Maternal and Paternal Teaching in a Naturalistic Home Environment

Fadwa Farhat

A Thesis

In

The Department

Of

Education

Presented in Partial Fulfillment of the Requirements

For the Degree of Master of Arts (Child Study) at

Concordia University

Montreal, Quebec, Canada

November 2019

CONCORDIA UNIVERSITY

School of Graduate Studies

This is to certify that the thesis prepared

By: Fadwa Farhat

Entitled: Maternal and Paternal Teaching in a Naturalistic Home Environment

and submitted in partial fulfillment of the requirements for the degree of

Master of Arts (Child Study)

complies with the regulations of the University and meets the accepted standards with respect to originality and quality.

Signed by the final examining committee:

_____ Chair
Dr. Nathalie Rothschild

_____ Examiner
Dr. Miranda D'Amico

_____ Examiner
Dr. Holly Recchia

_____ Supervisor
Dr. Nina Howe

Approved by _____
Chair of Department

_____
Dean of Faculty

Date _____

ABTRACT

Maternal and Paternal Teaching in a Naturalistic Home Environment

Fadwa Farhat

Research comparing maternal and paternal teaching styles is very limited and most previous literature addressed mainly the mother-child relationship with little attention to the father's role. In addition, most studies done in this domain are older and have used mainly semi-structured settings, whereas little research has addressed mothers' and fathers' teaching of their young children during ongoing, naturalistic interactions at home. Thus, the aim of this study is to address and compare paternal and maternal teaching as they are applied with their preschool children in a naturalistic home environment. The data was originally collected by Hildy Ross in Waterloo, ON in 1986; it includes 39 middle-class dyads observed over a 2-year period in early childhood during ongoing interactions in the home setting for six 90-minute sessions at both times. In the current study, only the data from Time 2 when the children were aged four and six was used. The sequences of mothers and fathers teaching their children were identified first and then coded for teacher/learner roles, context (game, contingent activity, conflict), teaching strategies (e.g., direct instruction, labeling, demonstration, explanation) and child response (no response, rejection, compliance, and active involvement). Mothers and fathers did not differ significantly in the proportion of their teaching. Fathers taught significantly more in the game context than mothers and mothers taught significantly more in the conflict context. Moreover, parents were mostly directive in teaching their children and mothers and fathers did not differ in the proportion of teaching strategies used except in explanation in which the mother used such statements more than the father. Parental differences in teaching initiation, teaching frequency, teaching across context, teaching strategies, teaching across age dyads and differences in children's responses were further examined and discussed.

Acknowledgements

I would like to express my deepest thanks and appreciation to my supervisor, Dr. Nina Howe, for her ongoing leadership, encouragement, and support. Her guidance throughout my Masters journey and her confidence in my abilities have been greatly supportive and cheering. I also would like to express my deepest thanks to Sandra Della Porta for her continuous help and feedback throughout my thesis work. My appreciation goes to my fellow lab mates for their support and feedback especially Ryan Persram for his assistance in data analysis and Julia Fuoco for her help in coding the data. My sincere acknowledgements also extend to Dr. Holly Recchia and Dr. Miranda D'Amico for their time and constructive feedback. My genuine thanks go to Dr. Hildy Ross, her research assistants, and the families who participated in this project. Lastly, I would like to express my very deep gratitude to my child for being my inspiration and motivation and to my parents and my husband for providing me with unfailing support and continuous encouragement throughout my years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them. Thank you.

Table of Contents

List of Figures

List of Tables

Introduction

Statement of the Problem

Teaching is not restricted to school settings (Frye & Ziv, 2005) and parents play a crucial role in their children's socialization and education (Bornstein, 2015; Rogoff, 1998). Several researchers have investigated mother-child and father-child interactions and found some differences (Clarke-Stewart, 1978; Droppleman & Schaefer, 1963; Hartup, 1989; Lamb, 1977; Power, 1985; Thompson, 1983). Mothers were usually seen as the predominant partner in interacting with the child (Bornstein, 2015; Clarke-Stewart, 1978); however, they engage with the child most often in caretaking behaviors while fathers most often engage with the child in play contexts (Hartup, 1989; Lamb, 1977). These differences in interaction might also suggest differences in teaching styles. Research comparing maternal and paternal teaching is very limited and most previous literature addressed mainly the mother-child relationship and little research has considered the father's role (Bornstein, 2015). In addition, most studies done in this domain have used mainly semi-structured settings (Diaz, Neal, & Vachio, 1991; Laosa, 1978; McLaughlin, Schutz, & White, 1980; Pratt, Kerig, Cowan, & Cowan, 1988; Steward & Steward, 1973; Williamson & Silvern, 1968; Worden, Kee, & Ingle, 1987). Little research has addressed mothers' and fathers' teaching of their young children during ongoing, naturalistic interactions at home. Thus, the aim of this study is to address and compare paternal and maternal teaching as they are applied with their preschool children in a naturalistic home environment.

Theoretical Background

Vygotsky's sociocultural theory of development emphasizes the crucial influence of social interactions on children's cognitive development (Sawyer, 2014). Cognitive development is a collaborative process that occurs during shared activities between the child and another person (Rogoff, 1998). Vygotsky focused on the important role that an adult may play in the

development of the child, and that occurs through the "zone of proximal development" (Parker, 1979). This zone is described as the distance between what a child can achieve by him/herself and his/her potential of achieving the same task under the guidance of a more knowledgeable adult (Parker, 1979). The child is an active agent in his or her surroundings and social interactions play a crucial role in socialization and cognitive development, in such a way that the more advanced partner influences the less advanced partner through their social-cognitive interactions (Bornstein, 2015).

Cognitive Development and Teaching

Cognitive development occurs through collaborations with others (LeBlanc & Bearison, 2004; Rogoff, 1998). Children gradually construct their social understanding through their interaction and experiences with the people around them (Carpendale & Lewis, 2004; Palincsar, 1998). This interaction begins during the first year of a child's life through social referencing, gaze following, and different forms of pointing (Carpendale & Lewis, 2004, 2015). Thus, the development of social understanding is interwoven with the development of communication (Carpendale & Lewis, 2015).

Teaching is one of the most apparent forms of communication that influences children's cognition (Frye & Ziv, 2005). Strauss and Ziv (2012) argue that teaching is a natural cognitive ability in humans since it is complex, learned effortlessly, occurs without an individual being aware of its underlying logic, unique in its intent to cause learning, developmentally reliable (follows same developmental trajectory among children of similar ages from different cultures and groups), and is species typical and universal. It is not restricted to school settings (Frye & Ziv, 2005) and it is a bidirectional activity that results in cognitive growth of both teacher and learner (LeBlanc & Bearison, 2004; Strauss, Calero, & Sigman, 2014).

Definition of Teaching

Teaching is defined as an intentional activity that is pursued to increase the knowledge of the other (Frye & Ziv, 2005; Strauss et al., 2014). In their chapter, Frye and Ziv explain these two prerequisites of teaching and claim that a difference in knowledge is not enough for teaching to occur, but rather there should be an awareness of the knowledge difference on the part of the teacher. They add that the activity can be still considered teaching even if it failed. The same is not true for learning. For learning to occur, according to this approach, there should be a change in a person's understanding regardless of how that knowledge is brought about. Thus, teaching is an intentional activity that is intended to remove some lack of understanding or correct a false belief or help the individual to gain knowledge (Frye & Ziv, 2005). Rogoff (1998) believed that teaching is the intentional transfer of knowledge from a more knowledgeable person to a less informed one so that the learner can take responsibility for his/her own learning.

Parents: A Valued Source of Their Children's Social Experience

Understanding the role of human interaction in promoting teaching and learning is important for the advancement of educational practices and adult-child relationships (Frye & Ziv, 2005). According to Vygotsky, teaching is the most efficient condition for promoting children's learning and cognitive development (Sawyer, 2014). Teaching usually occurs outside of educational settings especially in the preschool years (Strauss et al., 2014; Strauss & Ziv, 2012; Strauss, Ziv, & Stein, 2002), and parents are invested in their children's socialization and education (Bornstein, 2015; Rogoff, 1998). Much of socialization happens when parents and children participate in everyday activities and practices (Kuczynski & Parkin, 2007). Parents are a valued and "important source of social experience" for their children especially by providing instructions and prohibiting unwanted behavior (Smetana, 1999, p. 319). They play a very important role in the socialization of children through shared emotions and cognitions (Maccoby, 1992). Much of the research has demonstrated that the development of young children is affected

by the quality of parents' actions and practices as caregivers and educators (Meisels, 1985).

Mother-Child vs Father-Child Interaction

Clearly, parents have a crucial impact on their children's lives (Grusec & Davidov, 2007; Kuczynski & Parkin, 2007). Although both mothers and fathers engage with children in similar ways (Cabrera, Shannon, & Tamis-LeMonda, 2007), there are also noted differences (Cabrera, Fitzgerald, Bradley, & Roggman, 2014). Communication with children is one of the aspects where mothers and fathers differ. A study by Rowe, Coker, and Pan (2004) suggests that fathers are challenging conversational partners for their children. They discovered that mothers and fathers were similar in the amount and linguistic complexity of their talk with their children; however, fathers used more wh-questions and clarification requests. This finding differs from other findings, which reported that fathers use more directly controlling language (imperatives and direct suggestions) with their children than do mothers who use less directly controlling language (indirect suggestions, information questions, and rule clarifications) (McLaughlin et al., 1980). The sample in McLaughlin et al. study was a middle class sample and that in the Rowe at al. study was a low-income sample, hence one interpretation of this difference is that parents of different SES levels might have different purposes when interacting with their children; some parents may be mainly concerned with directing their children's behavior, while others aim to elicit talk from their children.

Another factor that differentiates mothers and fathers in their interaction with their children is the amount of time they spend in caretaking. In traditional homes, mothers have assumed the caretaking tasks, whereas fathers have assumed the financial responsibility (Thompson, 1983). Mothers are usually viewed as the predominant partner in interacting with the child (Bornstein, 2015; Clarke-Stewart, 1978). They are more responsive than fathers to infant prompts of attention and are more effective in inspiring child behaviors (Power, 1985). Reports taken from

school-aged children revealed that mothers appear to be more nurturing and affectionate and disregard and ignore less than fathers; as well as mothers are more controlling in an indirect, covert way (Droppleman & Schaefer, 1963). Thus, the mother-child relationship is more mutual and warm (Hartup, 1989). However, mothers hold the child most often to engage in caretaking behaviors while fathers most often hold the child to play (Hartup, 1989; Lamb, 1977). In a recent study by Monteiro, Fernandes, Torres, and Santos (2017), it was reported that fathers are less involved than mothers in direct and indirect care, in discipline, and outdoor leisure activities. However, mothers and fathers were found to be equally involved in play activities. Interestingly, mothers behave differently in father's presence, in which they talk, respond, and play less with the child (Clarke-Stewart, 1978).

As women enter the workforce, one might anticipate an increase in fathers' participation in child care activities (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000). Research literature is starting to show that fathers participate in several unique ways in their children's development (Bornstein, 2015). Mothers might be their children's primary caregivers and main socializers, but fathers encourage autonomy, independence and competitiveness in children (Cabrera et al., 2000). Lamb (1977) argued that the differences in the amount of interaction and quality of mother-child and father-child relationships reflect a distinction in their responsibility to their child. Each relationship involves different kinds of experiences and contexts. These studies that reflect different styles of interaction between the child and his/her parents, might also suggest that mothers and fathers might differ in the way they teach their children.

