**Current Issue:
Volume 15 Number 1**

Past Issues

Beyond This Issue

Search ECRP

Sign up for the
Email Newsletter

Find us on Facebook

About ECRP

Sponsoring ECRP

Information for Authors

ECRP Survey

Send comments
to the ECRP Editor.

Like Like

Home | Journal Contents | Issue Contents

Mirar esta página en español   Share

Volume 15 Number 1

©The Author(s) 2013

Young Children's Engagement and Learning Opportunities in a Cooking Activity with Parents and Older Siblings

Lauren Finn and **Maureen Vandermaas-Peeler**
Elon University

Abstract

Parents teach their children through informal social interactions in a process known as guided participation (Rogoff, 1990). Although most research focuses on parent-child dyads, young children also learn from older siblings and parents through shared participation in daily activities. Utilizing a structured observational design, the authors compared 15 triads (parent, preschooler, and older sibling) with 12 dyads (parent and preschooler) engaged in a cooking activity at home. The findings indicate that parents used the cooking activity as an occasion for teaching children about literacy, and basic mathematical concepts and skills. Analyses of parent-child interactions across groups indicated that parents did more teaching of numeracy and general skills in the dyadic condition, and that younger children gave more correct responses to parent guidance when the older sibling was not present. Parents in the triadic condition engaged in more complex literacy-related teaching of older siblings. More role negotiation, frustration and conflict occurred in triads than in dyads. The findings suggest that the presence of an older sibling has implications for adults' support of children's emergent literacy, numeracy, and social interactions in everyday activities performed at home.

Introduction

The majority of research on parent-child interactions focuses on dyads, with one parent (usually a mother) interacting with one child. However, in most families around the world children are integrated into the complexity of on-going family life rather than spending most of their time in dyadic interactions with one parent (Rogoff, 2003). In many homes, more than one child is present; in fact, 80% of the children in the United States are raised with siblings in the home (Dunn, 1983). Researchers have shown that the focus of attention and the adjustments that parents show in experimental teaching contexts with only one child are not representative of their everyday social interactions in the home with multiple children (Goncu, 1999). Relatively few studies have explored young children's learning that occurs in social interactions with a parent and an older sibling. The present study compared parental teaching and social interactions during a cooking activity with children under two conditions: when only one child was present and with two children (siblings) involved.

A Sociocultural Framework: Guided Participation and Intersubjectivity

Vygotsky emphasized the importance of cultural and social contexts for children's cognitive development and elaborated ways that these contexts set the stage for certain adult-child interactions to take place (Bjorklund, 2005). One of Vygotsky's most important concepts related to social interaction and learning is the "zone of proximal development" or ZPD (Vygotsky, 1978). A child at any given age or level of development, in interaction or collaboration with more experienced adults or peers, may be able to solve problems or complete tasks that he or she does not yet have the developmental capacity to do independently, provided that the interaction with the more experienced person is appropriate to and builds upon the child's existing capacities.

Elaborating upon Vygotsky's premise, Rogoff (2003) theorized that parents often guide their children in everyday tasks without the intent of being instructional. Her research pointed to a more varied, culturally

relevant form of assistance called "guided participation" (Rogoff, 2003). Guided participation is a collaborative process between children and their caregivers in which they interact and build upon current understanding to reach new understandings, with shifts in the children's responsibility over time (Rogoff, 1990, 2003). For example, in a cooking activity a parent may allow a child to measure cups of flour independently, but will guide or assist the child in stirring something hot on the stove. The child learns through an apprentice-style relationship in the context of a culturally relevant task.

In guided participation, the child and the adult must have a shared understanding and joint focus of attention on the task at hand (Rogoff, 1990). For example, a child and parent cooking together may display a common focus on the task as well as a shared sense of interest or even excitement. They may also have a common understanding of the way the food will be prepared (e.g., following a recipe); this joint understanding and focus has been conceptualized as intersubjectivity (Goncu, 1999).

Grafenhain and Behne (2009) examined intersubjectivity in a study in which a 2- to 3-year-old child and an experimenter made a verbal or nonverbal commitment to play a game together. In the middle of the game, the experimenter abruptly interrupted the play. The researchers coded the children's reactions to the abrupt stopping of play and found that children tended to attempt to re-engage the experimenter. By doing so, the children acknowledged social awareness of the joint commitment they made to the task (Grafenhain and Behne, 2009). Establishment of joint attention is fundamental to social engagement in shared activity contexts, and to children's cognitive development in those contexts. For the purposes of the present study we defined social engagement as shared participation in verbal or non-verbal socio-emotional connections during an activity.

