researcher has proceeded further in an effort to explain the data. Instead Valsiner (1986) suggested the method called the sequence-structure analysis, which is useful for interpreting the temporal structure of actions when these actions are explicitly goal-directed. In the analysis the chain of ABCDEFGHIJ... is broken into sub-sequences of various lengths: in the first length A,B,C, etc., in the second AB,BC,CD, etc., in the third ABC,BCD,CDE, etc. The analysis will proceed to eliminate sub-sequences that are actually components of longer strings. Finally, the purified sub-sequences can be further analyzed qualitatively. Since the successive events are considered equal, no attention is paid to the different meaning of those events.

Initiatives are necessary for eliciting interaction. Responding to the partner plays an essential role in maintaining interaction. Small children and also less sophisticated children have been found to use action responses in the informational sequences more often than more sophisticated children (Shatz, 1984). It is assumed that responding only nonverbally is not favourable, at least when responding to questions and suggestions. In regulating interaction one of the most important skills is affirming that the message has been received and is understood. Here these utterances are called acknowledgements.

The above components might be regarded as basic social skills (Takala, 1979), which are necessary for eliciting and maintaining interaction.

Coding procedures and measures of communication. A coding scheme was devised to characterize the use of language during each session. The conceptualization of the functions of language used here was derived from the author's earlier work (Rasku-Puttonen, 1981) and from the work of Condon, Cooper and Grotevant (1984). Before the interaction could be coded, verbal and/or nonverbal expressions had to be divided into codable units. The unit was defined as a sentence or specific communicative action. It was assumed that at least young children would use nonverbal means for conveying different functions of language. When parent-child interaction was coded it was, every now and then, necessary to rely on context cues, in which cases was of most importance the partner's subsequent reaction. For this reason the coding was based on the video-recordings instead of transcriptions. Interpretations were then made on the basis of both visual and auditory channels.

Categorization of verbal and nonverbal communication was performed for the 5 min. segment of each task and was as follows:

Suggestions (E) present a possible solution to the task, expresses the speaker's opinion as one alternative to organize cooperative action. Suggestions could be expressed verbally and/or nonverbally.

Requests information, asks a question (K). A yes or no answer or a single-word utterance will be satisfactory. Asking help and a piece of advice were also included here. This function could be expressed verbally and/or nonverbally.

Asking one's opinion, question with explanations (MK). Giving an answer requires inferences and/or reasoning. This function could be expressed verbally.

Requests action, demanding (KEV, KE1). The requests could be demands or commands. Requests were expressed directly using

imperative verb forms or indirectly using question forms. Demanding could be expressed verbally and/or nonverbally.

Agrees, accepts the partner's idea (A). This function could be expressed verbally and/or nonverbally.

Disagrees, criticizes the partner's idea (D). This function could be expressed verbally and/or nonverbally.

Answers request for information, short statements, relevant comments (T). This function could be expressed verbally and/or nonverbally.

Arguments, explanations with expanded information (H). This function could be expressed verbally.

Complies with request for action (S). This function could be expressed verbally and/or nonverbally.

Acknowledgements (Va) function to affirm that the message has been received ('yeah', repetition). This function could be expressed verbally and/or nonverbally.

Extended acknowledgements (LVa) function to provide new information about the same subjects or old information about a new subject.

Looking, smiling, gestures which accompany speech, task-related relevant action (NV). Looking NV(k) and smiling NV(h) were coded every time they occurred, but actions were coded only in that case when there was not found any 'higher' codable unit and the partner seemed to react.

No clear move or response function (N). Incomplete, uninterpretable utterances; focus on surroundings or on the equipment; nonsense vocalizations.

States own or other's feelings (F). Expresses needs, desires, wishes; supportive utterances.

The coding scheme included an exclusive and exhaustive set of code items. For this reason the category of task-related, relevant action was coded only in the case that there was no other simultaneous function and the immediate reaction of the partner was clearly elicited by it.

Using categories of functions the flow of interaction was

written into sequences: e.g. /child makes a statement (T) -> mother acknowledges (Va)/ -> /child indirectly makes a request for action (KEI) -> mother complies with request nonverbally (S nonverb.)/ -> /child makes a statement (T) -> mother makes a statement (T) -> child acknowledges (Va)/ -> /mother asks a question (K) -> child answers (statement) (T) -> mother acknowledges (Va) -> child acknowledges (Va)/ -> / child makes a statement (T) -> mother explains (H) -> child explains (H) -> mother acknowledges (Va)/.

Several efforts were made at analyzing sequential data. Since an application of lag-sequential analysis to the identical data revealed only sequences of question-answer, other alternatives were examined. In addition, attempts at conducting factor analysis were not productive. The sequence-structure analysis by Valsiner (1986) takes successive events to be equal although questions, demands and suggestions could be considered differently from statements, because they put more pressure on the partner to react. Therefore, these sequential data were broken into sub-sequences or exchanges which seemed to be natural (see the example above; exchanges are separated from each other by diagonal marks). Exchanges were initiated by questions, demands, suggestions or statements. In addition, attention was paid to the subsequent or immediate event (which could be verbal or nonverbal) and to the last event of the exchange, whether the exchange was ended with acknowledgements or not. Almost all the sequential data was covered this way.

To summarize, measures used in this work were as follows:

Basic social skills of interaction:

1. Initiatives made by the child and the parent (frequencies, expressing the total number of interactive exchanges).
2. Acknowledgements in child-initiated and parent-initiated exchanges.
3. Child's nonverbal reactions to all the initiatives.
4. Child's nonverbal reactions to questions and suggestions.

Acknowledgements and nonverbal reactions were used in analysis

as proportions of the total number of interactive exchanges.

Exchanges in communication: The focus here was on the exchanges initiated by parents, because parents made the majority of them. For the analysis of the data the exchanges were further aggregated into question-, demand-, suggestion- and statement-exchanges. The types of exchanges were analyzed as proportions of the total number of interactive exchanges.

The measures were taken from a 5-minute segment of each task.

#### Reliability of the measures

Two persons coded approximately 20 % of the data separately. Reliability was calculated by using the agreement ratio (number of agreements/ (number of agreements + disagreements). The agreement was 77 % for categories of functions in sequences and 91% for initiations of sequences. Those doing the coding were not informed of the social background of individual families.

#### 4. Results

A repeated measures analysis of variance was conducted for measures of communication. Repeated measures were analyzed with the MANOVA approach. The homogeneity of dispersion matrices was tested using the multivariate generalization of Box's M test. Two-way analysis of variance was conducted when the MANOVA was not appropriate.

#### 4.1. Communication in parent-child dyads

The effect of parental education, sex and task

Basic social skills of interaction. Results showed that fathers made more initiatives than mothers in the problem-solving task, whereas mothers made more in the planning task. The tasks differed from each other with regard to the amount of initiatives. All the parents had more initiatives in the planning task ( $F(1,44) = 15.41, p < 0.000$ ). No significant effects were found for parental education. The mean scores and results of the analysis are displayed in Table 2.

No significant differences were found between boys and girls of lower and higher education groups in the amount of initiatives.

The results showed a significant main effect for the number of acknowledgements with parent-daughter dyads using them more in terminating their exchanges than parent-son dyads (Table 2). The finding was revealed only for those exchanges initiated by the parents. In general, acknowledgements were more regularly used in the planning task than in the problem-solving task ( $F(1,44) = 27.88, p < 0.000$  for exchanges initiated by parents,  $F(1,44) = 8.67, p < 0.01$  for exchanges initiated by children). There were no significant differences between mothers and fathers nor between higher and lower educational groups.

Nonverbal responses to questions and suggestions were examined separately from the analysis of nonverbal responses to questions, suggestions and demands. Girls responded nonverbally more often than did boys. The analysis of nonverbal responses to all the initiatives indicated that parent's sex and child's sex had a significant interaction effect. Children in same-sex pairs made more nonverbal responses than in cross-sex pairs. One exception was mother-son dyads in the planning task, with more nonverbal responses than mother-daughter dyads. Overall, nonverbal responses were more common in the problem-solving task than in the

TABLE 2. Mean scores obtained by the parent-child groups on measures of basic social skills of interaction during the two cooperative tasks.