Parental Teaching

The area of parent-child teaching has received limited attention as research is very scarce in this domain. However, there are some studies that focused mainly on maternal teaching in relation to other variables like risk factors (Diaz et al., 1991), education (Laosa, 1978), and

ethnicity (Steward & Steward, 1973). Diaz et al. examined differences between high risk and low risk mothers while interacting with their 3-year-olds during a matching game. Risk factors included mother's age, number of children, marital status, and SES. Maternal teaching was coded for controlling speech (e.g., commands, directives), distancing speech which evokes mental representations (e.g., conceptual questions, direct relinquishing by asking the child to take over task responsibility), attention focusing (e.g., motivation statements, labeling, descriptions), and competence attributions (e.g., praise, encouragements). Mothers' sensitive withdrawal during the task was coded by comparing maternal speech over time (first half and second half of the matching game). This idea of withdrawal is in line with Rogoff's (1998) definition of maternal scaffolding, that is by adjusting the support the mother gives, the child assumes greater responsibility for their learning. Diaz et al. also observed the child's independent performance on a similar task at the end of the matching game. The authors indicated that low risk mothers used more distancing and more competence attributions in their teaching, whereas the high-risk mothers used more controlling strategies, but were not different from low risk mothers in attention focusing and withdrawal strategies. Interestingly, only competence attributions predicted a significant portion of the child improvement variance on his/her independent performance after the teaching session.

Another study by Laosa (1978) aimed to examine Chicano mothers' teaching strategies with their own young children as a function of mothers' education level. Several maternal behaviors were observed while mothers were teaching their children how to assemble a model. Examples of these behaviors are inquiry, directive, praise, negative verbal feedback, modeling, visual cue, physical affection, positive and negative physical control. Mothers with more years of formal education used inquiry and praise more than mothers with less education. On the other hand, the mothers with lower levels of education used more modeling with their children. Thus, mothers'

education level seems to influence their teaching strategies.

Moreover, 42 mothers from seven different ethnic backgrounds (e.g., Anglo-American, Mexican-American, Chinese-American) were observed with their 3-year-olds while playing with two games, a sorting game and a motor-skill game (Steward & Steward, 1973). The video recordings were coded for total time, pacing, and input. Despite the intriguing role that ethnicity played in predicting maternal teaching input, pacing, and the child's response, remarkably, the researchers found that all the mothers, regardless of their ethnic differences, were equally concerned about their children's education and did not differ significantly in the total time they spent teaching their children.

Parental teaching styles were addressed in a study by Williamson and Silvern (1968) who observed 22 middle class Caucasian parent-child dyads (three father-daughter, five father-son, seven mother-daughter, and seven mother-son pairs) over a two-week period while working on a computer task. Children ranged in age from 4 to 9 years old. Parental intrusiveness was coded by looking at parental imperatives, direct and indirect suggestions, prompting questions, information questions, and rule clarifications. Children's performance was scored on a similar task at the end of the two-week period. Findings revealed that parents were very directive regardless of the gender of the child or dyadic composition. A qualitative examination revealed that parents who employed less controlling language encouraged child participation in the teaching and learning process and progressed at the child's pace as opposed to the more directive parents.

Researchers have argued that the child is an active agent in his/her interaction with others (LeBlanc & Bearison, 2004; Rogoff, 1998). Mothers reduce their intervention as the child shows she/he is more capable (Hartup, 1989) and as the child becomes more informed and skilled, she/he gradually takes over the task at hand (Pratt et al., 1988; Rogoff, 1998). Several studies

emphasize the use of appropriate scaffolding during teaching situations and to account for the child's potential level (Bornstein, 2015; Hartup, 1989; LeBlanc & Bearison, 2004; Palincsar, 1998). An intriguing study by Pellegrini, Brody and Sigel (1985) examined parental language and interaction with their preschool children who exhibited language and communication disorders versus children with no language disability while performing origami tasks. They documented that parental language varied as a function of children's communicative status. Parents used more cognitively demanding language with communicatively more competent children. Thus, parents seem to adjust their teaching strategies and level of guidance as a function of children's competence level and communicative status (Pellegrini et al., 1985).

Similar findings were obtained in another study by Pratt, Green, and McVicar (1992) who examined parents teaching their fifth-grade children division tasks of varying levels of difficulty. Parent-child intervention was categorized into one of eight different levels of support: no directives, general verbal, general hints, label subcomponent, specify step of component, hint about step, give step answer or recording, give step answer and recording, and parent demonstrates. Children's responses were coded as either successful if the child followed parent's suggestions or as unsuccessful if the child did not follow parent's instructions. The authors reported that parents intervened more with children with weaker skills and did more scaffolding with tougher tasks and also that better scaffolding, where more difficult components received more support, lead to better learning.

Other studies tackled the variation in parent-child teaching interaction according to different family constellations. Fathers are more likely to place higher cognitive demands (proposing alternatives, inferring similarities or differences, generalizing, and questioning) on their daughters than with their sons as opposed to the mothers who were more likely to place lower level demands (observing, labeling, and describing) on their daughters than their sons

(McGillicuddy-De Lisi, 1988). Parents seem to use more complex language in dyads with cross-gender children (McLaughlin et al., 1980). Also, the socioeconomic status of parents affected the level of demand they placed on their children in a teaching episode in which working class parents placed lower demands on their children than middle class parents (McGillicuddy-De Lisi, 1988). Moreover, McGillicuddy-De Lisi reported that parents of an only child placed fewer demands on their child than parents of three children. Thus, family context variables seem to affect parents' interaction with their children (Bell, Johnson, McGillicuddy-De Lisi, & Sigel, 1981; McGillicuddy-De Lisi, 1988).

One of the few studies to compare mother and father teaching styles was conducted by Pratt et al. (1988). They observed fathers and mothers while working separately with their 3-year-old child on a block construction task, a matrix classification task, and a story retelling task. Parents reduced their level of support as their child progressed on the tasks providing support for Vygotsky's concept of scaffolding (Pratt et al., 1988). Parent's use of appropriate scaffolding and contingent teaching was correlated with the child's success in learning the tasks. Pratt et al. reported that mothers and fathers use similar patterns and parallel approaches in teaching their children by providing more support to the weaker child and with the more difficult task. These results support Rogoff's (1998) ideas about the transfer of responsibility from the teacher to the learner when the teacher adjusts the support given leading to the learner's advancement and understanding.

Another study by Worden et al. (1987) compared mothers' and fathers' teaching strategies with their 3-year-olds across two different tasks; alphabet learning activity using a book versus the computer. The utterances of each parent and child were coded for identifications, requests for identification, comments, questions, extraneous references, positive remarks, negative remarks, directives, use of name or other personal references, and laughter. Few differences were realized

between mothers and fathers interacting with their preschoolers. Both parents, compared to their children, oversaw the interactions, talked more, initiated most topics of conversation, and were more likely to end the chat. They used also a varied range of verbal devices as opposed to their children who were mainly focused on naming things. However, children became more focused on the task of naming things when book reading by making fewer comments and questions than during the computer task. This shift of focus as a function of the task happened only when reading with the mother and did not happen when interacting with the father. The authors realized that mothers were consistent in their verbal styles across the two tasks as opposed to fathers who were unpredictable in their frequency of comments, directives, and questions, which might be an explanation of the previously stated difference.

Hence, it appears that education is a vital human parenting function and is foundational to children's socialization (Bornstein, 2015). Mothers and fathers appear to interact with and care for their children in many complementary ways (Bornstein, 2015). Few studies compared mother and father teaching and most previous literature addressed mainly the mother-child relationship, whereas, little research considered the father's role (Bornstein, 2015). Despite increasing attention to fathers, and growing evidence of their importance in development (Lamb, 2010), fathers still receive less research consideration than do mothers. Many researchers argued that future studies about parenting and parent-child relationships should consider both mothers and fathers and compare them as hypothetically different contexts for socialization (Bornstein, 2015; Kuczynski & Parkin, 2007). Thus, including the father in this study has important consequences for understanding the different kinds of interactions or teaching styles that are employed in the home environment and gives a better picture of how children learn and develop cognitively. Moreover, most research done in this area is older and there are few recent studies in this domain. On another hand, most studies used semi-structured teaching paradigms where the

parents had a specific task to teach their children (Diaz et al., 1991; Laosa, 1978; McLaughlin et al., 1980; Pratt et al., 1988; Steward & Steward, 1973; Williamson & Silvern, 1968; Worden et al., 1987). What is missing in the literature seems to be parental teaching during naturalistic ongoing interactions at home, which has been stressed as an important context in a recent study by Howe et al. (2016) that focused on sibling teaching and the types of strategies children employ when teaching one another. Such methodology reflects parent-child real-life interaction and complements our knowledge based on experimental manipulations used in previous literature.

Literature on sibling teaching reports that learners are active members who are involved, ask questions, and display understanding while being taught by their siblings (Howe, Brody, & Recchia, 2006; Howe, Della Porta, Recchia, Funamoto, & Ross, 2015). Also, sibling teachers preferred some teaching strategies over others; specifically, direct instruction, demonstration, and negative feedback (i.e., correction of errors) were employed more regularly than other strategies (e.g., explanation, positive feedback, clarification; Howe et al., 2015; Howe, Della Porta, Recchia, & Ross, 2016). Clearly, these strategies that children mostly used are straightforward and concrete reflecting their level of cognitive development. It will be interesting to explore how parental teaching and use of particular strategies may be in line with sibling teaching.

The Present Study

The purpose of this study is to address and compare paternal and maternal teaching directed to their preschool children in a naturalistic home environment. The data were originally collected by Hildy Ross in Waterloo, Ontario in 1986; the data set includes 39 middle-class families observed over a 2-year period in early childhood during ongoing interactions in the home setting for six 90-minute sessions at both times. Ethical approval has already been given for use of this

data to my advisor. The Time 2 data were chosen for this study, because the children were older (ages four and six) and more cognitively sophisticated than at Time 1, thus potentially providing a richer context for parental teaching. Also, parents talk more and use more verbal teaching with their older children (Power, 1985), and older preschoolers are more likely to understand teaching because of their advanced Theory of Mind (Bensalah, Olivier, & Stefaniak, 2012; Strauss et al., 2002; Ziv & Frye, 2004). Hence, only the Time 2 data were used and only the sessions where the father was present. In the present study, the sequences of mothers' and fathers' teaching their children were identified first and then coded for teacher/learner roles, context (e.g., game, contingent activity, conflict), teaching strategies (e.g., direct instruction, labeling, demonstration, explanation) and child's response (no response, rejection, compliance, and active involvement).

Hypotheses

As mentioned above, mothers are usually perceived as the predominant partner in interacting with the child (Bornstein, 2015; Clarke-Stewart, 1978); however, they talk, respond, and play with the child less in the presence of the father than when the father is not present (Clarke-Stewart, 1978). Considering that this research is observing parent-child interactions while both parents are present, the purpose of the present study is to explore the difference in teaching frequency between fathers and mothers when both parents are present.

Moreover, since mothers interact with the child most often in caretaking settings while fathers most often engage with the child in play settings (Hartup, 1989; Lamb, 1977), and since mothers are usually perceived as the predominant partner in interacting with the child (Bornstein, 2015; Clarke-Stewart, 1978), it was predicted that the father will teach more during the play contexts (games) while the mother will have more teaching instances in contingent activity contexts. The literature does not provide a rationale for a hypothesis about teaching regarding conflict, thus the study will examine differences in this context as well.

Furthermore, based on the different findings reported before that fathers use more directly controlling language than mothers (McLaughlin et al., 1980) and are more likely to use conversation eliciting speech like wh-questions and clarification requests (Rowe et al., 2004) with their children than mothers, it is interesting to explore how mothers and fathers will differ in their teaching strategies.