Sibling Interactions

One of the few extant studies of parent-child interactions with a sibling present during the activity (Benigno & Ellis, 2004) involved a parent, preschooler and an older sibling playing a game together. They found that when a sibling was present, parents were less likely to use their turns as teaching opportunities. The presence of an older sibling also negatively affected how parents taught their preschoolers numeracy during the game. The parents were less likely to provide responsive aid when a sibling was present, and the quality of the interaction degraded as the number of people involved in the activity grew. These differences could have been due to greater attentional demands on the parent with two children present; for example, the parent had to monitor the preschooler's counting as well as respond to bids for attention from both children (Benigno & Ellis, 2004).

Dunn and Plomin (1989) observed naturalistic interactions of parents and two children in the home and found that differential maternal behavior was correlated with conflict in sibling relations. Differential maternal behavior—differences in the way a mother responds to each of her children—was also positively correlated with competitiveness between siblings. When there are differences in parental behavior between two children, problems may arise that are not typically present when dealing with only one child. For example, a parent may become more focused on effectively managing conflict between siblings instead of taking advantage of teaching opportunities presented throughout a task.

In contrast, Barton and Tomasello (1991) observed joint attention in mother-infant-sibling triads and found that the conversations were three times longer than dyadic conversations. They concluded that infants experienced a richer learning environment when the older sibling was present (Barton & Tomasello, 1991). Beningo, Clark, and Farrar (2007) also found that mother-child-older sibling contexts are beneficial to children's vocabulary development. However, this same study found that mothers spent over four times longer engaged in joint attention episodes with one child, as compared with one child and an older sibling. Coordinated joint attention occurs when individuals are actively engaged with an object, but also aware of each other (Beningo, et al., 2007). Although these contexts involving siblings seem to benefit younger children's language development, they may also negatively impact engagement and joint attentional processes. Another home observation study also found that young children reacted more negatively when interacting with an older sibling and a parent present, and more positively with just a parent present (Baskett & Johnson, 1982). Thus, findings from sibling-present studies are mixed and further research is needed to examine effects on younger and older children.

In a relatively new area of study, some research has examined third party attention, or attending to events that are addressed to another person (Correa-Chavez & Rogoff, 2009). This concept is applicable to situations in the home when more than one child is present but a parent's speech or behavior is directed at one "target" child. Correa-Chavez and Rogoff (2009) observed the way young children attended to a teaching session targeted at an older sibling and compared third party learning in families from the U.S. and Mayan cultures. For this study a target child was taught a craft by a researcher and the sibling was told to sit quietly and not participate. The next day the researcher asked the sibling to create the craft that the researcher had previously taught to the target child. The Mayan children were more apt to learn through third party attention than were American children (Correa-Chavez & Rogoff, 2009).

Method

Study Purpose

Children begin to develop emergent literacy and numeracy skills at home before they begin formal schooling, sometimes through shared participation in adult-oriented activities such as cooking (Vandermaas-Peeler, Way, & Umpleby, 2002). While cooking with their young children in the home, parents informally teach their children about letters and numbers by having them read a recipe, count cups of flour, or similar tasks.

We selected a cooking activity as the context for parent-child interactions. Our goal was to compare parent-child interactions during cooking across two conditions: a dyadic condition containing the mother and target four-year-old child, and a triadic condition containing the mother, the target 4-year-old child, and an older sibling (6-8 years old). The specific research questions investigated in the present study were as follows. First, how does parent guidance compare across the two conditions? That is, do parents provide the same type and amount of guidance with an older sibling present compared with interactions focused only on one four-year-old child? Second, how do four-year-old children's responses to the parental guidance compare when a sibling is or is not present? Finally, how do the two conditions compare regarding social engagement and attentional focus during a cooking task in the home?

Participants

Participants were recruited through child care centers and personal contacts in a small southeastern city in the USA. The participating families were 25 middle-class European American and 2 middle-class African American families, comprising twelve parent-child dyads and 15 parent-child-sibling triads. With the exception of one father-child dyad, parents were all mothers. Eleven male and 16 female four-year-olds participated (mean age 50.4 months). Older siblings in the triadic condition included 7 males and 8 females (mean age 79.3 months). The study was presented to all participants as a general study examining children's development through engagement in activities at home.

Setting

The researchers arranged to visit each family at mutually convenient times for the cooking activities, which took place in the families' homes. Afterward, all parents and children were provided with a small remuneration for their participation.