Dependent variable	Mother-child dyad								Father-child dyad							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Child-initiated exchanges *																
Problem-solving	9.83	5.36	8.42	4.85	10.92	6.79	10.83	5.75	13.58	7.94	9.08	5.00	9.75	4.75	9.00	5.75
Planning	10.58	5.33	8.17	4.26	9.50	4.70	10.33	6.49	15.58	7.30	7.83	5.15	11.08	6.24	11.83	4.59
Parent-initiated exchanges *																
Problem-solving	23.00	6.38	21.67	6.65	23.75	4.24	22.50	10.35	24.42	12.10	25.75	7.76	22.92	4.74	24.42	7.95
Planning	29.25	6.21	28.83	9.74	30.58	6.01	24.33	7.39	26.17	6.63	28.58	6.60	25.75	7.92	23.83	7.33
Acknowledgements in child-initiated exchanges																
Problem-solving	0.54	0.24	0.48	0.29	0.54	0.19	0.54	0.28	0.50	0.26	0.35	0.23	0.44	0.26	0.44	0.28
Planning	0.68	0.19	0.47	0.26	0.54	0.30	0.57	0.26	0.71	0.13	0.51	0.28	0.55	0.29	0.56	0.27
Acknowledgements in parent-initiated exchanges																
Problem-solving	0.40	0.15	0.31	0.13	0.38	0.18	0.33	0.17	0.45	0.12	0.35	0.16	0.40	0.18	0.34	0.12
Planning	0.56	0.14	0.46	0.15	0.50	0.14	0.42	0.13	0.55	0.16	0.36	0.15	0.46	0.20	0.47	0.11
Child's nonverbal reactions to questions and suggestions																
Problem-solving	0.11	0.10	0.07	0.10	0.10	0.09	0.06	0.07	0.11	0.12	0.05	0.05	0.09	0.07	0.07	0.08
Planning	0.05	0.06	0.02	0.04	0.05	0.04	0.04	0.04	0.06	0.06	0.03	0.03	0.06	0.06	0.05	0.06
Child's nonverbal reactions to all the initiatives																
Problem-solving	0.35	0.19	0.26	0.26	0.34	0.15	0.31	0.18	0.29	0.26	0.45	0.21	0.35	0.17	0.38	0.21
Planning	0.13	0.09	0.16	0.12	0.12	0.12	0.13	0.10	0.15	0.09	0.19	0.09	0.12	0.08	0.18	0.14

Note: \* Frequencies (other measures are proportions)

MANOVAs:

Parent-initiated exchanges

Task F (1,44) = 15.41, p = .000

Parent sex x Task F (1,44) = 4.64, p = .04

Acknowledgements in child-initiated exchanges

Task F (1,44) = 8.67, p = .005

Acknowledgements in parent-initiated exchanges

Child sex F (1,44) = 8.21, p = .006

Task F (1,44) = 27.88, p = .000

Child's nonverbal reactions to questions and suggestions

Child sex F (1,44) = 4.29, p = .04

Task F (1,44) = 18.94, p = .000

Child's nonverbal reactions to all the initiatives

Child sex x Parent sex F (1,44) = 5.00, p = .03

Task F (1,44) = 79.78, p = .000

planning task (  $F(1,44) = 18.94, p < 0.000$  for nonverbal responses to questions and suggestions,  $F(1,44) = 79.78, p < 0.000$  for nonverbal responses to all the initiatives). No significant differences were found between parental education groups.

Exchanges in communication. For the question-exchanges there appeared only task effect,  $F(1,44) = 114.76, p < 0.000$ . The proportion of questions asked was higher for all the dyads in the planning task than in the problem-solving task.

For the demand-exchanges the analysis revealed interactions between child's sex and parent's sex, and between child's sex, parent's sex and task (Table 3). This means that the relationship between demands and task differed for mother-child and father-child dyads and moreover, this relationship was different for boys and girls. The means indicated that mothers with daughters and fathers with sons used more demands than parents in cross-sex dyads in the problem-solving task. However, both mothers and fathers with sons used more demands than mothers and fathers with daughters in the planning task. Not surprisingly, demanding was more often used in the problem-solving task than in the planning task.

The proportion of suggestions was low compared with questions and demands. Significant interaction effects were found between child's sex and parent's sex, and between child's sex and task. An inspection of the means revealed that suggestions were more often used in cross-sex dyads than in same-sex dyads. Only fathers with lower education made more suggestions to sons than to daughters in the problem-solving task.

The child's sex was found to affect the statement-exchanges, too. Parent-daughter dyads had proportionately more statements than parent-son dyads.

The effect of the familiarity of the situation

The first stage vs the second stage of the study. Exchanges of communication observed in the problem-solving task of the first

TABLE 3. Mean scores obtained by the parent-child groups on measures of exchanges in communication during the two cooperative tasks.

Dependent variable	Mother-child dyad								Father-child dyad							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Question- exchanges																
Problem-solving	0.46	0.16	0.49	0.22	0.45	0.15	0.41	0.17	0.46	0.13	0.32	0.22	0.46	0.13	0.39	0.19
Planning	0.69	0.11	0.65	0.17	0.65	0.15	0.63	0.17	0.57	0.11	0.65	0.12	0.68	0.15	0.67	0.19
Demand- exchanges																
Problem-solving	0.32	0.19	0.26	0.22	0.32	0.19	0.29	0.17	0.26	0.15	0.51	0.22	0.29	0.18	0.38	0.22
Planning	0.12	0.08	0.18	0.18	0.09	0.11	0.13	0.11	0.14	0.08	0.18	0.09	0.07	0.08	0.17	0.15
Suggestion- exchanges																
Problem-solving	0.09	0.08	0.17	0.13	0.11	0.08	0.13	0.07	0.12	0.13	0.06	0.05	0.09	0.09	0.13	0.09
Planning	0.06	0.07	0.08	0.07	0.09	0.04	0.09	0.09	0.10	0.09	0.06	0.06	0.09	0.07	0.05	0.07
Statement- exchanges																
Problem-solving	0.13	0.09	0.09	0.09	0.12	0.11	0.12	0.08	0.16	0.08	0.11	0.09	0.15	0.11	0.09	0.06
Planning	0.12	0.06	0.10	0.05	0.17	0.11	0.14	0.12	0.19	0.13	0.11	0.08	0.16	0.08	0.12	0.08

MANOVAs:

Question- exchanges

Task F (1,44) = 114.76, p = .000

Demand- exchanges

Child sex F (1,44) = 4.32, p = .04

Parent sex F (1,44) = 4.12, p = .05

Child sex x Parent sex F (1,44) = 9.20, p = .004

Task F (1,44) = 83.37, p = .000

Child sex x Parent sex x Task F (1,44) = 6.16, p = .02

Suggestion- exchanges

Child sex x Parent sex F (1,44) = 5.78, p = .02

Task F (1,44) = 19.65, p = .000

Child sex x Task F (1,44) = 6.69, p = .01

Statement- exchanges

Child sex F (1,44) = 6.62, p = .01

stage of the study were compared with those in the problem-solving task of the second stage of the study. There were 24 families who participated in both the stages.

As shown in Appendix 1, for child-initiated exchanges there appeared interaction between parental education, child's sex and parent's sex,  $F(1,20) = 4.34$ ,  $p < 0.05$ . According to the means girls with parents from the higher educational group made more initiatives than boys, whereas in the lower educational group boys made more initiatives than girls. In addition, differences between boys and girls were greater with fathers than with mothers.

For acknowledgements in child-initiated exchanges only task effect appeared,  $F(1,18) = 4.37$ ,  $p < 0.05$ . The means revealed that parent-child dyads used acknowledgements more regularly in the first problem-solving task than in the second one. Box's M test, however, showed that the hypothesis of the homogeneity of dispersion matrices was rejected ( $p < 0.02$ ). For acknowledgements in parent-initiated exchanges the analysis revealed interaction between parent's sex and child's sex,  $F(1,20) = 4.39$ ,  $p < 0.05$ . The differences between mother-daughter and mother-son dyads were minimal, whereas father-daughter dyads had more acknowledgements compared to father-son dyads.

The proportion of nonverbal reactions to parents' questions and suggestions was rather low. Children in the higher educational group reacted nonverbally more often than children in the lower educational group. The effect of parental education was significant,  $F(1,20) = 5.39$ ,  $p < 0.03$ . However, the variance-covariance matrices for nonverbal reactions in parent-initiated exchanges were not equal across all levels of the between-subject factors ( $p < 0.01$ ). For nonverbal reactions to all the initiatives, there was found interaction between parent's sex and child's sex,  $F(1,20) = 8.11$ ,  $p < 0.01$ . The results indicated that children in the same-sex pairs had more nonverbal reactions than children in the cross-sex pairs.