Parents use fewer directives and cognitively more demanding language and teaching strategies with communicatively more competent children (Pellegrini et al., 1985). In addition, parents adjust the teaching strategies they use with their children as a function of children's communicative status. And at age 5, children's stronger understanding of both aspects - knowledge and intention- enables them to understand better the complexity of teaching compared to younger children (Ziv, Solomon, Strauss, & Frye, 2016). Thus, in accordance with the concept of scaffolding, it is predicted that parents will use more cognitively sophisticated strategies (suggestions, explanations, questioning) with the older (age 6) sibling and more directive teaching strategies (direct instruction, labeling, demonstration, positive feedback, negative feedback) with the younger (age 4) sibling.

Finally, previous literature on sibling teaching has found that learners are active members who are involved, ask questions, and display understanding (Howe et al., 2006; Howe et al., 2015). Learners were generally interested in being taught as demonstrated by their active involvement and more likely to comply or not respond than to reject the teaching attempts (Howe et al., 2015). Therefore, it is predicted that children in this study will actively involve, comply, or not respond more than reject.

Method

Participants

Participants included 39 middle-class Caucasian families (two siblings; two parents) living in a midsized Canadian city, who were representative of the local population. Older siblings' *M* age was 6.3 years (*SD* = .42) and younger siblings' *M* age was 4.4 years (*SD* = .21). Mean age gap was 1.94 years. Two families did not have sessions where father was present so based on 37 families, there were 20 same-sex sibling dyads (10 brothers, 10 sisters) and 17 mixed-sex dyads (nine older brother and younger sister; eight older sister and younger brother). There were 10 families with a third child whose mean age was 1.42 years (*SD* = .53). Parents' ages were: mothers' *M* = 34.8 years; fathers' *M* = 36.6 years; range 25–50 years. Parents' education included university 29%, community college 15%, high school 41%, and no high school diploma 15%. Of the mothers, 27 were employed outside the home on a full- or part-time basis; fathers or other family members generally cared for the children in their mothers' absences. There are a total of 111 transcripts of audio recordings of family interactions at home where the father was present in the 37 families.

Procedure

Each family was allocated two observers for reliability sessions that took 20 minutes but then only one observer was responsible for the actual data collection. The reliability sessions were held to get children accustomed to being observed, to become familiar with the observers, and to determine interrater reliability. Observers were instructed to record behavior silently and discretely with no interactions or distractions involving family members. Children were asked to play naturally with their toys and to pretend the observers were not there. Children rarely talked or interacted with the observers, which gives us a clue that being observed did not greatly influence their interactions. Furthermore, even in times of conflict between siblings and their parents, the observer recorded these instances without interfering with the participants, which provides further evidence that the family members were not very influenced by the observer's

presence.

A dual track audio-recorder system was used to record the original data; an omnidirectional microphone held by the observer recorded family communication onto one track, while the observer quietly dictated the behaviors of family members into a second microphone to provide more detailed descriptions of sibling and parent interaction. The family members' actions recorded were coded into 96 possible behaviors (e.g., laugh, smile, hit, grab) and integrated into the precise transcriptions of speech and observers' descriptions (Ross, Filyer, Lollis, Perlman, & Martin, 1994). Transcriptions included verbal and physical action codes of individuals' behavior toward one another (e.g., request action, protest) to translate the interactions accurately. Reliability for these behaviors, actor, and context codes were established by two observers during ten 20-min sessions conducted prior to the actual data collection, which were transcribed. The agreement for presence of each coded behavior = .86 [range 70% –100%], actor = .88 [range 76% –100%], and context = .95 [range 86% –100%].

Coding and Measures

Sequences of parent-child directed teaching (directed to the older or younger sibling but not to the baby present in some families) were identified from the observation transcripts. There were three kinds of teaching sequences based on the teacher role: only the mother is teaching, only the father is teaching, and mother and father are both teaching. Teaching sequences involved the intention of a parent to teach a child, whether explicitly evident or not. Sequences can present themselves as an explicit direct intention of teaching (e.g., "I'm going to show you how to play"), an implicit indirect sharing of information or knowledge (e.g., "Why don't you place the piece over here and don't just cover the other one"), a correction (e.g., "Yes, you can still do it"), or a reprimand with explanation (e.g., "You're going to break them. It's Sophia's turn to put this away. You put away those two and let Sophia put away the other two").

Conversations or general discussions that did not include an intention to teach were not coded. The start line and end line of each teaching sequence were identified. Teaching can start with a learner request for teaching (e.g., child to parent: "How come there's one, two, and three here?"). Teaching might start with a parent asking a question to elicit learning (e.g., "Now, how many are there?"). The sequence ends when the topic changes or the teaching appears to have ended. Teaching sequences do not need to include a learner response because in some cases the learner does not respond. Sequences, however, included the response to the teaching if there is a response. Instances where the parent was helping the child without verbal or physical explanation were not considered teaching (e.g., the parent bends down and tie child's shoes without saying anything or just say I'll tie your shoes). Also, other instances of reprimands without an explanation (e.g., "Don't scream"), asking episodic questions or information (e.g., "Whose car is this?"), and anything conversational were not considered teaching as well.

After the sequences were identified, coding originated using a scheme based on the coding scheme used for sibling teaching by Howe et al. (2016), but that was refined in the process of training before the actual coding was conducted. Teaching sequences were coded for these variables (see Table 1 after this section for a coding example and Appendix A for the coding scheme at the end of the paper):

Teacher/Learner role and context. The teaching sequences were coded for teacher (mother, father)/learner roles (younger, older sibling), and context (game, contingent activity, pretend, family conflict, conflict, nothing) that were included in the original Ross et al., (1994) data. The game context was defined as a sequence of interaction that is playful in which the partners mutually involved, alternate turns, and repeat their roles. The contingent activity context was defined as a sequence of interaction in which the actions of both people follow an action by the partner as a response. Pretend context was defined as a sequence of interaction in which the

partners assume roles of other people in their play or use objects in a non-literal manner. Family conflict was defined as a sequence of interaction which includes one or both of the parents as combatants with their children (more than two partners are involved). Conflict context was defined as a sequence of interaction in which there is an incompatibility of behavior between two partners. The action of one person is met with protest, resistance, or retaliation by the other. Nothing sequences are those that do not have any turns that would contribute in any way to any of the interaction sequences noted before. Pretend (3% out of all contexts) and nothing (3.3% of all contexts) sequences were omitted from analyses because of their rare occurrence. Family conflict and conflict were merged as one context because of the rare occurrence of family conflict (7.4 % of all contexts) and the similarity between the two contexts. The context within which the teaching occurred was not included in the start and end line of the teaching, but only for the entire teaching episode itself.

Teacher initiation. Initiation of teaching was coded with mutually exclusive categories as either (a) initiated by the teacher assuming the teacher role (e.g., parent explains to his younger child that because the older won, he goes first and then the game order goes clockwise) or (b) the learner requested knowledge from teacher (e.g., child asks parent: "Which way?").

Teaching strategies. Teaching sequences were coded for teaching strategies used by parents based on the coding scheme used for sibling teaching by Howe et al. (2016) and were refined in the process of training before the actual coding was conducted. Teaching strategies were coded as present or absent for each teaching sequence; because teachers often employed multiple strategies, more than one type of strategy could be coded per sequence. The nine strategies were defined as: (a) direct instruction, which can be verbal (e.g., "Do this; stand here, Blake! That goes there") or physical (e.g., parent moves child into right position for dance step) or can be an answer of yes or no in response to a child's question; (b) labeling, refers to describing and

sharing information (e.g., “This is an H”, “that was rude”); (c) suggestion, which is a kind of scaffolding or giving hints or suggesting an action to solve a potential issue (e.g., “Why don’t you just stand on opposite ends of the couch”; (d) demonstration, which is showing how to do something (e.g., “Watch me move”); (e) explanation, which is justifying or explaining a reason why (e.g., “Put it on top so it won’t fall over”); (f) questioning, the teacher uses a question to test learner’s knowledge or learning or check his/her understanding (e.g., “Now, how are you going to get it down?” talking about the balloon which was stuck up on the ceiling; “Do you see how to do it?”); (g) positive feedback, which is praising the child (e.g., “good; that’s right; yup”); (h) negative feedback, which is correcting the child (e.g., “You don’t turn, no, not like that; No, that’s not the bull”). For the sake of the fourth hypothesis which stated that parents will use more cognitively sophisticated strategies with the older sibling and more directive teaching strategies with the younger sibling, we decided to divide the strategies into two groups: sophisticated and nonsophisticated. Explanations and checking understanding are argued by Strauss et al. (2002) to be positively associated with ToM and thus to be considered sophisticated. In addition, in a study by Howe, Persram, and Bergeron (2019), they considered suggestion, explanation, and questioning as cognitive strategies, which are more sophisticated than other strategies like demonstration, verbal instruction, and feedback. Thus, based on this grouping, we divided teaching strategies into (a) sophisticated ones including suggestion, explanation, and questioning and (b) non-sophisticated strategies including direct instruction, labeling, demonstration, positive feedback and negative feedback.

Child’s response. Mutually exclusive learner responses, which represented progressively higher levels of involvement, were coded as (a) the learner not responding to the teacher’s instruction and when the response is unrelated to teaching or behavior is unclear and whether it follows from the context; (b) explicit rejection of knowledge being taught (e.g., parent to child

"wrong way", child says "it's not"); (c) complying with the teaching by imitating or verbally accepting information (e.g., child moves the way a parent told her to in a game); or (d) active involvement, which was considered the highest level of learner involvement, because the child could build on what was being taught with additional information or by asking questions or just repeating the teacher's answer (e.g., parent to child "that what happens when you put too much milk in it", child responds "you put too much milk in it"). If there were multiple types of learner involvement in a sequence, the highest level of involvement was coded. For example, if the learner rejected and then was actively involved, the learner response was coded as the latter since active involvement reflects highest level of engagement.

Table 1

Coding Examples of Parental Teaching Strategies and Learner Responses

Teacher	Learner	Teaching Initiation	Older Response	Younger Response	Teaching Strategy	Context	Conversation
M	OY	AR	NR	NR	SG/EXP	CA	M to OY: "Why don't you move the broom so that no one lands on it".
F	O	AR	REJ	-	EXP	C	F to O: "Be careful with the brush cause you'll pull the hairs out"; O continues to brush doll's hair roughly.
M	Y	AR	-	AI	LB	CA	M to Y: "You don't have to be too strong to plug in the lights"; Y replies: "Okay, I am going to turn these lights on".
F	Y	AR	-	COM	DI	CA	F to Y: " You are supposed to help her win"; Y replies: "Yeah".
F	Y	LR	-	COM	SG/PF	GA	Y to F: "Which way do I go?"; F replies: "Okay, what comes after five?"; Y points to a square; F says: "Yeah"; Y moves piece.

Note. F = father, M = mother, O = older, Y = younger, AR = assume teaching role, LR = learner request, AI = active involvement, COM = compliance, NR = no response, REJ = rejection, DI = direct instruction, LB = labeling, SG = suggestion, EXP = explanation, PF = positive feedback, CA = contingent activity, C = conflict, GA = game

Interrater reliability

In regard to identifying teaching sequences, 19% of the total number of lines (912/4777) was used to attain reliability on lines of teaching identified by myself and another trained research assistant. Reliability was calculated by recording whether the coders agreed or disagreed on whether each line was part of a teaching sequence. The coders had 70% agreement based on calculating agreed/(agreed + disagreed) identification of sequences and $Kappa = .74$, $p < .001$. For example, if both coders identified the same sequence, each line was counted as an agreement. If one coder missed a line, that one line was considered a disagreement. Finally, if one coder missed an entire sequence, each line in that sequence was a disagreement. To control for misinterpretations in identification, research assistants met frequently to discuss questions about the coding of specific sequences; overall, they took a very cautious approach to identifying teaching sequences.