Data Source

The source of data for this study was the observation/interview conducted during each family's cooking activity. The length of each observation/interview varied from approximately 30 to 40 minutes. One or two researchers videotaped each cooking activity in its entirety.

Procedure

Parents were given an informed consent/video release form and a brief demographic survey. After signing the informed consent, parents were provided with a set of 6 recipe cards with instructions for completing the cooking task (see Appendix A) and all necessary cooking materials and ingredients, including butter, crispy rice cereal, marshmallows, a spatula, a timer, measuring cups, two bowls, one 11″ x 13″ pan, a large sauce pan, and three cookie cutters. A set of simplified, illustrated recipe cards was provided for the children. The parents were asked to complete the cooking activity with either their four-year-old child or their four-year-old and the older sibling (depending on the condition).

Analysis and Coding

Videotapes of the cooking activity were transcribed for verbal and non-verbal behavior. The entirety of the cooking activity was observed and coded, except for a short period of time where parents and children were asked to tell a story together while the crispy rice treats cooled. All coding was conducted using both the transcripts and videotapes, and all coding categories are defined and explained in Table 1.

Table 1
Coding

Code	Definition	Example
ATTENTIONAL FOCUS		
Active participant	Physically engaged in the task.	Stirring, measuring cups, cutting shapes
Active observer	Actively watching the activity but not directly participating.	Child watches mother stir marshmallows and butter on the stove.
Off-task	Not physically or attentionally engaged in the task.	Child steps away from the activity/off camera.
	Individual is actively engaged in attempting to	"Can I measure the cups of cereal now?"

Role negotiation	discuss his/her participation in the task. For parents, this includes negotiating child(ren)'s role.	"Is it my turn to stir yet?"
SOCIAL ENGAGEMENT		
Emotional focus: Negative/Positive/Neutral	**Negative**: Obvious negative emotions including frustration at failed role negotiations. **Positive**: Laughing, joking, smiling, and obvious general enjoyment of the task. **Neutral**: Neither positive nor negative emotional focus.	**Negative:** Child crying or whining, "This is not fair, she got more turns to stir!" **Positive**: "I love cooking with you Mommy!"; laughing, joking. **Neutral**: Focused on task completion with no social engagement.
Bid for attention	Child actively and verbally attempting to get parent's attention.	"Mom, am I doing a good job stirring?"
Social connection	Any positive verbal engagement between two or more participants may include laughing and joking.	"Crispy rice treats are your favorite!"
GUIDED PARTICIPATION		
Parental Guidance		
Numeracy	Counting, shape and number identification, size comparison	"How many triangles do you have?"
Literacy	Reading recipe cards and identifying pictures	"Can you read me the next step on our recipe cards?"
General knowledge	Exchange related to general cooking knowledge and materials.	"What do you think is going to happen to the butter when we heat it up?"
Bridge	Verbal link to prior knowledge or experience.	"Do you remember when we used cookie cutters for Halloween?"
Children's Response to Guidance		
Correct/Incorrect	Child's response to a parent's guidance question coded as either correct or incorrect	"What shapes do we have?" "A triangle, a square, and a circle" (Correct Response)

The Observer XT (Noldus Informational Technology, 2009) is an observational coding software program that was used to code the duration and occurrence of attentional focus and social engagement. Observer XT software facilitates computerized coding of observations through researcher-developed coding schemes of the duration of ongoing events and the frequency of specific behaviors.

Attentional focus. Attentional focus was coded based on the roles parents and children assumed during the task, with three possible categories: *active participant*, *active observer*, or *off task*. These roles were mutually exclusive and participants switched roles throughout the task. All attentional focus codes were measured by duration in seconds throughout the cooking task. *Role negotiation* was coded when a parent directly assigned their children's role in the cooking task.

Social engagement. We coded social engagement, or emotional focus and engagement with others during the activity, for each participant during the cooking task. Each participant was coded as having a *positive*, *negative*, or *neutral* emotional focus (Dubrow & Howe, 1999). These codes were measured by duration in seconds for the entire cooking task. Positive emotional focus included laughing, joking, and smiling. Negative emotional focus encompassed obvious frustration with the task, or other display of negative emotions. Children's bids for attention and successful or unsuccessful attempts at role negotiation were also coded for each occurrence. Finally, we coded positive verbal engagement, such as laughing or joking between two or more participants, as a social connection.