For question-exchanges (Appendix 2) the analysis revealed

interactions between parental education and parent's sex,  $F(1,20) = 5.32$ ,  $p < 0.03$ , and between child's sex and parent's sex,  $F(1,20) = 8.39$ ,  $p < 0.01$ . The mother-child dyads asked more questions than the father-child dyads in the higher educational group, whereas the reverse was true in the lower educational group. Furthermore, parents and children in the cross-sex dyads asked more questions than the same-sex dyads. In addition, questions were more often asked in the first problem-solving task than in the second one. The effect of the task was significant,  $F(1,20) = 13.66$ ,  $p < 0.001$ .

Demanding was more common in the second problem-solving task than in the first one,  $F(1,20) = 7.69$ ,  $p < 0.01$ . In addition, for demand-exchanges an interaction was found between child's sex and parent's sex,  $F(1,20) = 14.98$ ,  $p < 0.001$ . Demands were directed to the child of the same sex more than to the child of the cross-sex.

For suggestions an interaction between parental education and child's sex was revealed,  $F(1,20) = 6.50$ ,  $p < 0.02$ . Inspection of the means indicated that both fathers and mothers in the lower educational group made more suggestions to the sons than to the daughters, whereas the differences between parent-son and parent-daughter dyads was not outstanding in the higher educational group, making slightly more suggestions to daughters. The proportion of suggestions was higher for the lower educational group.

Parent-child dyads in the higher and lower educational groups used statements similarly.

Home vs laboratory. Half of the families were examined at their home and the other half again in the laboratory setting. A two-way analysis of variance was conducted here. The analysis of basic social skills of interaction showed only a few effects of parental education and setting (Appendix 3). The results revealed that mothers in the higher educational group made more initiatives in the laboratory than at home, whereas mothers in the lower educational group made them more at home,  $F(\text{inter})(1,20) = 4.97$ ,  $p < 0.04$ . The difference was not found for fathers.

The setting seemed to have an effect on acknowledgements of child-initiated exchanges in father-child dyads,  $F(1,20) = 4.40$ ,  $p < 0.05$ . Father-child pairs at home used acknowledgements more regularly in terminating their exchanges. As mentioned earlier, nonverbal reactions were rather few. The results indicated that children in the higher educational group reacted nonverbally to questions and suggestions more often than children in the lower educational group,  $F(1,20) = 4.24$ ,  $p < 0.05$ . This was found only in father-child dyads.

No differences were found in interactive exchanges between educational groups at home or in the laboratory.

#### 4.2. Communication in mother-father-child triads

The effect of parental education, sex and task

Basic social skills of interaction. In the second stage of the study parents and their child were asked to perform two tasks: clay-modelling and a construction play with dolls, toy dishes, flowers etc. There were 24 families who participated in this stage of the study. The results (Tables 4 and 5) showed that children made more initiatives in the construction play than in clay-modelling,  $F(1,20) = 6.02$ ,  $p < 0.02$ . Multivariate test rejected the hypothesis of homogeneity of dispersion matrices. The analysis for parent-initiated exchanges showed the main effects of parental education and sex,  $F(1,20) = 5.15$ ,  $p < 0.04$  for education and  $F(1,20) = 17.63$ ,  $p < 0.00$  for sex. Parents in the higher educational group seemed to make more initiatives than parents in the lower educational group. In addition, mothers made them much more than fathers.

There were no differences between parent-child groups in acknowledgements of child-initiated exchanges. For acknowledgements in parent-initiated exchanges interaction was found between parental education, parent's sex, child's sex and task,  $F(1,20) =$

TABLE 4. Mean scores obtained by the triads on measures of basic social skills of interaction during the two cooperative tasks.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Parent-initiated exchanges *																
Clay-modelling	20.33	10.41	19.67	6.77	14.50	7.29	12.50	5.89	8.50	2.59	10.67	5.32	10.00	7.18	12.33	4.08
Construction play	19.83	7.44	18.33	5.35	15.00	5.62	14.17	3.66	10.17	3.31	10.83	3.31	6.83	6.68	9.83	6.65
Acknowledgements in parent-initiated exchanges																
Clay-modelling	0.40	0.08	0.24	0.17	0.26	0.22	0.25	0.10	0.20	0.13	0.39	0.13	0.26	0.18	0.18	0.14
Construction play	0.33	0.10	0.26	0.17	0.31	0.15	0.33	0.12	0.45	0.15	0.43	0.23	0.29	0.28	0.37	0.21
Child's nonverbal reactions to questions and suggestions																
Clay-modelling	0.05	0.06	0.03	0.03	0.05	0.08	0.05	0.06	0.03	0.05	0.01	0.02	0.02	0.05	0.04	0.06
Construction play	0.08	0.08	0.02	0.03	0.06	0.05	0.08	0.07	0.01	0.03	0.08	0.06	0.08	0.20	0.00	0.00
Child's nonverbal reactions to all the initiatives																
Clay-modelling	0.10	0.06	0.09	0.09	0.12	0.11	0.18	0.17	0.08	0.11	0.05	0.05	0.08	0.10	0.19	0.20
Construction play	0.20	0.09	0.26	0.17	0.20	0.26	0.28	0.10	0.09	0.08	0.18	0.12	0.14	0.22	0.17	0.18

Note: \* Frequencies (other measures are proportions)

MANOVAs:

Parent-initiated exchanges

  Education F (1,20) = 5.15, p = .04

  Parent sex F (1,20) = 17.63, p = .000

Acknowledgements in parent-initiated exchanges

  Task F (1,20) = 4.87, p = .04

  Parent sex x Task F (1,20) = 6.48, p = .02

  Education x Child sex x Parent sex x Task F (1,20) = 5.98, p = .02

Child's nonverbal reactions to questions and suggestions

  Education x Child sex x Parent sex F (1,20) = 5.38, p = .03

  Education x Child sex x Parent sex x Task F (1,20) = 4.67, p = .04

Child's nonverbal reactions to all the initiatives

  Parent sex F (1,20) = 6.30, p = .02

  Task F (1,20) = 11.35, p = .003

TABLE 5. Mean scores obtained by the triads on child initiatives and acknowledgements in child-initiated exchanges.

Dependent variable	Higher education				Lower education			
	Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd
Child-initiated exchanges *								
Clay-modelling	10.00	3.29	7.67	5.00	7.83	1.72	11.17	4.36
Construction play	15.83	9.15	11.50	8.80	13.33	6.28	10.00	3.52
Acknowledgements in child-initiated exchanges								
Clay-modelling	0.50	0.13	0.37	0.22	0.39	0.28	0.44	0.21
Construction play	0.40	0.13	0.46	0.29	0.34	0.19	0.55	0.29

Note: \* Frequencies (other measures are proportions)

MANOVAs :

Child-initiated exchanges

Task F (1,20) = 6.02, p = .02

5.98,  $p < 0.02$ . This means that the relationship between acknowledgements and the task was different in the two educational and sex groups. The means revealed that HE fathers in triads with daughters and LE fathers in triads with sons initiated more exchanges which received acknowledgements in the construction play, whereas there were minor differences in acknowledgements of mother-initiated exchanges. However, exception to the common trend were exchanges initiated by HE mothers in triads with daughters. Acknowledgements were more common in clay-modelling.

Children reacted nonverbally more often to mothers' than to fathers' initiatives,  $F(1,20) = 6.30$ ,  $p < 0.02$ . Nonverbal reactions were used more in the construction play than in clay-modelling. Although there were only a few nonverbal reactions to questions and suggestions interaction appeared between parental education, parent's sex, child's sex and task,  $F(1,20) = 4.67$ ,  $p < 0.04$ . The interpretation of such interactions is rather complicated. Inspection of the means showed that nonverbal reactions were directed more to mothers than to fathers. In addition, daughters in the HE group and sons in the LE group reacted more often nonverbally. The use of nonverbal reactions was related to the task differently in different parent-child groups.