Reliability (kappa) for the coding of parental teaching was obtained between two trained coders on 24% (255/1061) of sequences; one coder was unfamiliar with the study's goals. Kappas for identifying the sequence characteristics were as follows (all ps $< .001$): (a) initiation of teaching = .75; (b) older response = .80; (c) younger response = .76. Kappas for the eight teaching strategies were (a) direct instruction = .68; (b) labeling = .77; (c) suggestion = .73; (d) demonstration = .73; (e) explanation = .71; (f) questioning = .91; (h) positive feedback = .79; (i) negative feedback = .73. According to Fleiss (1981), a kappa value between .60 and .75 is good, and a value greater than .75 is excellent.

Results

Descriptive Information

Analyses were conducted using repeated measures analysis of variance (ANOVA) with family as the unit of analysis. Statistical significance (p-value) was determined *a priori* and set at

$p < .05$. Effect sizes for significant effects are reported as partial eta-squares. Degrees of freedom were adjusted using the Greenhouse-Geisser correction to account for the violation of sphericity when necessary, and Bonferroni corrections were employed for all post hoc pairwise comparisons ($p < .05$).

To analyze each of the hypotheses, proportion scores were created for each variable to account for the number of teaching sequences per family. For example, to create a proportion score for fathers' use of direct instruction, the total number of fathers' use of direct instruction was divided by the total number of fathers' teaching sequences, where only the father was teaching. In the analyses, (a) parent (mother, father, mother and father), (b) context (game, contingent activity, conflict), (c) teaching strategies (e.g., labeling, direct instruction, suggestion), (d) learner (older, younger, older and younger), and (e) child's response (active involvement, compliance, no response, rejection) served as independent variables (where appropriate) and the proportion of teaching and of children's responses as dependent variables.

In total, there were 1061 teaching sequences in the 37 families (range = 4 to 114). Descriptive statistics for teaching frequency, teaching across context and teaching strategies, and teaching strategies across age dyads and learner's response are presented in Tables 2, 3, and 4 respectively (all tables and graphs are found at the end of the Results Section).

Preliminary Analyses

Gender. A series of one-way ANOVAs were conducted to test for the effects of gender and gender composition (mixed-sex vs same-sex dyads) in teaching initiation, teaching strategy, context, and learner response variables. Results revealed no significant effects for the older child among 89 tests conducted and only one significant result for younger compliance to the father; $p = .048$ among 89 tests. Regarding gender composition, only 2/89 tests were significant. Given

these marginal effects compared to all the other variables, gender and gender composition were not controlled for in the analysis.

Teaching Initiation. A dependent *t*-test used to compare proportions of teaching initiation variables (initiated by the parent or learner requested teaching) was significant, $t(36) = 35.967$, $p < .05$. Initiation of teaching by parents ($M = .94$, $SE = .01$) was significantly greater than when the learner requested teaching ($M = .07$, $SE = .01$).

Learner. A repeated measure ANOVA was conducted to compare proportions of the three learner roles (older, younger, older plus younger). The ANOVA revealed a main effect of learner role, $F(2, 72) = 18.93$, $p < .05$, $\eta_p^2 = .35$. Pairwise comparisons revealed older ($M = .40$, $SE = .03$) and younger ($M = .44$, $SE = .03$) children were taught alone significantly more than both together ($M = .16$, $SE = .03$), but older and younger children did not differ.

Mothers' and Fathers' Teaching

We tested the proportions of parental teaching by conducting a repeated measures ANOVA where the parents were the independent variable with three levels (mother, father, mother plus father). Findings revealed a significant main effect, $F(1.05, 37.63) = 21.31$, $p < .05$, $\eta_p^2 = .37$. Refer to Table 5 for results of differences in parental teaching. Pairwise comparisons revealed that mother alone ($M = .48$, $SE = .05$) and father alone ($M = .47$, $SE = .05$) taught significantly more than both together ($M = .06$, $SE = .01$), but mothers and fathers alone did not differ. Given how rarely both parents taught together, this variable was dropped from further analyses.

Teaching Across Contexts

We tested the difference in teaching proportions of parents across the three different contexts (contingent activity, conflict, games) by conducting a 2 (parent) × 3 (context) repeated measures ANOVA. The independent variables were parents (father, mother) and contexts (contingent activity, conflict, games), whereas the dependent variable was the proportion of

teaching. Findings revealed no main effect of context, $F(2, 62) = 1.53$, $p = .23$. The proportion of teaching did not differ between contingent activity ($M = .40$, $SE = .05$), conflict ($M = .25$, $SE = .04$), and game ($M = .35$, $SE = .06$) contexts. However, an interaction (refer to Figure 1) was found between parents and contexts (refer to Table 6), $F(1.63, 50.37) = 3.6$, $p < .05$, $\eta_p^2 = 1.04$. The mother ($M = .30$, $SE = .04$) taught significantly more in the conflict context than the father ($M = .20$, $SE = .05$), while the father ($M = .43$, $SE = .07$) taught significantly more in the game context than the mother ($M = .28$, $SE = .05$). Mothers' ($M = .42$, $SE = .06$) and fathers' ($M = .37$, $SE = .07$) teaching did not differ significantly in the contingent activity context. Thus, the hypothesis was partially supported.

Teaching Strategies

We tested the difference in teaching strategies used by fathers and mothers by running a 2 (parent) × 8 (teaching strategies) repeated measures ANOVA. The independent variables were parents (father, mother) and teaching strategies (direct instruction, labeling, suggestion, demonstration, explanation, questioning, negative feedback, and positive feedback) and the dependent variable was the proportion of teaching. Findings revealed a main effect of teaching strategy, $F(4.05, 125.68) = 24.89$, $p < .05$, $\eta_p^2 = .45$. Direct instruction ($M = .31$, $SE = .03$) was used significantly more than the other strategies except explanation ($M = .17$, $SE = .02$). Labeling ($M = .18$, $E = .02$) was also used significantly more than the other strategies except direct instruction, explanation, and negative feedback ($M = .16$, $SE = .02$). Explanation and negative feedback did not differ significantly and were both used significantly more than demonstration ($M = .05$, $SE = .01$), questioning ($M = .05$, $SE = .02$), and positive feedback ($M = .01$, $SE = .003$). Suggestion ($M = .08$, $SE = .01$) was used significantly more than positive feedback only and significantly less than direct instruction and labeling. Demonstration, questioning and positive feedback were used significantly less than direct instruction, labeling, explanation, and negative

feedback. In brief, the most commonly used strategies were direct instruction, labeling, explanation, and negative feedback and the least used strategies were demonstration, questioning and positive feedback. No significant interaction was found between parents and teaching strategies. Pairwise comparisons revealed only one significant difference between fathers and mothers. Mothers (M = .21, SE = .04) used significantly more explanations than fathers (M = .13, SE = .02).

Teaching Strategies Across Age

This analysis examined if parents differed in their use of sophisticated and nonsophisticated teaching strategies with different aged children. For the sake of this hypothesis, strategies were divided into two groups: sophisticated and nonsophisticated. Based on previous literature by Howe et al. (2019) and Strauss et al. (2002), teaching strategies were divided into (a) sophisticated ones included suggestion, explanation, and questioning and (b) nonsophisticated strategies included direct instruction, labeling, demonstration, positive feedback and negative feedback. Thus, we conducted a 3 (learner) × 2 (strategies) repeated measures ANOVA. The independent variables were learner (older, younger, both children) and strategies (sophisticated and nonsophisticated). The dependent variable was the proportion of teaching. Findings revealed a main effect of strategy, $F(1, 29) = 69.02$, $p < .05$, $\eta_p^2 = .7$ (refer to Table 7). Parents used nonsophisticated strategies (M = .70, SE = .02) significantly more than the sophisticated ones (M = .30, SE = .02). An interaction (refer to Figure 2) was found between the learner and the parents' sophisticated and nonsophisticated strategies, $F(1.27, 36.96) = 4.48$, $p < .05$, $\eta_p^2 = .13$. Parents employed nonsophisticated strategies significantly more with the younger child (M = .77, SE = .03) than with both children together (M = .60, SE = .06); however, they did not differ in their use of nonsophisticated strategies with the older (M = .73, SE = .03) and the younger sibling. Also, parents employed sophisticated strategies significantly more with both children

together (M = .40, SE = .06) than with the younger alone (M = .23, SE = .03). As well, parents did not use sophisticated strategies differently with the older (M = .27, SE = .03) and the younger sibling. Hence, our hypothesis was not supported.

Learners' Responses

To examine children's response to parental teaching a 2 (learner) × 4 (response) repeated measures ANOVA was conducted. The independent variables were learner (older, younger) and response (active involvement, compliance, no response, rejection). The dependent variable was the proportion of the child's response. Findings revealed a main effect of response, $F(1.52, 54.7) = 32.18$, $p < .05$, $\eta_p^2 = .47$ (refer to Table 8). Children responded with active involvement (M = .37, SE = .03) and with no response (M = .48, SE = .05) significantly more than with compliance (M = .14, SE = .02) and rejection (M = .05, SE = .01). Also, they responded with rejection significantly less than the other three responses. Hence, the least used response was rejection and the most used were active involvement and no response. No significant interaction was found between learner and response, $F(1.63, 58.7) = 1.18$, p =.31. However, pairwise comparisons revealed only one significant difference between the older and the younger child in which the younger sibling (M = .17, SE = .02) responded with compliance significantly more than the older sibling (M = .11, SE = .02).

Table 2

Descriptive Statistics for Teaching Frequency of Mothers, Fathers, and both Parents Together

	Frequency	*M* (*SD*)	Range
Father	620	16.67 (22.88)	0-106
Mother	377	10.19 (8.94)	0-48
Father/Mother	65	1.73 (2.43)	0-13

Table 3

Descriptive Statistics for Teaching across Contexts and Teaching Strategies

	Father			Mother		
	Frequency	*M* (*SD*)	Range	Frequency	*M* (*SD*)	Range
Context						
Contingent Activity	98	2.65 (2.79)	0-9	120	3.24 (2.79)	0-10
Conflict	90	2.43 (4.66)	0-27	111	3 (3.3)	0-13
Games	417	11.27 (18.8)	0-75	115	3.11 (6.04)	0-33
Teaching Strategies						
Direct Instruction	304	8.22 (2.05)	0-48	163	4.41 (5.71)	0-33
Labeling	209	5.65 (11.71)	0-67	79	2.14 (2.21)	0-8
Suggestion	46	1.24 (2.27)	0-12	54	1.46 (1.85)	0-9
Demonstration	42	1.14 (1.72)	0-6	37	1.00 (2.16)	0-12
Explanation	118	3.19 (5.01)	0-19	108	2.92 (2.75)	0-10
Questioning	72	1.95 (4.65)	0-22	15	0.41 (1.09)	0-5
Positive Feedback	31	0.84 (1.83)	0-9	7	0.19 (0.46)	0-2
Negative Feedback	177	4.78 (7.05)	0-28	93	2.51 (3.37)	0-18

Table 4

Descriptive Statistics for Teaching Strategies and Child's Response across Age

		Frequency	*M* (*SD*)	Range
	Teaching Strategy			
Older	nonsophisticated	415	21.92 (67.37)	0-42
	sophisticated	154	7.90 (24.26)	0-13
Younger	nonsophisticated	590	30.28 (94.63)	0-119
	sophisticated	173	8.88 (27.58)	0-31
Older and Younger	nonsophisticated	123	6.32 (19.94)	0-31
	sophisticated	87	4.47 (14.14)	0-21
	Response			
Older	Active Involve.	202	5.46 (4.95)	0-23
	Compliance	84	2.27 (3.43)	0-12
	No Response	217	5.86 (4.20)	0-19
	Rejection	24	0.65 (0.92)	0-4
Younger	Active Involve.	204	5.51 (6.97)	0-28
	Compliance	123	3.32 (4.00)	0-18
	No Response	273	7.38 (7.35)	0-41
	Rejection	23	0.62 (0.89)	0-3

Table 5

Proportion Means and Standard Errors of Father and Mother Teaching

	M	*SE*
Father	0.47[a]	0.052
Mother	0.48[b]	0.051
Father/Mother	0.06[ab]	0.01

Note. Frequency of parental teaching was controlled. Means and standard deviations are based on the proportion scores of teaching over all teaching sequences. Means that are in the same column are labeled with the same superscripts when post hoc Bonferonni tests revealed significant differences at $p < .05$ (e.g., "a" is significantly different from "a").