Guided participation. All coding schemes for parental guidance were created based on the theoretical framework of guided participation proposed by Rogoff (1990, 2003) and previous coding schemes developed by Vandermaas-Peeler et al. (2003, 2009). We coded the frequency of parental guidance behaviors in 6 categories. *Bridges* included any verbal links between the cooking event and previous events or knowledge. *Literacy exchanges* included reading recipe cards, sounding out words, and identifying pictures. *Numeracy exchanges* included counting, identifying shapes, addition and subtraction, and spatial reasoning. The fourth category was *general knowledge* which included basic knowledge of cooking procedures and tools. We coded as "correct" or "incorrect" every child response to parental efforts to teach literacy, numeracy, or other content. For example, if a parent asked a child to count the cups of marshmallows and the child miscounted, this interaction would receive a code of "incorrect". For the first four categories we coded who initiated each of these guidance behaviors as well as labeled each exchange as simple or complex depending upon the content of the teaching exchange. For each of these codes, total frequency of all instances of the behavior during the entire cooking activity was coded.

Interrater Reliability

Interrater reliability was established on 20% of the sample using the Cohen's Kappa statistic. The average Cohen's Kappa across all coded guidance behaviors was 0.89 ($p < .001$). The specific Kappa values for each code were as follows: for all literacy exchanges Kappa = 0.55; for all numeracy exchanges Kappa = 0.92; for all "general knowledge" teaching exchanges Kappa = 0.66; for bridges Kappa = 0.94; for all social connections Kappa = 0.87; and for all attentional focus and social engagement behaviors Kappa = 0.52 ($p < .001$).

Results

We compared parent guidance behaviors (ranging from teaching behaviors to attention management), children's correct responses to guidance behaviors, and mutual engagement (intersubjectivity) across the two conditions. One-way analyses of variance (ANOVAS) were conducted for between-groups analyses (dyads compared with triads). Paired samples t tests were used for comparisons within the triadic group (the younger child and older child in the same family).

Attentional Focus

Means and standard deviations for attentional focus (duration in seconds) are presented in Table 2.

Table 2
Mean duration of attentional focus in seconds, by group

Code	Dyadic Condition Mean (S.D.)	Triadic Condition Mean (S.D.)
Active Participant(s)		
Parent	1334.17 (442.74)	1412.20 (542.86)
Older sibling	—	730.87 (262.33)
Four-year-old	777.83 (458.70)	497.33 (255.08)
Active Observer(s)		
Parent	545.7 (482.48)	346.73 (278.27)
Older sibling	—	903.47 (312.47)
Four-year-old	1137.17 (376.96)	1043.47 (340.64)
Off Task(s)		
Parent	22.67 (45.61)	12.67 (42.40)
Older sibling	—	134.47 (205.14)
Four-year-old	64.0 (75.74)	230.53 (221.56)
Role Negotiation		
Parent	4.50 (3.10)	7.73 (4.48)
Older sibling	—	3.40 (2.56)
Four-year-old	2.17 (1.80)	3.13 (4.39)

Parents in the triadic group mediated significantly more role negotiations compared with parents in the dyadic group, $F(1, 26) = 4.515$, $p < .05$. Four-year-olds in the triadic group spent significantly more time *off-task* when an older sibling was present, $F(1, 26) = 6.16$, $p < .05$. A marginally significant trend indicated that the four-year-old children spent more time in the role of *active participant* when an older sibling was not present, $F(1,26) = 4.07$, $p < .10$. Further, within the triadic group, the four-year-olds spent significantly more time in the role of *active observer*, $t(14) = -2.61$, $p < .05$, and the older sibling spent significantly more time in the role of *active participant*, $t(14) = 3.02$, $p < .01$. No significant results were obtained for analyses of differences in the parent role between groups, or for role negotiations for the four-year-old or the older sibling within or between groups.

Social Engagement

Means and standard deviations for social engagement within the triadic condition are portrayed in Table 3.