Exchanges in communication. The results showed interactions between education, parent's sex, child's sex and task both for question-exchanges,  $F(1,20) = 9.70$ ,  $p < 0.05$  and for statement-exchanges,  $F(1,20) = 6.74$ ,  $p < 0.02$  (Table 6). This finding reveals that there is the relationship between questions asked and the task as well as between suggestions made and the task. However, the relationships differed for different parent-child groups. The inspection of the means indicated that questions were asked more in the clay-modelling and that girls were asked more than boys. In a construction play there were minor differences between the groups. In the clay-modelling HE parents with daughters and LE mothers with daughters asked more than other parents. In the construction play most questions were asked by LE fathers in the triads with daughters. Statement-exc-

TABLE 6. Mean scores obtained by the triads on measures of exchanges in communication during the two cooperative tasks.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Question- exchanges																
Clay-modelling	0.65	0.14	0.59	0.15	0.62	0.23	0.34	0.23	0.64	0.29	0.44	0.17	0.52	0.18	0.52	0.14
Construction play	0.49	0.24	0.47	0.12	0.40	0.23	0.42	0.14	0.41	0.22	0.48	0.20	0.63	0.25	0.37	0.25
Demand- exchanges																
Clay-modelling	0.06	0.08	0.09	0.07	0.07	0.09	0.14	0.19	0.05	0.08	0.05	0.07	0.06	0.07	0.19	0.19
Construction play	0.16	0.13	0.25	0.18	0.15	0.22	0.22	0.11	0.08	0.08	0.14	0.09	0.06	0.14	0.18	0.18
Suggestion- exchanges																
Clay-modelling	0.13	0.06	0.18	0.11	0.16	0.16	0.23	0.23	0.16	0.19	0.19	0.13	0.13	0.19	0.13	0.13
Construction play	0.20	0.20	0.17	0.17	0.15	0.08	0.16	0.15	0.21	0.12	0.12	0.09	0.10	0.20	0.14	0.13
Statement- exchanges																
Clay-modelling	0.17	0.13	0.14	0.11	0.15	0.19	0.28	0.15	0.15	0.15	0.33	0.11	0.28	0.19	0.17	0.13
Construction play	0.15	0.09	0.11	0.08	0.29	0.15	0.20	0.06	0.29	0.14	0.26	0.16	0.21	0.25	0.30	0.13

MANOVAs:

Question- exchanges

  Task F (1,20) = 4.34, p = .05

  Education x Child sex x Parent sex x Task F (1,20) = 9.70, p = .005

Demand- exchanges

  Task F (1,20) = 9.98, p = .005

Statement- exchanges

  Parent sex F (1,20) = 4.44, p = .05

  Education x Child sex x Parent sex x Task F (1,20) = 6.74, p = .02

changes were made by fathers more often than by mothers. In triads LE parents used statements more with the same-sex child in the construction task and with the cross-sex child in the clay-modelling. HE fathers in the triads with sons made statements more often than fathers with daughters. Other differences were minimal and not worth considering.

#### The effect of familiarity of the situation

Home vs laboratory. The setting did not seem to affect the overall scores of communication in triads (Appendix 4). The results showed that children made initiatives more often in the construction play. Mothers made more initiatives than fathers and HE parents more than LE parents,  $F(1,20) = 5.71$ ,  $p < .03$  for education,  $F(1,20) = 17.46$ ,  $p < 0.00$  for parent's sex.

For acknowledgements in child-initiated exchanges interaction appeared between education and setting,  $F(1,20) = 5.08$ ,  $p < 0.04$ . In the HE group acknowledgements seemed to be made more often in the laboratory, whereas in the LE group they were made more often at home. In mother-initiated exchanges, acknowledgements were made more regularly in clay-modelling, whereas father-initiated exchanges were terminated more regularly with acknowledgements in the construction task. As mentioned earlier, more nonverbal reactions were directed to mother than to father,  $F(1,20) = 6.66$ ,  $p < 0.02$ .

The analysis showed no main effects (Appendix 5) for setting in measures of exchanges. For suggestion-exchanges interaction appeared between education and setting,  $F(1,20) = 5.81$ ,  $p < 0.03$ . HE parents made more suggestions at home, whereas LE parents made them more in the laboratory. For demand-exchanges only task effect was found, which showed that demanding language was more common in the construction play than in the clay-modelling.

#### 4.3. Communication in the dyad compared to that in the triad

Communication of mother, father and the child in dyad was compared with their communication in the triad. The planning task, because of its nature, represented a dyadic situation. The planning task was compared separately with clay-modelling and with the construction play. The results showed that children made as many initiatives in dyads as in triads. For parents' initiatives task effect and parent's sex effect appeared (Appendix 6). Mothers made more initiatives than fathers. For parents the amount of initiatives was higher in the dyadic situation compared with the triadic situation.

For acknowledgements in child-initiated exchanges only one effect was found namely in comparison of child with his father in the dyad to child with his parents in the construction play. Child-initiated exchanges seemed to be terminated more regularly with acknowledgements in father-child dyad than in mother-father-child triad. Acknowledgements in parent-initiated exchanges were made more often in dyads than in triads,  $F(1,20) = 30.35$ ,  $p < 0.000$  for clay-modelling, and  $F(1,20) = 21.86$ ,  $p < 0.000$  for the construction play.

In addition, there were interactions between parent's sex and child's sex (dyad vs triad in clay-modelling) and between education, parent's sex, child's sex and task (dyad vs triad in construction play). The inspection of the means indicated that in clay-modelling both mother-initiated and father-initiated exchanges terminated with acknowledgements more often with daughters than with sons. The relationship between acknowledgements and the number of the persons differed for the two educational and sex groups in the construction play. The means indicated that in the construction task father-initiated exchanges were more regularly terminated with acknowledgements and slightly more often with daughters than with sons in the HE group, whereas in the LE group this was the case more often with sons than with

daughters, the differences between LE mothers and fathers being minimal.

The analysis of nonverbal reactions to all the initiatives showed interactions between education and task for clay-modelling,  $F(1,20) = 4.42$ ,  $p < 0.05$ , and between parent's sex and task for construction play,  $F(1,20) = 5.58$ ,  $p < 0.03$ . Children of the HE group reacted nonverbally more often than children of the LE group in dyads, whereas the opposite was true in triads. In dyads children reacted nonverbally slightly more often to fathers' initiatives, whereas in the triads they reacted nonverbally more often to mothers' than fathers' initiatives. For nonverbal reactions to suggestions and questions interaction appeared between parental education, parent's sex, and child's sex,  $F(1,20) = 4.87$ ,  $p < 0.04$  in the construction play. Daughters made more nonverbal reactions to HE mothers' and to LE fathers' initiatives, whereas sons reacted nonverbally more often to HE fathers' and LE mothers' suggestions and questions.

For exchanges in communication there were only a few effects. Question- and suggestion-exchanges were made more in dyads than in triads (Appendix 7). The results showed that for demand-exchanges interactions were found between education and task in clay-modelling,  $F(1,20) = 5.89$ ,  $p < 0.03$ , and between parent's sex and task in construction play,  $F(1,20) = 5.07$ ,  $p < .04$ . Demanding language was more common in the HE group in a dyadic situation, but more common in the LE group in a triadic situation. The other interaction indicated that fathers used demands more in dyads and mothers more in triads. This was found only in comparison of the planning task and a construction play.

There were more interactions for statement-exchanges. Parental education, parent's sex, child's sex and the task interacted in the comparison of the planning task and clay-modelling,  $F(1,20) = 4.58$ ,  $p < 0.05$ . The relationship between statement-exchanges and the task differed for different groups. In the planning task there were only minor differences; especially with sons parents made statements similarly to each other. In the clay-modelling

most statements were made by LE mothers and HE fathers with sons and LE fathers with daughters. In the comparison of the dyad with the triad in construction task the task effect appeared,  $F(1,20) = 13.46$ ,  $p < 0.002$ . More statements were made in the triad than in the dyad. In addition, interaction was found between education and parent's sex,  $F(1,20) = 8.35$ ,  $p < 0.01$ . The finding indicated that HE fathers and LE mothers made more statements than other parents.

#### 4.4. Summary of the main results

The results showed that in only a few cases did parental education affect parent-child communication (Table 7). Parents in the higher education group (HE) made more initiatives in the triadic situations than parents in the lower education group (LE). There were also findings which indicated that parental education was quite often related to the sex or to the task to be completed.

An interaction effect for parental education and parent's sex was found for question-exchanges in the comparison of the two stages of the study. The mother-child dyads asked more questions than father-child dyads in the HE group, whereas the reverse was true for the LE group. Additionally, interactions between parental education and child's sex was found for children's initiatives. Only in the comparison of the two stages of the study was it revealed that girls in the HE group made initiatives more often than boys, whereas in the LE group more initiatives were made by the boys. These results on parental education are consistent with earlier Finnish data (Rasku-Puttonen, 1983, 1987), which showed no outstanding differences between the educational groups in formal aspects of language nor in most interactional measures, such as cooperation and emotionality.