Table 6

Proportion Means and Standard Errors of Father and Mother Teaching across Contexts

	Father		Mother	
	M	*SE*	*M*	*SE*
Context				
Contingent Activity	0.37	0.07	0.42	0.06
Conflict	0.20[a]	0.05	0.30[a]	0.04
Game	0.43[b]	0.07	0.28[b]	0.05

Note. Frequency of parental teaching across context was controlled. Means and standard deviations are based on the proportion scores of teaching across a context over all teaching sequences. Means that are in the same row, are labeled with the same superscripts when post hoc Bonferonni tests revealed significant differences at $p < .05$ (e.g., "a" is significantly different from "a").

Table 7

Proportion Means and Standard Errors of Sophisticated and Nonsophisticated Teaching Strategies

	M	*SE*
Sophisticated	0.30[a]	0.02
Nonsophisticated	0.70[a]	0.02

Note. Proportion of parental teaching strategies was controlled. Means and standard deviations are based on the proportion scores of teaching strategies over all teaching strategies sequences. Means that are in the same column are labeled with the same superscripts when post hoc Bonferonni tests revealed significant differences at $p < .05$ (e.g., "a" is significantly different from "a").

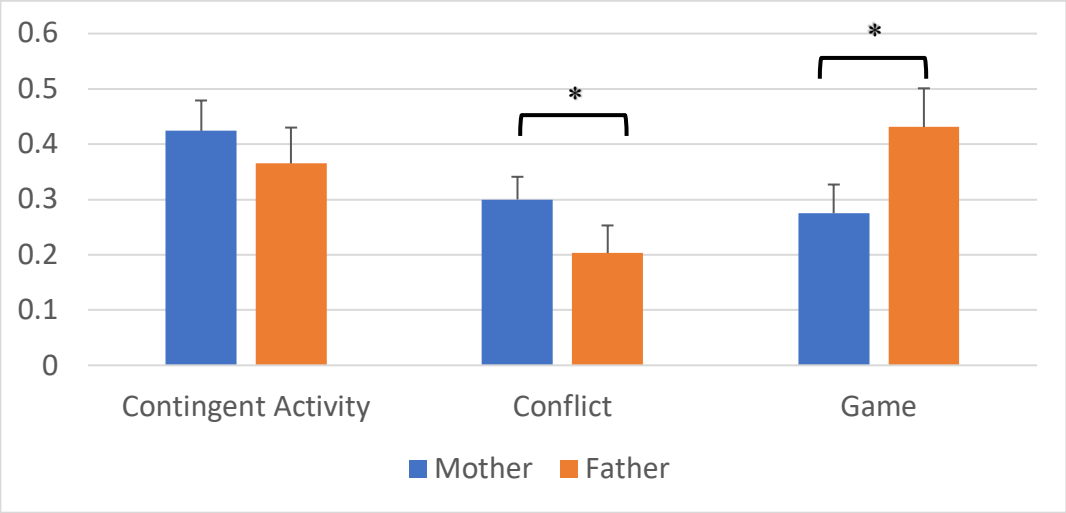
Table 8

Proportion Means and Standard Errors of Learner Responses

	M	*SE*
Active Involvement	0.36^{a}	0.03
Compliance	0.14^{abc}	0.02
No Response	0.48^{c}	0.05
Rejection	0.04^{abc}	0.01

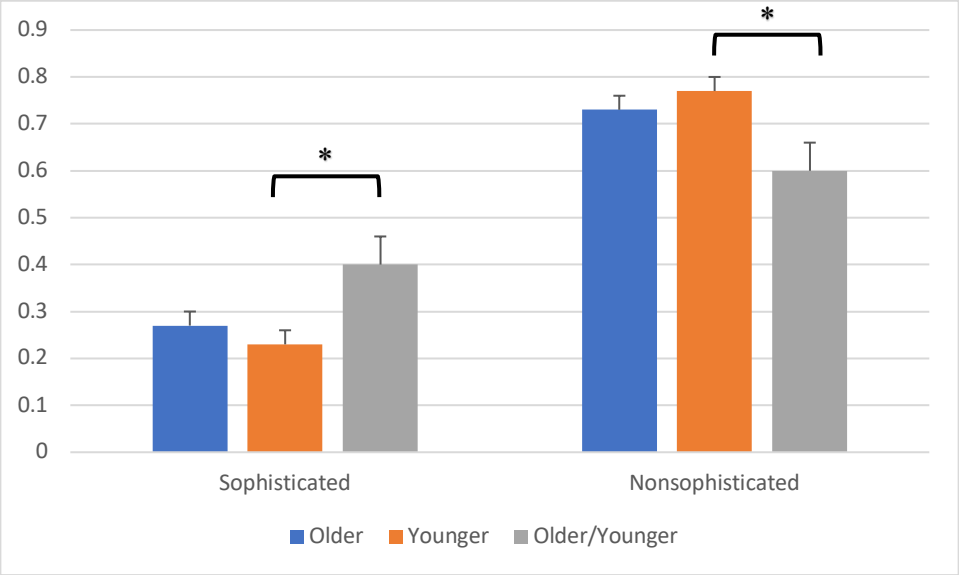
Note. Proportion of learner's responses was controlled. Means and standard deviations are based on the proportion scores of each response over all responses. Means that are in the same column are labeled with the same superscripts when post hoc Bonferonni tests revealed significant differences at $p < .05$ (e.g., "a" is significantly different from "a").

Figure 1. Parents' Teaching by Contexts Interaction



Note. The asterisk represents a significant difference between mothers and fathers.

Figure 2. Learner by Teaching Strategies (Sophisticated and Nonsophisticated) Interaction



Note. The asterisk represents a significant difference.

Discussion

Overall, the purpose of the present study was to address and compare paternal and maternal teaching directed to their preschool children in the naturalistic home environment. In the following section, a discussion of the findings reported above will be presented in more detail as related to the research questions. In addition, limitations, directions for future research, and the implications of the findings from this study will be discussed.

Mothers' and Fathers' Teaching Initiation and Learner Roles

The initiation of teaching by parents was significantly greater than when the learner requested teaching. This agrees with Worden et al.'s (1987) finding that parents, compared to their children, oversaw the interactions, talked more, initiated most topics of conversation, and were more likely to end the chat. Also, the findings illuminate the spontaneous nature of these interactions and reflect parents' understanding of the required knowledge and how to transfer it to their children. This highlights Rogoff's (1998) definition of teaching as an intentional transfer of knowledge from a more knowledgeable person to a less informed one so that the learner can take responsibility for his/her own learning.

It was also beneficial to examine differences in learner roles. Learner roles can be either younger, older, or both younger and older children and it involves who is the recipient of parental teaching. The findings indicated that older and younger children did not differ significantly in the frequency of learner roles, which means that parents directed similar amounts of teaching to the older and younger child. Perhaps given the similarity in age of the two children, parents directed a similar amount of teaching to each of them. However, older and younger children were taught alone significantly more than both together. This is logical as well

as children engage in different actions and ask different questions and, thus parents are more likely to direct teaching to one child alone more than to both together.

Proportion of Maternal and Paternal Teaching

The proportion of parental teaching was tested and mothers and fathers did not differ significantly in their teaching. Previous literature indicates that mothers are the predominant partner in interacting with the child (Bornstein, 2015; Clarke-Stewart, 1978) and it seems that with time progress, fathers' participation in child care activities is increasing (Cabrera et al., 2000). However, the literature also suggests that mothers and fathers engage differently with their children depending on the context (Clarke-Stewart, 1978; Hartup, 1989; Lamb, 1977, 2010), thus it seems that even though parents may differ in the amount they interact with the child, each parent teaches more in a particular context as will be discussed later in the 'teaching across contexts' section. Thus, while we did not find differences in the amount of mothers' and fathers' teaching overall, there were differences in the context that may reflect some of the earlier literature (Bornstein, 2015; Clarke-Stewart, 1978; Hartup, 1989; Lamb, 1977, 2010). In addition, most previous research studies were conducted on samples where mothers were unemployed; however, in the present study, more than half of the mothers were employed and thus this might affect mothers' and fathers' involvement with their children when both are present at home. As both parents have outside responsibilities, they may both tend to share the inside home responsibilities.

The present findings also might challenge the notion that mothers behave differently in the father's presence, in which they talk, respond, and play less with the child (Clarke-Stewart, 1978). Even though the current study did not compare maternal teaching in the father's presence versus in his absence, the findings provide some insight into how mothers teach and interact with

her children in the presence of the father. It seems that the mother is still engaging and involved with her children when the father is present at home.

In addition, the present findings indicated that the mother alone and the father alone taught significantly more than both together when they were both present at home. This result seems interesting as when a parent initiates teaching, the other parent hands over the responsibility to him/her, but yet sometimes both parents engage together in the same teaching sequence where both share a role in the teaching process. For example, in a teaching sequence in one family, both parents supported each other when addressing the younger child for speaking impolitely with the father. The father said: "How does daddy feel about being blackmailed like that?" and the mother added: "We don't like it", the father then said: "Yeah, we don't give daddy ultimatums…" In another sequence in the same transcript, the mother suggested to the older child who wanted a solution to a problem to divide the room to play with his sibling by saying: "You need to divide the room in half, right in the middle of this chair, in between these two chairs, that's even." In this example, the mother alone addressed teaching to her child with no father support and intervention. Hence, parents cooperate in different ways when teaching their children. Also, this finding could suggest that mothers and fathers might be teaching different topics, which explains their turn taking in teaching the children, a question for future research. Moreover, even though both parents are present at home, this does not mean both are actively engaging with their children at the same time. They might be switching responsibilities, when one is engaging with the children, the other is finishing other chores. This might explain why each one taught alone more than with the other. Evidently, these speculations demand further examination.

Teaching Across Contexts

In regards to parental teaching across the different contexts (contingent activity, conflict, games), the proportion of teaching across these contexts was examined. The overall proportion of teaching did not differ between contingent activity, conflict, and game contexts. Perhaps parents tend to take advantage of every opportunity to teach their children something and these opportunities arise in diverse contexts. Also, the similar frequency of teaching between contexts could be explained by the frequency of occurrence of each of these contexts across all transcripts. It might be that the interaction between parents and children at home ranged from contingent activity to games to conflict in a relatively equal manner and thus the overall proportion of teaching by parents across these contexts was similar. It is interesting to examine this hypothesis in the future. Do parents spend more time with their children in one context over the others or is the time they spend at home distributed relatively equally between contingent activity, conflict and game contexts? Does this affect the teaching frequency across these contexts?