Table 3
Mean duration of social engagement in seconds, by group

Code	Dyadic Condition Mean (S.D.)	Triadic Condition Mean (S.D.)
Positive Emotional Focus		
Parent	30.08 (34.35)	10.13 (12.01)
Older sibling	—	6.47 (9.30)
Four-year-old	53.67 (78.15)	28.40 (28.52)
Negative Emotional Focus		
Parent	0.00 (0.00)	3.13 (6.37)
Older sibling	—	11.40 (16.86)
Four-year-old	15.73 (19.32)	15.73 (19.32)
Neutral Emotional Focus		
Parent	1948.75 (547.32)	1758.33 (472.04)

Older sibling	—	1753.73 (463.63)
Four-year-old	1924.92 (542.51)	1727.40 (467.09)
Bids for Attention		
Older sibling	—	0.47 (0.74)
Four-year-old	0.33 (0.78)	1.67 (2.38)
Social Connections		
Parent	3.42 (3.15)	1.50 (0.92)
Older sibling	—	1.60 (1.92)
Four-year-old	2.08 (2.31)	1.00 (1.20)

Parents in the dyadic group engaged in significantly more social connections, $F(1,26) = 5.25$, $p < .05$, and spent more time with a positive emotional focus, $F(1,26) = 4.422$, $p < .05$. Also, as seen in Table 3, the 4-year-olds in the triadic group had a longer duration of negative emotional focus, $F(1,26) = 7.448$, $p < .05$. We observed a marginally significant trend that the four-year-olds in the triadic group engaged in more bids for parental attention than 4 year-olds in the dyadic group, $F(1,26) = 3.45$, $p < .10$. Within the triadic group, the younger child spent significantly more time with a positive emotional focus than the older child, $t(14) = -3.08$, $p < .01$. No significant results were found for parent or younger-child initiated bridges.

Guided Participation

Two aspects of guided participation were examined: parental guidance behaviors and children's responses to parental guidance.

Parental guidance behaviors. Means and standard deviations for parental guidance are portrayed in Table 4.

Table 4
Mean frequencies of parental guidance, by group

Code	Dyadic Condition Mean (S.D.)	Triadic Condition Mean (S.D.)
Parent Initiated Numeracy	7 (4.33)	3.47 (2.0)
Parent Initiated Literacy	2.25 (2.14)	2.73 (2.46)
Parent Initiated "Other"	3.33 (2.93)	0.87 (1.13)
Parent Initiated Bridges	5.17 (3.16)	2.93 (2.63)

Parents in the dyadic group initiated significantly more numeracy, $F(1,26) = 7.95$, $p < .01$, and other general knowledge teaching exchanges, $F(1,26) = 9.02$, $p < .01$. Parents in the dyadic group also engaged in more bridges than parents in the triadic group, $F(1, 26) = 0.56$, $p < .10$; this was marginally significant. No significant results were found for parent-initiated literacy exchanges.

Children's response to guidance behaviors. Means and standard deviations for children's responses to parental guidance are portrayed in Table 5.

Table 5
Four-year-olds' mean correct responses to guidance, by group

Code	Dyadic Condition Mean (S.D.)	Triadic Condition Mean (S.D)
Correct Numeracy		
Four-year-old	16 (11.98)	5.73 (6.7)
Older sibling	—	4.47 (3.14)
Correct Literacy		
Four-year-old	3.33 (3.68)	0.27 (0.6)
Older sibling	—	17.33 (19.0)
Correct "other"		
Four-year-old	2.83 (3.33)	0.13 (0.52)
Older sibling	—	0.60 (0.83)

Four-year-olds in the dyadic group had significantly more correct literacy, $F(1,26) = 10.204$, $p < .01$, numeracy, $F(1,26) = 7.96$, $p < .01$, and general knowledge responses, $F(1,26) = 9.689$, $p < .01$. They also had significantly more incorrect numeracy, $F(1,26) = 5.14$, $p < .01$, and incorrect general knowledge responses, $F(1,26) = 5.172$, $p < .05$. No significant results were found for incorrect literacy responses between groups. Within the triads, the older siblings initiated more literacy exchanges, $t(14) = 3.76$, $p < .01$, had more correct responses to literacy guidance, $t(1,14) = 3.51$, $p < .01$, and more correct responses to other general knowledge guidance, $t(1,14) = 2.43$, $p < .05$, compared with their younger siblings. No significant results were found for child-initiated numeracy exchanges or general knowledge exchanges within the triadic condition.

Discussion

The present study compared a parent-child dyadic group with a parent-child-sibling triadic group during a cooking activity in the home. We investigated the differences in attentional focus and social engagement between these two groups, compared the types and amounts of parent guidance behaviors across the two conditions, and analyzed four-year-olds' responses to parent guidance behaviors in each group. The primary findings and conclusions from this study are described below with transcript examples to augment the quantitative results.