In a few cases child's sex, parent's sex or both seemed to

Table 7. The significant effects of parental education, the sex of parent and child, and task on dyadic and triadic communication

Dependent variable	Parent-child dyads (N=48)						Mother-father-child triads (N=24)								
	Educa- tion	Parent sex	Child's sex	Parent sex x child's sex	Task sex x task	Child's sex x task	Inter- actions	Educa- tion	Parent sex	Child's sex	Parent sex x child's sex	Task sex x task	Parent sex x task	Child's sex x task	Interactions: Education x parent sex x child's sex x task
Basic social skills of interaction															
- Child-initiated exchanges												.02			
- Parent-initiated exchanges				.000	.04		.04	.000							
- Acknowledgements in child-initiated exchanges				.005											
- Acknowledgements in parent-initiated exchanges			.006	.000								.04	.02	.02	
- Child's nonverbal reactions to questions and suggestions			.04	.000										.04	
- Child's nonverbal reactions to all the initiatives				.03	.00			.02				.003			
Exchanges of communication															
- Question-exchanges				.000								.05		.005	
- Demand-exchanges		.05	.04	.004	.000		Child's sex x parent sex x task .02					.005			
- Suggestion-exchanges				.02	.000	.01									
- Statement-exchanges			.01						.05					.02	

have an effect on parent-child communication. Mothers made more initiatives both in the dyads and in the triads than did fathers. The only exception was the problem-solving task. The finding that mothers are involved in more verbal interchanges with their children has also been shown in earlier studies (Clarke-Stewart, 1980; Lytton, 1980; Stoneman & Brody, 1981).

There were also differences between boys and girls and in the treatment of boys and girls. Girls were found to react nonverbally to questions and suggestions more often than boys. In general, nonverbal reactions were used more in the same-sex pairs, which may indicate something about shared meanings and closeness within mother-daughter and father-son dyads. Earlier findings (Stoneman & Brody, 1981) have argued that same-sex pairs also make more utterances to each other.

An additional finding was related to acknowledgements in parent-child exchanges. Parents with daughters seemed to use acknowledgements more regularly in terminating their exchanges than parent-son dyads. At least in the two problem-solving tasks father-daughter dyads made more acknowledgements than father-son dyads, while the differences between mother-child dyads were not outstanding. Also for triads a complicated interaction appeared between parental education, parent's sex, child's sex and the task. It could be speculated that making initiatives and acknowledgements encourage reciprocity and social behavior in girls.

The results concerning exchanges of communication showed interactions between child's sex and parent's sex. Both mothers and fathers made more demands on the same-sex child. This was found in the two problem-solving tasks. On the contrary, demands were directed to boys more often in the planning task. More suggestions were made in the cross-sex pairs, although in comparison of the two stages of the study it was found that in the LE group both mothers and fathers made more suggestions to the sons, whereas minor differences between parent-son and parent-daughter dyads were found for the HE group. In the two problem-solving tasks parents asked the cross-sex child more questions. A more

complicated interaction for question-exchanges was revealed in triadic situations as well as for statement-exchanges.

Findings on dyadic vs. triadic communication (Table 8) were consistent with earlier results (Clarke-Stewart, 1980; Pedersen et al., 1980, Stoneman & Brody, 1981) that children make initiatives in triads as much as in dyads, whereas parents adjust their speaking to the new situation in which additional persons are included. Both mothers and fathers made fewer initiatives in the triads compared to the dyads.

Additional findings were related to acknowledgements, non-verbal reactions and demanding language. Acknowledgements in child-initiated exchanges were made in father-child dyads more often than in mother-father-child triads. For nonverbal reactions the results indicated that children of the HE group used them more often in dyads, whereas LE children used them more in triads. In addition, nonverbal reactions were more directed to mothers than to fathers. Demanding language seemed to be used more often by HE parents in dyads and by LE parents in triads. Furthermore, fathers made more demands in the dyad and mothers in the triad of construction play. It could be speculated that many interactions between parental education, the sex of parent and child and the task in this study reflect the complexity of the mechanisms working in the process of interaction.

The results of this paper replicated many earlier findings on the impact of the characteristics of the tasks (e.g. Aragona & Eyberg, 1981; Jones & Adamson, 1987; Rasku-Puttonen, 1983, 1987). Parents made more initiatives, acknowledgements were used more regularly in the end of the exchanges and the proportion of the question-exchanges was highest in the planning task, whereas non-verbal responses were more common and suggestion- and demand-exchanges were more often used in the problem-solving task. Task effects were also revealed in the triads for acknowledgements in parent-initiated exchanges and nonverbal reactions.

In accordance with earlier Finnish data (Rasku-Puttonen, 1987) the results of this paper showed that the setting was not of

Table 8. The significant effects of parental education, the sex of parent and child and the number of participants on the communication between parents and child (N=24)

Dependent variable	Education	Parent sex	Child's sex	Parent sex x child's sex	Task	Parent sex x task	Child's sex x task	Interaction
Basic social skills of interaction								
- Child-initiated exchanges								
- Parent-initiated exchanges	<u>.009</u>				<u>.000</u>			
- Acknowledgements in child-initiated exchanges	<u>.002</u>				<u>.000</u>			
- Acknowledgements in parent-initiated exchanges				.02	.03			
- Child's nonverbal reactions to questions and suggestions					<u>.000</u>			Education x parent sex x child's sex x task .009
- Child's nonverbal reactions to all the initiatives					<u>.000</u>			Education x parent sex x child's sex x task <u>.04</u>
Exchanges of communication								
- Question-exchanges					<u>.02</u>			
- Demand-exchanges					<u>.000</u>			
- Suggestion-exchanges					.04			Education x task .03
- Statement-exchanges	<u>.02</u>				.01			
					<u>.02</u>			
					<u>.01</u>			Education x parent sex x child's sex x task .05
					<u>.002</u>			

Note: The significant effects of the comparison of the planning-task to the construction play are underlined.

greater importance in regard to parent-child communication. For dyads it was found that the HE mothers made more initiatives in the laboratory and the LE mothers at home. The two groups of fathers did not differ from each other. Father-child dyads, however, made acknowledgements in child-initiated exchanges more often at home than in the laboratory. In triadic situations acknowledgements were made by the HE group more regularly in the laboratory and by the LE group at home. The proportion of suggestions was low. However, the HE parents made them more often at home and the LE parents in the laboratory. Despite the few effects and interactions attention should be paid to the fact that most interactions with the setting were with parental education. The use of video-equipment is probably one of the factors that diminish differences between the laboratory and the home. The second one is related to the procedure: Comparisons between home and laboratory setting were made in the second stage of the study. 88% of the mothers and 71% of the fathers were of the opinion that the second stage was more pleasant than the first one, because the situations were familiar to them and they knew what would happen.

## 5. Discussion

The major question addressed in this study was whether mothers and fathers communicate differently with their child when they are in different activities or contexts. In accordance with earlier findings (Rasku-Puttonen, 1983, 1987) the results revealed only a few main effects of parental education, sex of parent and child, and setting. Instead, it should be emphasized that the purpose of interaction was found to be as important as characteristics of the participants in determining parent-child com-

munication. The results showed, for example, that in the problem-solving task mothers with daughters and fathers with sons used more demanding language than parents in cross-sex pairs. However, in the planning task parents directed more demands to their sons. Only this latter finding was in accordance with the results (e.g. Weitzman et al., 1985) that mothers stimulate sons verbally more than daughters.

In addition to the type of task, the context appeared to exert differential effects on mother-child and father-child communication in dyads and triads and further, in the laboratory and at home. For example, fathers made more demands in dyads and mothers more in triads. Demanding language was found to be more common in the HE parent-child dyads and in the LE parent-child triads. Although the differences between home and laboratory setting were found to be minimal, the setting was related to basic social skills of interaction differently in different groups. For example, HE mothers in dyads made more initiatives in the laboratory and LE mothers at home. Fathers did not differ from each other in this respect.