The analyses indicated an interaction between parents' teaching and context, in partial support of the hypothesis. It was hypothesized that the father will teach more during the play contexts (games), whereas the mother will have more teaching instances in contingent activity contexts. Fathers taught significantly more in the game context than mothers. Fathers' involvement in teaching as a play companion finds support in other studies by Hartup (1989) and Lamb (1977, 2010). On another hand, mothers taught significantly more in the conflict context than fathers. Reports taken from school-aged children revealed that mothers appear to be more nurturing and affectionate and disregard and ignore less than fathers; as well, mothers are more controlling in an indirect, covert way (Droppleman & Schaefer, 1963). These findings might explain why mothers had more teaching instances during conflict situations than fathers as they

are usually more responsive, less disregarding, and more controlling. It is possible that these maternal behaviours make mothers more in tune to their children during conflict.

Mothers' and fathers' teaching did not differ significantly in the contingent activity context. The literature suggests that the mother engages most often with the child in caretaking behaviors (Hartup, 1989; Lamb, 1977). Contingent activities are defined in the present study as interactions in which the actions of a person follow the action of another as a response. While, caretaking behaviors are defined as physical contact (e.g., changing, feeding, bathing) with the child to take care of her/him (Lamb, 1977). Thus, these two concepts might overlap, but do not exactly match. Contingent activities might include caretaking behaviors but they are more general and involve a wider range of interactions. Moreover, in another study by Clarke-Stewart (1978), mothers were the predominant partner in interacting with children in caretaking episodes including touching, verbal communication, holding, and responding. These activities are usually done during contingent activities. However, the mothers in the Clark-Stewart study were all unemployed and were their children's main caregivers. Beside the difference in definition between contingent activity and caretaking behaviours that might explain the difference in findings, the difference in the employment status of parents might also affect the result.

In a recent study by Monteiro et al. (2017), it was reported that fathers are less involved than mothers in direct and indirect care, in discipline, and outdoor leisure activities. However, mothers and fathers were equally involved in play activities. This finding does not support our finding about fathers' greater teaching in the game context, but supports the finding about maternal teaching in conflict situations. The differences in findings might be due to methodological differences where Monteiro et al. study employed a questionnaire completed by mothers themselves to assess the father's involvement with his children as opposed to the

naturalistic observation method used in the present study. Mothers might have exaggerated their involvement when self-reporting and thus fell into a response bias. Also, the children's age in Monteiro et al. study ranged between 2-6 years, which reflects a greater range, including younger aged children, than the age of children in the present study (4-6). This might explain why mothers were involved more than fathers in the caretaking behaviours and had similar involvement as the fathers in play activities since mothers are expected to be more responsible for younger children.

Teaching Strategies

With respect to parental differences in teaching strategies, the overall proportion of teaching strategies was examined. Direct instruction and labeling were used significantly more than most other strategies. The most commonly used strategies were direct instruction, labeling, explanation, and negative feedback and the least used strategies were demonstration, questioning and positive feedback. This agrees with Williamson and Silvern (1968), who found that parents are mostly directive when interacting with their children.

Interestingly, parents employed similar teaching strategies as child teachers as reported in previous sibling teaching literature (Howe et al., 2015; Howe et al., 2016). Sibling teachers use direct instruction and negative feedback more than other strategies. This suggest that perhaps children model their parents' use of particular strategies. Yet, children used demonstration more than other strategies while parents used it less than most strategies; further, parents used explanation, whereas children used it less than other strategies. Thus, despite the similarities, differences in using such strategies may reflect differences in cognitive development between parents and children as explanation is considered to be a more complicated and indirect strategy than others and demonstration is considered to be a direct and concrete strategy.

The difference between fathers' and mothers' teaching strategies was explored. The only significant difference between mothers and fathers was in their use of explanation where mothers used such statements more than fathers. The difference between mothers and fathers in their use of explanation, which is somehow an indirect and a more complicated strategy than others such as direct instruction and labeling, is supported by McLaughlin et al. (1980), who reported that mothers tend to use more indirectly controlling language than fathers. This difference could also be driven by the different contexts in which mothers and fathers are teaching, a question for future research. Also, previous literature (McLaughlin et al., 1980; Rowe et al., 2004) reported that fathers used more directly controlling language and more wh-questions and clarification requests with their children than mothers. Thus, there seems to be differences reported in the literature between fathers' and mothers' teaching strategies more than what was found in the present study. This disparity might be due to methodological differences. Both the McLaughlin et al. and Rowe et al. studies employed a predetermined activity for their observations and thus the children and parents interacted in a semi-structured setting as opposed to the case in the present study. As mentioned earlier, most of previous literature did not use naturalistic observation and, thus results might be affected by this methodological difference. Hence, based on the present study's findings, it seems that fathers and mothers teaching strategies are more similar than different.

Teaching Strategies Across Age

The fourth hypothesis examined parental differences in their use of sophisticated and nonsophisticated teaching strategies with different aged children. For the sake of this hypothesis, strategies were divided into two groups: sophisticated and nonsophisticated. Based on previous literature by Howe et al. (2019) and Strauss et al. (2002), teaching strategies were divided in to

(a) sophisticated strategies including suggestion, explanation, and questioning, and (b) nonsophisticated strategies including direct instruction, labeling, demonstration, positive feedback, and negative feedback. In general, parents used nonsophisticated strategies significantly more than the sophisticated ones regardless of children's age. This means that parents used mostly nonsophisticated strategies when teaching their children and they did not vary the level of complexity between the older and the younger child. Previous literature indicated that children's understanding of teaching usually starts from three years old and develops with ToM (Frye & Ziv, 2005). Possibly, the young age of the children and the similarity between their ages has affected this nonadjustment in parental use of sophisticated or nonsophisticated strategies. Thus, perhaps parents tended to use simpler teaching strategies when interacting with their children to account for their young age.

It was predicted that parents will use more cognitively sophisticated strategies with the older (age 6) sibling and more directive teaching strategies with the younger (age 4) sibling. This hypothesis was not supported. Parents did not differ in their use of nonsophisticated and sophisticated strategies with the first- and second-born siblings. In previous literature, it has been found that at age 5, children's stronger understanding of both aspects of teaching -knowledge and intention- enables them to understand better the complexity of teaching compared to younger children (Ziv et al., 2016). Moreover, parents used fewer directives and cognitively more demanding language and teaching strategies with communicatively more competent children aged four to six (Pellegrini et al., 1985). Thus, parents adjusted their teaching strategies level of guidance as a function of children's competence level and communicative status. This adjustment was not supported in our study as parents did not differ in their use of nonsophisticated and sophisticated strategies with their two children. This might be due to both children being present

together at the time of teaching. Hence, parents used similar strategies when addressing each child taking into account the presence of the other child. Yet, interestingly, parents employed nonsophisticated strategies more with the younger than when teaching both children together and more sophisticated strategies with both children than with the younger alone. Thus, it seems that when the older sibling is involved when the parent is teaching both children, parents are more likely to use sophisticated strategies and less likely to use nonsophisticated strategies. So, in fact they might be adjusting to the level of the older child or to the context in which there is one or two children. This highlights the importance of exploring teaching sequences directed to both children together as opposed to those directed to each child alone. The former context may reflect an important teaching milieu for the younger child where parents tend to use more sophisticated strategies when the older is included in the teaching episode as opposed to when the younger is being taught alone. As for why this difference was not evident when teaching the older and the younger child alone, this might need further analysis and perhaps a larger data set to be addressed. It is also important to note that the findings are confounded between age and birth order, thus, it is interesting to explore in the future the differences by adding another time point and comparing, for example, teaching strategies addressed to first-born 4-year-olds and second-born 4-year-olds to discriminate between these variables.

Learner Response

Given that teaching and learning are bidirectional processes, it is important to examine the response of the learner (Palincsar, 1998; Rogoff, 1998), though less attention has been given to this matter in the literature (Strauss et al., 2014). In the present study, children responded with active involvement and with no response significantly more than with compliance and rejection. Also, they responded with rejection significantly less than the other three responses. Hence, the

least used response was rejection and the most used were active involvement and no response in support of the proposed hypothesis. Findings are generally in line with the literature on sibling-directed teaching indicating that learners are active members who are involved, ask questions, and display understanding (Howe et al., 2006; Howe et al., 2015). In accordance with the findings of previous research by Howe et al. (2015) on sibling-directed teaching, learners were generally interested in being taught as demonstrated by their active involvement or to comply or not respond than to reject the teaching efforts. Not responding might indicate their understanding or satisfaction with the parents' teaching and they may have felt there was no need to reply in any way.

The only difference between the younger and older children's responses to parental teaching was that the younger responded with compliance significantly more than the older sibling. This is possibly due to the difference in cognitive development between the 4- and 6-year-olds and, thus, younger learners might be more likely to comply with the teaching, perhaps reflecting their lower cognitive skills. The older children might have other responses like active involvement or rejection, which require more advanced cognitive abilities. It could also be a birth order effect in that older siblings are the leaders and younger siblings are the followers (Abramovitch, Corter, Pepler, & Stanhope, 1986). Hence, do siblings differ in their responses due to their developmental abilities or because as firstborns they have higher status as perceived by children and parents? Clearly, these speculations require further investigation.

Limitations and Future Directions

Although this study provided a rich description of parents' teaching their children in their naturalistic setting at home, there are a few limitations that should be raised. The sample is generally middle-class, white, Canadian families, which limits the generalizability of our

findings. Also, the sample was relatively small including 37 families, yet they were representative of the local population and there were extensive observations of each family. Moreover, the sample included limited family dyadic composition (two parents with at least two children), which is not representative of other family combinations. Studies focusing on parents and children from other cultural and ethnic backgrounds with diverse socioeconomic status and family combinations would broaden our understanding of parental teaching.

Relying on transcripts that reflect language and behaviors sometimes made it difficult to determine some nuanced details of the teaching and the learner's response such as tone of voice. Yet, the transcriptions of the audio-recordings offered a rich source of data to examine parental teaching, thus expanding our understanding of the significance of the naturalistic parent-child interactions as a rich context of teaching. However, it would be beneficial for future research to include audio and visual records of what emerged between family members during the sessions, which would allow researchers to be more confident in identifying teaching sequences by separating pure reprimands from actual teaching and by distinguishing teaching strategies from each other.

The data were collected in the 1980s, which is a somehow different time than nowadays. Nowadays, as women enter the workforce, one might anticipate an increase in fathers' participation in child care activities (Cabrera et al., 2000). Research literature is starting to show that fathers participate in several unique ways in their children's development (Bornstein, 2015). Thus, it is crucial in the future to replicate such study on more recent samples that reflect current family roles.

Some additional fields warrant additional study in the future. Rogoff (1998) believed that planning, clarifying, and providing positive feedback would be likely to enhance learners'

understanding and desire to be actively involved in teaching and are indicative of a guided participation approach to teaching. In the current study, teaching strategies and children's responses were examined separately, nevertheless it is interesting in the future to examine the interaction of teaching strategies and response of the child and to check if some strategies enhance child's understanding and involvement.

Previous research has found that mothers behave differently in the father's presence, in which they talk, respond, and play less with the child (Clarke-Stewart, 1978). Thus, it is noteworthy to investigate this notion by widening the data to include sessions where the father was not present at home and compare the difference between mothers' teaching in the two situations.

In addition, in the present study, teaching strategies across age and learner responses were not compared between fathers and mothers, because there was not enough power to do so and because some of these variables did not occur very often. It is interesting in the future to explore differences between mothers and fathers across these variables using a larger data set.