Major Findings and Transcript Examples

We found that parents interacting with only one child initiated more teaching opportunities, engaged in more social connections, and spent more time with a positive emotional focus as compared with parents interacting with two children in a cooking activity. As previous research with multiple children suggests (Benigno & Ellis, 2004), parents cooking with a preschool-aged child and an older sibling were more focused on managing the children's participation in the activity and mediated significantly more role negotiations compared to dyads. One interpretation is that parents in the triadic condition were more focused on successfully completing the task and avoiding conflict between siblings rather than on potential literacy and numeracy teaching opportunities. Parents in the dyadic condition also had more elaborated and lengthy teaching opportunities, whereas parents in the triadic condition were focused more on attention management and role negotiation between their two children. Two transcript examples below illustrate this finding. The first example occurred in a dyad with one mother and her four-year-old child.

> M: You're really doing great. You're focused. Do you think there's a faster way to melt these marshmallows?
> C: Oh yeah.
> M: How would you do it if you were going to do it?
> C: Put in the oven.
> M: Yeah, the oven. I'm thinking what kind of oven, maybe this one?
> C: No, it's the bottom.
> M: Yeah. That would work. I think the microwave would've been faster.
> C: How come?
> M: Because it sends radio waves into the food more quickly than baking. I saw that on TV last week. Ooh, do you think this is going to taste sweet or sour or salty or what?
> C: Sweet.
> M: Sweet? Do you think this is healthy food or not healthy food?
> C: Not.
> M: Yeah, not healthy. Why don't you think it's healthy? What does it have too much of?
> C: Too much marshmallows.
> M: Yeah. And what is marshmallow made from?
> C: I don't know.
> M: Too much sugar, and what do you think butter's made from?
> C: Sugar.
> M: Fat. Too much sugar and fat, so we don't usually eat this. This is really fun.

The mother in the above example used the cooking activity as an opportunity for teaching her child about the science of cooking, taste sensation and basic nutrition. In the next example, a mother cooking with a four-year old child and the older sibling (S) focuses more on management of the cooking activity (e.g., taking turns) and negotiating her children's roles, though she does include some basic numeracy teaching (e.g., shapes).

> C: I want circles.
> M: Okay. If both of you need this shape—hold on, let me ask her. How can we make sure that both of you use it? Because we only have one and both of you want to use it. What can we do?
> C: Cut it in half.
> S: No.
> M: No. Then it won't be a circle if you cut it in half. It'll look like a C, half a circle.
> S (Sibling): Share.
> M: Share. How can we share?
> S: We can take turns.
> M: Very good. Haven't we read that book about sharing and taking turns?
> S: Yeah.
> M: Do you remember what you're supposed to do? Who wants to be first because we have to take turns?
> C: I want to be first.
> M: If we don't share then I'll have to do it and I don't think you guys are going to like it.
> C: I want to use this one.

M: Kelsey, can you let her use it? We're going to take turns. Maybe we'll let her do it first and the next time you get the first one.

Within the triadic condition, older siblings initiated significantly more literacy exchanges and had more correct responses to literacy and other general knowledge parent guidance behaviors than the younger sibling. Although the younger children participated in fewer direct teaching opportunities when an older sibling was present, they took the role of active observer for more complex literacy and numeracy exchanges. This supports Correa-Chavez and Rogoff's (2009) concept of "third-party attention" in which a parent's speech or behavior is solely directed at one child, but more than one child is present who learns from this indirect teaching. Thus, although the younger sibling received less direct teaching when an older sibling participated in the cooking task, the younger child was still actively engaged during this period of more advanced teaching exchanges. For example, rather than reading the simple illustrated child recipe cards, often the older siblings sounded out words and attempted to read the adult recipe cards. This type of elaborated literacy can be observed in the transcript example below.

M: Can you do me a favor? Can you flip over the directions and see what the next step is? What number is the next step?
S (Sibling): Four.
M: All right. See if you can read it. I will tell you the first word— it says remove. What does that say?
S: Uh —
M: What's the next word?
S: Pan.
M: Uh huh.
S: For.
M: From, uh-huh.
S: From the heat.
M: Heat, very good. So we're going to remove the pan from the heat, then it says?
S: Add.
M: Add.
S: Six.
M: Um-hm.
C2: Cups.
M: Cups.
S: Of.
M: Cereal.
S: Cereal and put
M: No, not put…
S: Pour in.
M: Until.
S: Until well.
M: Well. And that one is a hard word…coated. What it wants us to do now is add six cups of cereal. So we're going to remove this from the heat and why don't you step down and go get me the cereal?