Perhaps the nature of the tasks in this study require considering. In the first stage of the study two types of tasks were presented. One was a problem-solving task, a model-building with blocks. It was a definite-solution task, which required the manual arrangement of blocks. This kind of task elicits both verbal and nonverbal forms of communication. The other, the planning task was relatively less structured and promotes more verbal expressions. The majority of the parents (60 %) preferred the problem-solving task to the planning task, whereas 10 children liked both the tasks equally and 45 % of the children preferred the planning task. Tasks in the second stage of the study were designed to be similar to those in the first stage. It could be assumed that the choice of the means to achieve different goals may be reflected in variations of the behavior. Individual interpretations and expectations may vary and then emerge in variations of communication.

According to Hess (1981) the parent's behavior is a function of his or her conception of the child's level of ability, effort, other personality characteristics and the demands of the task to be solved. Recently, many other authors have paid attention to cognitive activities of parents and their role in the socialization process (e.g., Ashmore & Brodzinsky, 1986; Bacon & Ashmore, 1986; Elias & Ubriaco, 1986; Sigel, 1986). For example, Sigel reported that the types of distancing behaviors parents use are associated with their expressed beliefs. Furthermore, the strategies like structuring and imperatives, i.e. those which are highly didactic, are related to parents' views that the child is a passive recipient of knowledge. One step to a further understanding of the nature of the complex phenomena of psychological development is suggested to be that of considering individual subjects as organized open systems that can develop through different routes in their life courses (e.g., Bronfenbrenner & Crouter, 1983; Sameroff, 1983; Elder, 1984; Minuchin, 1985). These issues are important for future research and also for the evaluation of the advantages of sequential data. One of the advantages is the time dimension which is possible to take into account in sequences.

These results raise the issue of how often inconsistent findings are due to the differences in task characteristics. On the other hand, another neglected issue might be raised, too. There are several methods used in studies of parents and children. The results may be based on questionnaires, interviews or observation of activities and interactional forms of the family. In addition, the analyzing techniques vary. Contradictory findings have seldom been considered in relation to methods, although it might be assumed that different methods may reveal different aspects of the phenomena.

The results of this paper are based on the observation of parent-child communication. The flow of interaction was described through sequences of naturally occurring events. Events were functions of communication. Serious efforts to use methods

of sequential analysis techniques were made. While Valsiner (1986) broke a sequentially organized phenomena into subsequences without considering the different meaning of the events, in this work the subsequences or exchanges were broken so that each of them was initiated by questions, demands, suggestions or statements. The different types of exchanges were summed up and used in the analysis as proportions of the total number of interactive exchanges.

The major weakness of this analysis was that the particular context which certain exchanges were related to could not be traced. In addition, the temporal form of the social interaction process could not be captured. Nevertheless, the chosen way of analyzing these sequential data seemed to be appropriate. The analysis will proceed in the next step to patterns of interaction.

For generalization of the results it is important to estimate the influences of the observational context. Parents were asked a few questions about the representativeness of observed behavior. Less influence was rated by the parents for child's independence (67 % rated typical/normal). The majority of the parents (67% of fathers; 54% of mothers) thought that they gave more help and guidance in experimental situations than under natural conditions. The majority of the mothers (61%; 46% of the fathers) believed that there was less misbehavior and disagreements than typically. Maybe this could be interpreted that these kinds of observational periods are representative of one type of family interaction, when people behave in a socially desirable and child centered way.

The results of this study showed that parent's sex or parental education was not of central importance in communication in ordinary interaction. The results can, however, be generalized only to particular tasks in which parents and children participated. Very often the studies are aimed at discriminating different factors. Sometimes they are found, but in many cases the standard deviations are high. What then would be the role of an

experiment in relation to everyday life? The fact that the purpose of interaction or the given task was of great importance to parent-child communication and that the effects were different in different groups suggests implications for everyday life. In an experiment persons perform given tasks. In everyday life there are particular life events, which could also be regarded as specific tasks. On such occasions individual differences in verbal and nonverbal style and competence might be revealed.

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TABLE 1. Mean scores obtained by the parent-child groups on measures of basic social skills of interaction during the two cooperative tasks.

Dependent variable	Mother-child dyad								Father-child dyad							
	Higher education				Lower education				Higher education				Lower education			
	Girl M	Sd	Boy M	Sd	Girl M	Sd	Boy M	Sd	Girl M	Sd	Boy M	Sd	Girl M	Sd	Boy M	Sd
Child-initiated exchanges *																
The first problem-solving	10.50	6.09	8.50	5.47	11.50	6.66	12.83	6.91	16.00	8.94	8.83	6.34	6.83	3.13	11.83	5.08
The second problem-solving	9.33	7.03	6.67	3.56	8.67	3.72	14.00	6.42	16.00	8.15	3.67	2.88	9.67	3.33	11.17	4.75
Parent-initiated exchanges *																
The first problem-solving	21.67	8.96	23.83	6.27	23.83	5.04	25.83	11.51	20.00	11.19	28.33	7.97	20.33	4.89	23.17	7.76
The second problem-solving	22.50	11.15	23.67	5.16	23.33	5.85	21.50	6.22	19.83	7.47	22.83	6.46	22.83	6.52	25.67	8.57
Acknowledgements in child-initiated exchanges																
The first problem-solving	0.56	0.14	0.47	0.34	0.59	0.14	0.44	0.30	0.59	0.30	0.42	0.14	0.47	0.34	0.38	0.24
The second problem-solving	0.40	0.18	0.50	0.25	0.34	0.28	0.40	0.16	0.48	0.28	0.39	0.42	0.36	0.22	0.34	0.16
Acknowledgements in parent-initiated exchanges																
The first problem-solving	0.44	0.12	0.31	0.14	0.29	0.10	0.35	0.14	0.47	0.11	0.32	0.13	0.37	0.22	0.34	0.14
The second problem-solving	0.34	0.09	0.39	0.08	0.29	0.18	0.28	0.11	0.47	0.10	0.24	0.09	0.27	0.12	0.31	0.13
Child's nonverbal reactions to questions and suggestions																
The first problem-solving	0.14	0.12	0.08	0.11	0.07	0.03	0.05	0.06	0.14	0.13	0.07	0.06	0.04	0.02	0.03	0.04
The second problem-solving	0.08	0.06	0.03	0.04	0.04	0.03	0.08	0.08	0.14	0.12	0.06	0.04	0.02	0.03	0.06	0.07
Child's nonverbal reactions to all the initiatives																
The first problem-solving	0.36	0.25	0.21	0.14	0.38	0.13	0.27	0.12	0.32	0.33	0.46	0.18	0.26	0.12	0.33	0.24
The second problem-solving	0.43	0.21	0.36	0.17	0.47	0.27	0.33	0.16	0.41	0.15	0.56	0.25	0.39	0.22	0.38	0.28

Note: \* Frequencies (other measures are proportions)

MANOVAs:

Child-initiated exchanges

- Education x Child sex F (1,20) = 8.09, p = .01
- Education x Parent sex F (1,20) = 5.83, p = .03
- Child sex x Parent sex F (1,20) = 4.54, p = .05
- Education x Child sex x Parent sex F (1,20) = 4.34, p = .05

Acknowledgements in child-initiated exchanges

- Task F (1,18) = 4.37, p = .05

Acknowledgements in parent-initiated exchanges

- Child sex x Parent sex F (1,20) = 4.39, p = .05

Child's nonverbal reactions to questions and suggestions

- Education F (1,20) = 5.39, p = .03

Child's nonverbal reactions to all the initiatives

- Child sex x Parent sex F (1,20) = 8.11, p = .01

TABLE 2. Mean scores obtained by the parent-child groups on measures of exchanges in communication during the two cooperative tasks.