Implications

The present research adds new knowledge to the domain of maternal and paternal teaching in a naturalistic home environment as research in this domain is very scarce. When researchers use a semi-structured observational method by telling the parents what to teach their children, we then have limited information about the extent of spontaneous parent-child directed teaching. The naturalistic observation method used in this study provides a window into parent-child real-life interaction and complements our knowledge based on experimental manipulations contributing significantly to the literature.

This study also sheds the light on the importance of parental involvement and engagement with their children in their daily activities and gives us insight about the strategies parents usually use while teaching their children. Including the father in this study is important for understanding the different kinds of interactions that are employed in the home environment. Additionally, it features a better understanding of family relationships and children's cognitive development. Moreover, it emphasizes better understanding of the different contexts where parents may actively educate their children other than the mostly researched and structured school-related teaching setting such as homework. Furthermore, it highlights a greater understanding of parental teaching methods, which is important for the advancement of educational practices and adult-child relationships (Frye & Ziv, 2005).

Parents are encouraged to harvest every opportunity to teach their children as teaching occurs in different contexts such as game and conflict settings in addition to the structured school-related teaching setting. Fathers are ought to emphasize their role in interacting with their children as they have an important function in their children's teaching. As well, parents should focus more on their similarities and on the complementary roles they play in raising and engaging with their children. Moreover, regarding teaching strategies, it is important that parents diversify the strategies they use with their children and try to use more cognitively complicated strategies like questioning and more positive feedback than negative feedback, taking into account the need to adjust their level of guidance as a function of children's competence level and communicative status. Finally, since teaching and learning are bidirectional processes (Palincsar, 1998; Rogoff, 1998), it is important that parents concentrate on their children's response to teaching, which gives them a clue about their children's understanding and

engagement. It is crucial that parents emphasize their child's active involvement and not just wait for his/her compliance as active engagement stimulates more advanced cognitive abilities.

Conclusion

Overall, this study supports several ideas from diverse studies about the importance of investigating mothers' and fathers' responsibilities and roles in raising and interacting with their children. Parents appear to have a great deal of potential as teachers due to the various settings in which they interact with their children and the diverse opportunities they have to invest in teaching. The results demonstrated both similarities and differences between paternal and maternal teaching and highlighted the differences in parental use of teaching strategies and their children's responses. Most importantly, this study has illuminated the important teaching contributions of both parents and children in their natural interaction at home. Thus, the family continues to be an important and unique context through which parents interact and cooperate in enhancing their children's development and understanding

References

Abramovitch, R., Corter, C., Pepler, D. J., & Stanhope, L. (1986). Sibling and peer interaction: A final follow-up and a comparison. *Child Development*, *57*, 217–229. doi: 10.1111/j.1467-8624.1986.tb00022.x

Bell, C. S., Johnson, J. E., McGillicuddy-de Lisi, A. V., & Sigel, I. E. (1981). The effects of family constellation and child gender on parental use of evaluative feedback. *Child Development, 52*, 701-704. doi:10.2307/1129192

Bensalah, L., Olivier, M., & Stefaniak, N. (2012). Acquisition of the concept of teaching and its relationship with theory of mind in French 3- to 6-year-olds. *Teaching and Teacher Education, 28*, 303-311. doi:10.1016/j.tate.2011.10.008

Bornstein, M. H. (2015). Children's parents. In M. H. Bornstein, R. M. Lerner, & T. Leventhal (Eds.), *Handbook of child psychology and developmental science,* (Vol. 2, pp. 55-132). Hoboken, New Jersey: Wiley. 10.1002/9781118963418.childpsy403

Cabrera, N. J., Fitzgerald, H. E., Bradley, R. H., & Roggman, L. (2014). The ecology of father-child relationships: An expanded model. *Journal of Family Theory & Review*, *6*, 336–354. doi/10.1111/jftr.12054

Cabrera, N. J., Shannon, J. D., & Tamis-LeMonda, C. (2007). Fathers' influence on their children's cognitive and emotional development: From toddlers to Pre-K. *Applied Development Science, 11*, 208–213. doi: 10.1080/10888690701762100

Cabrera, N. J., Tamis-LeMonda, C. S., Bradley, R. H., Hofferth, S., & Lamb, M. E. (2000). Fatherhood in the twenty-first century. *Child Development,71*, 127-136. doi: 10.1111/1467-8624.00126

Carpendale, J. I., & Lewis, C. (2015). The development of social understanding. In L. S. Liben, R. M. Lerner, & U. Muller (Eds.), *Handbook of child psychology and developmental science* (7th ed., Vol. 2, pp. 381-424). Hoboken, New Jersey: Wiley. 10.1002/9780470880166.hlsd001017

Carpendale, J. I., & Lewis, C. (2004). Constructing an understanding of mind: The development of children's social understanding within social interaction. *Behavioral and Brain Sciences, 27,* 79-151. doi:10.1017/s0140525x04000032

Clarke-Stewart, K. A. (1978). And daddy makes three: The father's impact on mother and young child. *Child Development, 49*, 446-478. doi:10.2307/1128712

Diaz, R. M., Neal, C. J., & Vachio, A. (1991). Maternal teaching in the zone of proximal development: A comparison of low- and high- risk dyads. *Merrill-Palmer Quarterly, 37*, 83-107. doi: 1991-18706-001

Droppleman, L. F., & Schaefer, E. S. (1963). Boys' and girls' reports of maternal and paternal behavior. *Journal of Abnormal and Social Psychology,67*, 648-654. doi: 10.1037/h0043970

Fleiss, J. L. (1981). Statistical methods for rates and proportions. New York, NY: Wiley

Frye, D., & Ziv, M. (2005). Teaching and learning as intentional activities. In B. D. Homer & C. S. Tamis-Le Monda (Eds.), *The development of social cognition and communication* (pp. 231–258). Mahwah, NJ: Erlbaum. doi: 2005-06810-010

Grusec, J. E., & Davidov, M. (2007). Socialization in the family: The roles of parents. In J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization: theory and research* (pp. 284-308). New York: Guilford. doi: 2006-23344-011

Hartup, W. W. (1989). Social relationships and their developmental significance. *American Psychologist, 44*, 120-126. doi:10.1037/0003-066x.44.2.120

Howe, N., Brody, M.-H., & Recchia, H. (2006). Effects of task difficulty on sibling teaching in middle childhood. *Infant and Child Development*, *15*, 455–470. doi: 10.1002/icd.470

Howe, N., Della Porta, S., Recchia, H., Funamoto, A., & Ross, H. (2015). ‘‘This bird can’t do it ‘cause this bird doesn’t swim in water’’: Sibling teaching during naturalistic home observations in early childhood. *Journal of Cognition and Development*, *16*, 314–332. doi: 10.1080/15248372.2013.848869

Howe, N., Della Porta, S., Recchia, H., & Ross, H. (2016). “Because if you don't put the top on, it will spill": A longitudinal study of sibling teaching in early childhood. *Developmental Psychology*, 52, 1832-1842. doi: 10.1037/dev0000193

Howe, N., Persram, R. J., & Bergeron, C. (2019). Imitation as a learning strategy during sibling teaching. *Journal of Cognition and Development,*1-21. doi:10.1080/15248372.2019.1614591

Kuczynski, L., & Parkin, C. M. (2007). Agency and bidirectionality in socialization: Interactions, transactions, and relational dialectics. In J. E. Grusec & P. D. Hastings (Eds.), *Handbook of socialization: theory and research* (pp. 259-283). New York: Guilford. doi: 2006-23344-010

Lamb, M. E. (2010). How do fathers influence children’s development? Let me count the ways. In M. E. Lamb (Ed.), *The role of the father in child development* (5th ed., pp. 1-26). Hoboken, NJ: Wiley. doi: 2010-04805-001

Lamb, M. E. (1977). Father-infant and mother-infant interaction in the first year of life. *Child Development, 48*, 167-181. doi:10.2307/1128896

Laosa, L. M. (1978). Maternal teaching strategies in Chicano Families of varied educational and socioeconomic levels. *Child Development, 49*, 1129-1135. doi:10.2307/1128752

Leblanc, G., & Bearison, D. J. (2004). Teaching and learning as a bi-directional activity: Investigating dyadic interactions between child teachers and child learners. *Cognitive Development, 19*, 499-515. doi:10.1016/j.cogdev.2004.09.004

Maccoby, E. E. (1992). The role of parents in the socialization of children: A historical overview. *Developmental Psychology, 28*, 1006-1017. doi:10.1037//0012-1649.28.6.1006

Meisels, S. J. (1985). The efficacy of early intervention: Why are we still asking this question? *Topics in Early Childhood Special Education, 5*, 1-11. doi:10.1177/027112148500500202

McGillicuddy-de Lisi, A. V. (1988). Sex differences in parental teaching behaviors. *Merrill-Palmer Quarterly*, *34*, 147-162. doi: 1988-26364-001

Mclaughlin, B., Schutz, C., & White, D. (1980). Parental speech to five-year-old children in a game-playing situation. *Child Development, 51*, 580-582. doi:10.1111/j.1467-8624.1980.tb02584.x

Monteiro, L., Fernandes, M., Torres, N., & Santos, C. (2017). Father's involvement and parenting styles in Portuguese families: The role of education and working hours. *Análise Psicológica*, *35*, 513–528. doi: 10.14417/ap.1451

Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology*, *49*, 345–375. doi: 10.1146/annurev.psych.49.1.345

Parker, S. T. (1979). Mind in society: The development of higher psychological processes. L. S. Vygotsky. *American Anthropologist, 81*, 956-957. doi:10.1525/aa.1979.81.4.02a00580

Pellegrini, A. D., Brody, G. H., & Sigel, I. E. (1985). Parents teaching strategies with their children: The effects of parental and child status variables. *Journal of Psycholinguistic Research, 14*, 509-521. doi:10.1007/bf01067382

Pratt, M. W., Green, D., Macvicar, J., & Bountrogianni, M. (1992). The mathematical parent: Parental scaffolding, parenting style, and learning outcomes in long-division mathematics homework. *Journal of Applied Developmental Psychology, 13*, 17-34. doi:10.1016/0193-3973(92)90003-z

Pratt, M. W., Kerig, P., Cowan, P. A., & Cowan, C. P. (1988). Mothers and fathers teaching 3-year-olds: Authoritative parenting and adult scaffolding of young children's learning. *Developmental Psychology, 24*, 832-839. doi:10.1037//0012-1649.24.6.832

Power, T. G. (1985). Mother- and father-infant play: A developmental analysis. *Child Development, 56*, 1514-1524. doi:10.2307/1130470

Rogoff, B. (1998). Cognition as a collaborative process. In W. Damon (Ed.), *Handbook of child psychology* (Vol. 2, pp. 679-744). Hoboken, NJ: Wiley. doi: 2005-01927-013

Ross, H. S., Filyer, R. E., Lollis, S. P., Perlman, M., & Martin, J. L. (1994). Administering justice in the family. *Journal of Family Psychology, 8,* 254–273. doi.org/10.1037/0893-3200.8.3.254

Rowe, M. L., Coker, D., & Pan, B. A. (2004). A comparison of fathers' and mothers' talk to toddlers in low-income families. *Social Development, 13*, 278–291. doi:10.1111/j.1467-9507.2004.000267.x

Sawyer, J. (2014). Vygotsky's revolutionary theory of psychological development. Retrieved from: https://isreview.org/issue/93/vygotskys-revolutionary-theory-psychological-development.