Although the above teaching exchange was directed at the older sibling, the younger child observed the advanced literacy teaching exchange. Barton and Tomasello (1991) claim that younger children may benefit from a richer learning environment when an older sibling is present, and our findings lend indirect support to this assumption. In the context of a cooking task, a richer learning environment may be a result of more developmentally advanced literacy and numeracy exchanges initiated by the older sibling. Therefore, despite the potential negative consequences incurred with lower frequencies of direct parental teaching, four-year-olds may benefit from observing more complex teaching with an older sibling present.

These findings also support previous research suggesting that adults can help foster emergent literacy and numeracy in young children through culturally relevant tasks such as cooking (Vandermaas-Peeler et al., 2002, 2007, 2009). While cooking with their young children in the home, parents informally taught their children about numbers and letters by having them read a recipe, or count cups of flour, as illustrated in the following transcript example of a dyad.

M: That's one. Can you help me count?
C: That's one.
M: Okay.
C: Two.
C: Three.
M: Very nice. How many more do we have? We've done three and we want to do six, so how many more do we have? We have to do three more.
C: Okay. Three.

C: Okay.

M: Now we did four. Do you know how many more we're going to do? We have to do number five and number six.

C: So two more.

M: That's right. Okay. That's five. Okay. And we've done five, we want to do six. How many more?

C: One more.

M: All right.

As Rogoff (1990) and many others have theorized, these cultural and social contexts of learning are important for children's cognitive and social development. Cooking provides an opportunity for parents and children to engage in literacy and numeracy exchanges in order to accomplish the goal (an edible product). If these opportunities for teaching are used effectively, cooking can be a very engaging learning experience for young children. A possible detrimental effect of an overly didactic parental focus during the cooking activity is that children may find the joint activity less fun or engaging. However, most children in our study seemed to enjoy the activity, and our results suggest that the cooking activity provided opportunities for positive social engagement, as illustrated in the two transcript examples below.

Dyadic Example:

M: If you were going to be a piece of candy, what type of candy would you like to be?

C: A marshmallow.

M: A marshmallow? Why?

C: Because you can make this with me.

M: I could make you all syrupy and gooey? (laughing)

C: Yeah. I'd be all sticking and stuff (laughing)

Triadic Example:

S: You see all the marshmallow goo? It looks like a drink of marshmallows. Look at all my goo.

C: It looks smooth like ice cream.

S: Yeah. Vanilla ice cream.

C: It's marshmallow cream. One time we made S'mores at school. It's really easy to make. All you need to do is get two graham crackers out, two chocolates, and some marshmallows. It doesn't even have to be marshmallows. It can be marshmallow cream. And then you warm it up for a few minutes then eat it. It's so yummy.

M: Is it?

C: Yeah. I ate all of it.

S: Mmm, I want to make S'mores!

As illustrated above, the cooking activity provided a shared context for positive social engagement and learning. In the second example, the 4-year-old child also linked the present activity to a prior cooking experience at school. As suggested by previous research (e.g., Goncu, 1999; Rogoff, 1990), this type of shared participation cultivates a rich learning environment with opportunities for connecting new information to prior experiences.

Limitations

The present study has several limitations. Our participants constituted a small, heterogeneous sample; findings may have limited generalizability to other populations. The study participants were all middle-class and primarily European Americans. Research with a more economically and culturally diverse group is needed. In addition, the presence of researchers in the home may have altered more naturally occurring behaviors. In order to minimize these challenges we selected a familiar and highly engaging activity to observe, and filmed participants in their own kitchens. However, we cannot know the extent to which parents may have modified their normal interactions in our presence.

Conclusions

Our findings support previous research suggesting that adults can foster emergent literacy and numeracy learning in young children through shared participation in joint activities at home (e.g., Vandermaas-Peeler, Nelson, & Bumpass, 2007; Vandermaas-Peeler, Nelson, von der Heide, & Kelly, 2009). The findings confirm that parents used the cooking activity as an opportunity for teaching children about literacy via the recipe cards, and as a means of helping them practice basic mathematical activities such as counting, measuring, and identifying shapes. The findings also suggest that the presence of an older sibling may alter the types of teaching and learning opportunities parents can facilitate. Analyses of parent-child interactions across groups indicated that parents did more teaching related to numeracy and general skills in the dyadic condition, and that younger children had more correct responses to parent guidance behaviors when the older sibling was not present. Parents in the triadic condition engaged in more complex literacy-related teaching of older siblings, with the younger children taking the role of observer. With regard to social interactions, more role negotiation, frustration and conflict occurred in triads than in dyads.