Dependent variable	Mother-child dyad								Father-child dyad							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Question-exchanges																
The first problem-solving	0.50	0.22	0.60	0.15	0.37	0.13	0.42	0.19	0.51	0.12	0.34	0.19	0.51	0.12	0.41	0.20
The second problem-solving	0.35	0.17	0.44	0.24	0.33	0.17	0.33	0.19	0.36	0.13	0.24	0.13	0.40	0.12	0.28	0.14
Demand-exchanges																
The first problem-solving	0.31	0.24	0.19	0.15	0.41	0.14	0.24	0.13	0.25	0.15	0.47	0.17	0.25	0.13	0.34	0.22
The second problem-solving	0.41	0.19	0.38	0.24	0.48	0.29	0.32	0.08	0.32	0.13	0.57	0.23	0.42	0.18	0.43	0.22
Suggestion-exchanges																
The first problem-solving	0.11	0.11	0.10	0.11	0.11	0.07	0.21	0.06	0.09	0.17	0.07	0.05	0.09	0.10	0.15	0.10
The second problem-solving	0.09	0.06	0.05	0.04	0.06	0.08	0.16	0.07	0.09	0.07	0.09	0.07	0.09	0.05	0.14	0.11
Statement-exchanges																
The first problem-solving	0.08	0.07	0.11	0.10	0.11	0.10	0.12	0.08	0.15	0.10	0.12	0.09	0.15	0.12	0.10	0.05
The second problem-solving	0.15	0.11	0.13	0.06	0.13	0.10	0.19	0.11	0.23	0.17	0.10	0.07	0.08	0.08	0.15	0.08

MANOVAs:

Question-exchanges

Education x Parent sex  $F(1,20) = 5.32, p = .03$

Child sex x Parent sex  $F(1,20) = 8.39, p = .01$

Task  $F(1,20) = 13.66, p = .001$

Demand-exchanges

Child sex x Parent sex  $F(1,20) = 14.98, p = .001$

Task  $F(1,20) = 7.69, p = .01$

Suggestion-exchanges

Education  $F(1,20) = 5.05, p = .04$

Education x Child sex  $F(1,20) = 6.50, p = .02$

TABLE 3. The effect of parental education and setting on basic social skills of interaction in parent-child dyads.

Dependent variable	Higher education		Lower education		Parental education	Setting	Parental education x Setting
	Home M	Laboratory M	Home M	Laboratory M			
Child-initiated exchanges *							
Child with mother	8.33	7.67	10.00	12.67			
Child with father	11.33	8.33	9.17	11.67			
Parent-initiated exchanges *							
Child with mother	18.67	27.50	24.00	20.83			F(1,20)=4.967, p= .04
Child with father	18.33	24.33	24.33	24.17			
Acknowledgements in child-initiated exchanges							
Child with mother	0.33	0.53	0.43	0.32			F(1,20)=2.995, p= .10
Child with father	0.58	0.27	0.41	0.29		F(1,20)=4.398, p= .05	
Acknowledgements in parent-initiated exchanges							
Child with mother	0.33	0.40	0.29	0.28	F(1,20)=3.149, p= .09		
Child with father	0.34	0.37	0.30	0.27			
Child's nonverbal reactions to questions and suggestions							
Child with mother	0.04	0.08	0.06	0.06			
Child with father	0.08	0.13	0.07	0.01	F(1,20)=4.240, p= .05		F(1,20)=3.360, p= .08
Child's nonverbal reactions to all the initiatives							
Child with mother	0.38	0.41	0.33	0.46			
Child with father	0.40	0.57	0.43	0.34			

Note: \* Frequencies (other measures are proportions)

TABLE 4. Mean scores obtained by the triads on measures of basic social skills of interaction during the two free-play sessions.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges								
	Higher education				Lower education				Higher education				Lower education				
	Home M	Sd	Laboratory M	Sd	Home M	Sd	Laboratory M	Sd	Home M	Sd	Laboratory M	Sd	Home M	Sd	Laboratory M	Sd	
Parent-initiated exchanges *																	
Clay-modelling	17.83	6.40	22.17	10.11	14.33	5.54	12.67	7.61	9.17	2.99	10.00	5.33	10.83	7.47	11.50	3.94	
Construction play	16.67	3.01	21.50	7.89	15.17	5.08	14.00	4.34	10.50	2.66	10.50	3.89	8.83	7.17	7.83	6.49	
Acknowledgements in parent- initiated exchanges																	
Clay-modelling	0.25	0.17	0.39	0.11	0.30	0.13	0.21	0.14	0.25	0.16	0.34	0.15	0.18	0.17	0.26	0.15	
Construction play	0.23	0.14	0.36	0.11	0.36	0.13	0.28	0.12	0.37	0.20	0.52	0.14	0.31	0.21	0.35	0.28	
Child's nonverbal reactions to questions and suggestions																	
Clay-modelling	0.03	0.04	0.04	0.06	0.03	0.04	0.07	0.09	0.00	0.00	0.04	0.05	0.04	0.06	0.02	0.05	
Construction play	0.04	0.08	0.05	0.05	0.02	0.03	0.12	0.02	0.04	0.06	0.05	0.06	0.00	0.00	0.08	0.20	
Child's nonverbal reactions to all the initiatives																	
Clay-modelling	0.05	0.04	0.14	0.08	0.10	0.12	0.19	0.16	0.05	0.05	0.08	0.11	0.11	0.11	0.16	0.21	
Construction play	0.23	0.16	0.23	0.12	0.13	0.13	0.35	0.19	0.14	0.14	0.13	0.08	0.08	0.11	0.23	0.24	

Note: \* Frequencies (other measures are proportions)

MANOVAS:

Parent-initiated exchanges

  Education F (1,20) = 5.71, p = .03

  Parent sex F (1,20) = 17.46, p = .000

Acknowledgements in parent-initiated exchanges

  Task F (1,20) = 4.58, p = .05

  Parent sex x Task F (1,20) = 4.93, p = .04

Child's nonverbal reactions to all the initiatives

  Parent sex F (1,20) = 6.66, p = .02

  Task F (1,20) = 12.49, p = .002

TABLE 5. Mean scores obtained by the triads on child initiatives and acknowledgements in child-initiated exchanges during the two free-play sessions.

Dependent variable	Higher education				Lower education			
	Home		Laboratory		Home		Laboratory	
	M	Sd	M	Sd	M	Sd	M	Sd
Child-initiated exchanges *								
Clay-modelling	9.83	5.23	7.83	2.99	8.17	2.32	10.83	4.36
Construction play	12.67	10.37	14.67	7.92	10.33	5.24	13.00	5.18
Acknowledgements in child-initiated exchanges								
Clay-modelling	0.39	0.24	0.47	0.12	0.41	0.28	0.41	0.21
Construction play	0.27	0.09	0.59	0.17	0.54	0.30	0.36	0.19

Note: \* Frequencies (other measures are proportions)

MANOVAs:

Child-initiated exchanges

Task F (1,20) = 5.48, p = .03

Acknowledgements in child-initiated exchanges

Education x Setting F (1,20) = 5.08, p = .04

TABLE 6. Mean scores obtained by the triads on measures of exchanges in communication during the two free-play sessions.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges							
	Higher education				Lower education				Higher education				Lower education			
	Home		Laboratory		Home		Laboratory		Home		Laboratory		Home		Laboratory	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Question-exchanges																
Clay-modelling	0.57	0.12	0.67	0.15	0.57	0.24	0.39	0.27	0.46	0.18	0.62	0.30	0.53	0.17	0.51	0.16
Construction play	0.47	0.19	0.50	0.18	0.48	0.11	0.34	0.22	0.44	0.25	0.45	0.16	0.53	0.37	0.47	0.17
Demand-exchanges																
Clay-modelling	0.05	0.06	0.10	0.08	0.08	0.10	0.13	0.19	0.06	0.07	0.04	0.07	0.09	0.08	0.16	0.21
Construction play	0.22	0.18	0.19	0.15	0.14	0.15	0.24	0.19	0.12	0.11	0.09	0.06	0.08	0.11	0.16	0.21
Suggestion-exchanges																
Clay-modelling	0.16	0.08	0.14	0.10	0.09	0.09	0.30	0.22	0.25	0.16	0.10	0.12	0.10	0.14	0.16	0.18
Construction play	0.22	0.23	0.15	0.11	0.08	0.09	0.23	0.08	0.18	0.08	0.15	0.14	0.11	0.14	0.14	0.20
Statement-exchanges																
Clay-modelling	0.22	0.13	0.09	0.05	0.26	0.18	0.18	0.17	0.23	0.14	0.24	0.19	0.28	0.16	0.17	0.17
Construction play	0.09	0.08	0.17	0.07	0.30	0.14	0.19	0.07	0.25	0.14	0.31	0.16	0.28	0.20	0.24	0.21

MANOVAs:

Demand-exchanges

Task F (1,20) = 9.93, p = .005

Suggestion-exchanges

Education x Setting F (1,20) = 5.81, p = .03

TABLE 7. Mean scores obtained by parents and children from dyads to triads on measures of basic social skills of interaction.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Parent-initiated exchanges *																
Planning	30.00	6.51	31.33	12.01	30.33	5.99	28.50	3.94	23.83	6.85	28.83	6.21	23.33	8.55	28.83	5.27
Clay-modelling	20.33	10.41	19.67	6.77	14.50	7.29	12.50	5.89	8.50	2.59	10.67	5.32	10.00	7.18	12.33	4.08
Construction play	19.83	7.44	18.33	5.35	15.00	5.62	14.17	3.66	10.17	3.31	10.83	3.31	6.83	6.68	9.83	6.65
Acknowledgements in parent-initiated exchanges																
Planning	0.57	0.13	0.42	0.08	0.53	0.14	0.42	0.09	0.59	0.15	0.38	0.17	0.46	0.26	0.48	0.09
Clay-modelling	0.40	0.08	0.24	0.17	0.26	0.22	0.25	0.10	0.20	0.13	0.39	0.13	0.26	0.18	0.18	0.14
Construction play	0.33	0.10	0.26	0.17	0.31	0.15	0.33	0.12	0.45	0.15	0.43	0.23	0.29	0.28	0.37	0.21
Child's nonverbal reactions to questions and suggestions																
Planning	0.03	0.04	0.03	0.05	0.04	0.03	0.05	0.03	0.06	0.08	0.03	0.02	0.04	0.05	0.01	0.02
Clay-modelling	0.05	0.06	0.03	0.03	0.05	0.08	0.05	0.06	0.03	0.05	0.01	0.02	0.02	0.05	0.04	0.06
Construction play	0.08	0.08	0.02	0.03	0.06	0.05	0.03	0.07	0.01	0.03	0.08	0.06	0.08	0.20	0.00	0.00
Child's nonverbal reactions to all the initiatives																
Planning	0.11	0.08	0.17	0.10	0.13	0.15	0.12	0.05	0.13	0.09	0.18	0.11	0.11	0.05	0.15	0.18
Clay-modelling	0.10	0.06	0.09	0.09	0.12	0.11	0.13	0.17	0.08	0.11	0.05	0.05	0.08	0.10	0.19	0.20
Construction play	0.20	0.09	0.26	0.17	0.20	0.26	0.23	0.10	0.09	0.08	0.18	0.12	0.14	0.22	0.17	0.18

Note: \* Frequencies (other measures are proportions)

MANOVAs:

Parent-initiated exchanges during planning and clay-modelling  
 Parent sex,  $F(1,20) = 8.48, p = .009$   
 Task,  $F(1,20) = 139.29, p = .000$   
 Parent-initiated exchanges during planning and construction play  
 Parent sex,  $F(1,20) = 12.01, p = .002$   
 Task,  $F(1,20) = 172.59, p = .000$   
 Acknowledgements in parent-initiated exchanges during planning and clay-modelling  
 Child sex x Parent sex,  $F(1,20) = 6.30, p = .02$   
 Task,  $F(1,20) = 30.35, p = .000$   
 Education x Child sex x Parent sex x Task,  $F(1,20) = 8.44, p = .009$   
 Acknowledgements in parent-initiated exchanges during planning and construction play  
 Task,  $F(1,20) = 21.86, p = .000$

Child's nonverbal reactions to questions and suggestions during planning and construction play  
 Education x Child sex x Parent sex,  $F(1,20) = 4.87, p = .04$   
 Child's nonverbal reactions to all the initiatives during planning and clay-modelling  
 Education x Task,  $F(1,20) = 4.42, p = .05$   
 Child's nonverbal reactions to all the initiatives during planning and construction play  
 Parent sex x Task,  $F(1,20) = 5.58, p = .03$

TABLE 8. Mean scores obtained by parents and children from dyads to triads on child initiatives and acknowledgements in child-initiated exchanges.

Dependent variable	Higher education				Lower education			
	Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd
Child-initiated exchanges *								
Planning with mother	9.33	3.88	6.50	3.78	9.83	4.54	12.17	7.94
Planning with father	14.33	6.77	6.67	2.73	9.83	7.28	12.67	5.24
Clay-modelling	10.00	3.29	7.67	4.97	7.83	1.72	11.17	4.36
Construction play	15.83	9.15	11.50	8.80	13.33	6.28	10.00	3.52
Acknowledgements in child-initiated exchanges								
Planning with mother	0.72	0.18	0.51	0.35	0.64	0.27	0.50	0.29
Planning with father	0.69	0.17	0.50	0.21	0.59	0.32	0.64	0.22
Clay-modelling	0.50	0.13	0.37	0.22	0.39	0.28	0.44	0.21
Construction play	0.40	0.13	0.46	0.29	0.34	0.19	0.55	0.29

Note: \* Frequencies (other measures are proportions)

MANOVAS:

Acknowledgements in child-initiated exchanges

Task,  $F(2,19) = 4.40, p = .03$

TABLE 9. Mean scores obtained by parents and children from dyads to triads on measures of exchanges in communication.

Dependent variable	Mother-initiated exchanges								Father-initiated exchanges							
	Higher education				Lower education				Higher education				Lower education			
	Girl		Boy		Girl		Boy		Girl		Boy		Girl		Boy	
	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd	M	Sd
Question-exchanges																
Planning	0.70	0.06	0.66	0.14	0.64	0.21	0.68	0.22	0.56	0.12	0.59	0.15	0.67	0.20	0.65	0.14
Clay-modelling	0.65	0.14	0.59	0.15	0.62	0.23	0.34	0.23	0.64	0.29	0.44	0.17	0.52	0.18	0.52	0.14
Construction play	0.49	0.24	0.47	0.12	0.40	0.23	0.42	0.14	0.41	0.22	0.48	0.20	0.63	0.25	0.37	0.25
Demand-exchanges																
Planning	0.13	0.05	0.14	0.11	0.10	0.15	0.09	0.04	0.12	0.06	0.18	0.11	0.09	0.10	0.15	0.16
Clay-modelling	0.06	0.08	0.09	0.07	0.07	0.09	0.14	0.15	0.05	0.08	0.05	0.07	0.06	0.07	0.19	0.19
Construction play	0.16	0.13	0.25	0.18	0.15	0.22	0.22	0.11	0.08	0.08	0.14	0.09	0.06	0.14	0.18	0.18
Suggestion-exchanges																
Planning	0.06	0.08	0.09	0.10	0.07	0.05	0.10	0.08	0.11	0.11	0.07	0.08	0.10	0.10	0.09	0.07
Clay-modelling	0.13	0.06	0.18	0.11	0.16	0.16	0.23	0.23	0.16	0.19	0.19	0.13	0.13	0.19	0.13	0.13
Construction play	0.20	0.20	0.17	0.17	0.15	0.08	0.16	0.15	0.21	0.12	0.12	0.09	0.10	0.20	0.14	0.13
Statement-exchanges																
Planning	0.10	0.05	0.11	0.05	0.19	0.15	0.13	0.11	0.20	0.12	0.15	0.08	0.15	0.07	0.11	0.08
Clay-modelling	0.17	0.13	0.14	0.11	0.15	0.19	0.28	0.15	0.15	0.15	0.33	0.11	0.28	0.19	0.17	0.13
Construction play	0.15	0.09	0.11	0.08	0.29	0.15	0.20	0.06	0.29	0.14	0.26	0.16	0.21	0.25	0.30	0.13

MANOVAs:

Question-exchanges during planning and clay-modelling  
 Task,  $F(1,20) = 6.74, p = .02$

Question-exchanges during planning and construction play  
 Task,  $F(1,20) = 18.13, p = .000$

Demand-exchanges during planning and clay-modelling  
 Education x Task,  $F(1,20) = 4.15, p = .03$

Demand-exchanges during planning and construction play  
 Parent sex x Task,  $F(1,20) = 5.07, p = .04$

Suggestion-exchanges during planning and clay-modelling  
 Task,  $F(1,20) = 7.62, p = .01$

Suggestion-exchanges during planning and construction play  
 Task,  $F(1,20) = 6.24, p = .02$

Statement-exchanges during planning and clay-modelling  
 Education x Parent sex,  $F(1,20) = 4.56, p = .05$   
 Education x Child sex x Parent sex,  $F(1,20) = 5.08, p = .04$   
 Task,  $F(1,20) = 7.28, p = .01$   
 Education x Child sex x Parent sex x Task,  $F(1,20) = 4.58, p = .05$

Statement-exchanges during planning and construction play  
 Parent sex,  $F(1,20) = 5.97, p = .02$   
 Education x Parent sex,  $F(1,20) = 8.35, p = .009$   
 Task,  $F(1,20) = 13.46, p = .002$