Smetana, J. G. (1999). The role of parents in moral development: A social domain analysis. *Journal of Moral Education, 28*, 311-321. doi:10.1080/030572499103106

Steward, M., & Steward, D. (1973). The observation of Anglo-, Mexican-, and Chinese-American mothers teaching their young sons. *Child Development, 44*, 329-337. doi:10.2307/1128004

Strauss, S., Calero, C. I., & Sigman, M. (2014). Teaching, naturally. *Trends in Neuroscience and Education, 3*, 38-43. doi:10.1016/j.tine.2014.05.001

Strauss, S., & Ziv, M. (2012). Teaching is a natural cognitive ability for humans. *Mind, Brain, and Education, 6*, 186-196. doi:10.1111/j.1751-228x.2012.01156.x

Strauss, S., Ziv, M., & Stein, A. (2002). Teaching as a natural cognition and its relations to preschoolers' developing theory of mind. *Cognitive Development, 17*, 1473-1487. doi:10.1016/s0885-2014(02)00128-4

Thompson, R. A. (1983). The father's case in child custody disputes: The contribution of psychological research. In A. Sagi & M. E. Lamb (Eds.), *Fatherhood and Family Policy* (pp. 53-100). Hillsdale, NJ: Erlbaum. doi: 0898591902

Williamson, P. A., & Silvern, S. B. (1986). Parental teaching styles in an open-ended teaching-learning environment. *Early Childhood Research Quarterly, 1*, 407-415. doi:10.1016/0885-2006(86)90017-7

Worden, P. E., Kee, D. W., & Ingle, M. J. (1987). Parental teaching strategies with preschoolers: A comparison of mothers and fathers within different alphabet tasks. *Contemporary Educational Psychology,12*, 95-109. doi:10.1016/s0361-476x(87)80043-7

Ziv, M., & Frye, D. (2004). Children's understanding of teaching: The role of knowledge and belief. *Cognitive Development, 19*, 457-477. doi:10.1016/j.cogdev.2004.09.002

Ziv, M., Solomon, A., Strauss, S., & Frye, D. (2016). Relations between the development of teaching and Theory of Mind in early childhood. *Journal of Cognition and Development,17*, 264-284. doi:10.1080/15248372.2015.1048862

Appendix A

Coding Scheme of Parental Teaching

Teaching Sequence Identification

Read transcripts and identify sequences of teaching by a parent directed to a child (older or younger sibling, not baby). Teaching sequences must involve the intention of a parent to teach a child, whether explicitly evident or not. Sequences can present themselves as the following:

a) An explicit direct intention of teaching
    - M to OY "Wait, it's easier [this way], a few lines later M to OY "I'm going to show you how to play"

b) An implicit indirect sharing of information or knowledge
    - M to O "Why don't you place the piece over here and don't just cover the other one".

c) A correction
    - M corrects a statement made to by O to Y: "You can't do the puzzle when you're five", M disagrees and says "Yes, you can still do it".
    - F corrects Y "No, go the other way".

d) Reprimand with explanation
    - e.g., F to Y "You're going to break them. It's Sophia's turn to put this away. You put away those two and let Sophia put away the other two"; F to O "You're going to flip off the chair"

Note. Conversations or general discussions that do not include an intention to teach would not be coded.

Identifying the start and end line

Teaching sequences do not need to include a learner response because in some cases the learner does not respond. Sequences must, however, include the response to the teaching if there is a response. The context within which the teaching occurred is not to be included in the start and end line of the teaching, only the teaching episode itself. Context will be considered for all coding purposes.

- Start Line.
    - Teaching can start with a learner request for teaching
        - e.g., Y asks F "Which way?" to move piece in a game; O to M "How come there's one, two, and three here?"
    - Most of the time, the parent will likely just start to spontaneously teach a child, so start on the first line of the spontaneous teaching line.
    - Teaching might start with a parent asking a question to elicit learning
        - e.g., F asks Y "now how many are there?" to elicit her to count dice number; F asks Y "so we need to move how many more since you already moved 3?" to elicit her to count and subtract moving spaces from dice number.
- End Line. End the sequence when the topic changes or the teaching appears to have ended (i.e., when the learner has responded or shows no response from the learner), it will likely end in one of the following ways:

- No clear response to teaching (learner ignores or stops responding with no further evidence of teaching), line ends at the end of the teaching episode (e.g., F describes to younger that he got one balloon and there is still one left to find and younger does not respond)
    - It is possible that a teaching "sequence" is one line due to a lack of response from the learner either immediately or a few lines later.
- Learner agrees or complies with the teaching
    - The sequence may end with compliance and a similar teaching episode may re-occur soon after.
- Teacher checks to determine if learner has understood the lesson
- Teacher praises the learner

What is not teaching?

- Helping the child (e.g., tying shoes) without verbal explanation, instruction, or physically showing is not considered teaching.
- Reprimand or giving orders that directs the child on what to do or not to do.
    - e.g., "Don't call him a dummy"; "Don't scream".
- Negotiating play or making up rules for pretense.
- Asking episodic questions or information
    - e.g., "What is the dog's name?"; "Whose car is this?"
- Providing basic information (like narration). An episode that is not clearly teaching (ambiguous)
    - e.g., F to OY "King's high, that's Ryan's [win]"
    - e.g., F to O "Put one down, and flip one"
- Anything conversational.

Context (Ross et al, 1994)

a) CO = Conflict: A sequence of interaction in which there is an incompatibility of the behavior of two people. The action of one person is met with protest, resistance, a retaliation by the other person. Brief disagreements that do not consist of more than one move from each partner can occur within sequences that are not conflicts. These brief interchanges do not change the interaction in to a conflict.

b) CF = Family conflict: A sequence of interaction which includes one or both of the parents as combatants with their children. Family conflicts arise when (1) a sibling conflict moves into a parent child conflict and the parent becomes a combatant in the conflict rather than just a mediator and (2) an issue of sibling treatment is discussed such as when a parent instructs one child on how to treat a sibling.

c) CA = Contingent activity: A sequence of interaction in which the actions of both people follow an action by the partner. Additionally, the actions appear to be in response to the partner's actions.

d) PR = Pretend: A sequence of interaction in which the partners assume roles of other people in their play or use objects in a non-literal manner.

e) GA = Game: A sequence of interaction that is nonliteral in which the partners are mutually involved, alternate turns, and repeat their roles.

f) N = Nothing sequence: Sequences that do not have any turns that would contribute in any way to any of the interaction sequences noted above.

Initiation of Teaching
LR = Learner requests information or how to do something or directly asks for teaching. Request can also be implicit such as learner showing that they are having trouble with something.
AR = Assumes teaching role: Teacher just starts engaging in direct teaching or announces that he/she is teacher. For example, if learner makes a mistake and the teacher corrects the learner.

Teaching Strategies
Parents can use a variety of strategies during a teaching sequence. Code if the following strategies are present in each teaching sequence. Note each occurrence of the following strategies.

(a) DI = Direct instruction: A command within the context of teaching that tells the child exactly what to do. Can be verbal: e.g., "do this; stand here, Blake!"; "That goes there"; F says to O: "you have to put another leg in the corner" or can be physical (e.g., moves Y into right position for dance step) or can be an answer of yes or no.

(b) LB = Labeling/Describing/Sharing Information: should be verbal, providing name or label for an object, etc. (e.g., "This is an H"; "Nanny, nanno, nan, grandma, granny, gran, There's a lot of names for grandmother") or pointing out an inappropriate behavior (e.g., "that was rude"). Can be coded along with another code (e.g., no (NF) that's the bull (LB)).

(c) SG = Suggestion: It is kind of scaffolding-giving hints or suggesting action to solve a potential issue (e.g., "why don't you just stand on opposite ends of the couch" – to continue playing a game, mother needed chairs they were using).

(d) DEM = Demonstrating: showing how to do something (e.g., T does actions for a dance step so L can see; F to Y "watch me move"). Also, simply showing something (e.g., an outcome, what a letter looks like). Can be verbal or nonverbal (pointing).

(e) EXP = Explanations: justifying or explaining a reason why or the consequence of an action (e.g., "you're gonna lose the marbles then we won't be able to play anymore"). It often starts with "because", (e.g., "because it's a name for grandma"), "so that" (e.g., "put it on top so it won't fall over") or when it means in order to (e.g., "squish those together to make them fit"). If the direct instruction is accompanied by an explanation then it is coded as EXP.

(f) Q = Questioning: The teacher uses a question to test learner's knowledge or to test the learner's learning or to check his/her understanding (e.g., "Ok? or do you see how to do it?"; "where do you go?" F to O while playing a game).

(g) PF = Positive feedback/praise (e.g., "good"; "that's right"; "yup"; "that's good")

(h) NF = Negative feedback/correction (e.g., "you don't turn", "no", "not like that"; "no, that's not the bull"). If the teaching has no kind of instruction and is just a correction then it is coded as NF only and no DI. Also, if a parent corrects the child by just saying the right thing without saying no or giving a negative feedback we code it as only DI.

Teaching Strategies	Definition	Example
Direct Instruction (DI)	Can be verbal or physical or an answer of yes or no	"do this; stand here, Blake!" "you have to put another leg in the corner" or moving child into right position for a dance step
Labeling (LB)	Should be verbal, providing name or label for an object or pointing out an inappropriate behavior	"this is an H" "that was rude"
Suggestion (SG)	Giving hints or suggesting action to solve a potential issue	"why don't you just stand on opposite ends of the couch" – to continue playing a game, mother needed chairs they were using
Demonstration (DEM)	Showing how to do something, can be verbal or nonverbal (pointing)	"watch me move" simply showing what a letter looks like
Explanation (EXP)	Justifying or explaining a reason why or the consequence of an action	"put it on top so it won't fall over" "squish those together to make them fit"
Questioning (Q)	Testing learner's knowledge or learning or checking his/her understanding	"Ok? do you see how to do it?" "where do you go?"
Positive feedback (PF)	Praise	"good" "that's right" "yup"
Negative Feedback (NF)	Negative feedback or correction	"you don't turn" "no" "not like that" "no, that's not the bull"

Child's Response

Rating of degree of learner involvement in the teaching sequence. When the learner's involvement varies across the sequence, rate the highest degree of involvement (e.g., if initially the learner rejects the teacher's actions, but then passively complies, rate the Learner response as COM).

a) NR = ignores/no response to Parent -When response is unrelated to teaching or behavior is unclear whether it follows context (e.g., when coded as other action).
b) REJ = rejects Parent's actions/statements
c) COM = compliance (appears to agree to teaching). For example, Parent asks question and C responds with yes/no or follows directions as instructed by Parent.
d) AI = active involvement (e.g., learner asks questions, C repeats Parent's answer, extends or builds onto Parent's Ideas or clearly wants to be involved).

If the learner's response is unclear, we code the response as NR. If the child didn't reject the teaching but made a mistake while complying with the teaching then we code the response as COM and not REJ. Also, if the child seems to reject the teacher's teaching but is clearly involved by asking questions and negotiating then we should code both responses.

Note: F = Father, M = Mother, T = Teacher, L = Learner, O = Older child, Y = Younger child, P = Parent, C = Child

Child's Response	Definition	Example
Active Involvement (AI)	Learner asks questions or repeats parent's answer or extends and builds on parent's ideas or clearly wants to be involved	Parent to child "that what happens when you put too much milk in it", child responds "you put too much milk in it"
Compliance (COM)	Appears to agree to teaching	Child responds with yes or follows directions as instructed by parent
Rejection (REJ)	Rejects parent's actions/statements	"no" Parent to child "wrong way", child says "it's not"
No Response (NR)	Ignoring or not responding to teaching or response is unrelated or unclear	-