Given the paucity of data comparing dyadic and triadic parent-child interactions, this study offers a unique contribution to the literature on guided participation. Additional observational studies of parents' interactions with multiple children are needed to understand the different contexts in which teaching and learning occur in young children's everyday lives and the impact of different contexts for learning on development in multiple domains. Parent-child interactions with multiple children present may be similar to the socio-cultural context of learning within the classroom, as teachers must manage the attention of multiple students, and students actively engage and participate in social learning processes. Studying these interactions may be beneficial to understanding how links might be fostered between home and school environments. In conclusion, future research in this area would be beneficial to educators and child development professionals interested in the various contexts in which adults provide guidance and support for young children's cognitive and social development.

Acknowledgements

References

Barton, Michelle E.; & Tomasello, Michael. (1991). Joint attention and conversations in mother-infant-sibling triads. *Child Development, 62*, 517–529.

Basket, Linda Munsun; & Johnson, Stephen M. (1982). The young child's interactions with parents versus siblings: A behavioral analysis, *Child Development, 53*, 643–650.

Benigno, Joann P.; Clark, Laura; & Farrar, Jeffrey. (2007). Three is not always a crowd: Contexts of joint attention and language. *Child Language, 34*, 175–187.

Benigno, Joann P.; & Ellis, Shari. (2004). Two is greater than three: Effects of older siblings on parental support of preschoolers' counting in middle-income families. *Early Childhood Research Quarterly, 19*, 4–20.

Boomgarden, Erin E. (2009). Parent-child guidance and numeracy interactions in a cooking activity. Unpublished manuscript, Elon University.

Correa-Chávez, Maricela; & Rogoff, Barbara. (2009). Children's attention to interactions directed to others: Guatemalan Mayan and European American patterns. *Developmental Psychology, 45*,630–641.

Dubrow, Lainie V.; & Howe, Nina. (1999). Parental play styles and sibling interaction during a problem-solving task. *Infant and Child Development, 8*, 101–115.

Dunn, Judy. (1983). Sibling relationships in early childhood. *Child Development, 54*, 787–811.

Goldsmith, Denise Fitz & Rogoff, Barbara. (1997). Mothers' and toddlers' coordinated joint focus of attention: Variation with maternal dysphoric symptoms. *Developmental Psychology, 33*, 113–119.

Göncü, Artin. (1999). *Children's engagement in the world: Sociocultural perspectives*. New York: Cambridge University Press.

Gräfenhain, Maria; & Behne, Tanya. (2009). Young children's understanding of joint commitments. *Developmental Psychology, 45*, 1430–1443.

The Observer Version XT [Computer software]. (2009). Wageningen, The Netherlands: Noldus Information Technology.

Rogoff, Barbara. (1990). *Apprenticeship in thinking: Cognitive development in social context*. New York: Oxford University Press.

Rogoff, Barbara. (2003). *The cultural nature of human development*. New York: Oxford University Press.

Stocker, Clare; Dunn, Judy; & Plomin, Robert. (1989). Sibling relationships: Links with child temperament, maternal behavior, and family structure. *Child Development, 60*, 715–727.

Vandermaas-Peeler, Maureen; Nelson, Jackie; & Bumpass, Charity. (2007). "Quarters are what you put into the bubble gum machine": Numeracy interactions during parent-child play. *Early Childhood Research & Practice, 9*(1). Retrieved from http://ecrp.uiuc.edu/v9n1/vandermaas.html (Spanish)

Vandermaas-Peeler, Maureen; Nelson, Jackie; von der Heide, Melissa; & Kelly, Erica. (2009). Parental guidance with four-year-olds in literacy and play activities at home. In David Kuschner (Ed.), *From children to Red Hatters: Diverse images and issues of Play* (pp. 93–112). Lanham, MD: University Press of America.

Vandermaas-Peeler, Maureen; Way, Erin; & Umpleby, Jennifer. (2002). Guided participation in a cooking activity over time. *Early Childhood Development and Care, 172*, 547–554.

Vygotsky, L. S. (1978). *Mind in society. The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Author Information

Lauren Finn graduated as an Elon College Fellow from Elon University in 2011 with a dual degree in Psychology and Philosophy. She is currently pursuing her Masters of Social Work at UNC Chapel Hill, with a focus on community management and policy practice.

Maureen Vandermaas-Peeler is a professor of psychology at Elon University. She served as director of the honors program from 2008 to 2013. She is a developmental psychologist with a particular interest in understanding how social and cultural practices support young children's development. Her research focuses on ways that young children learn by interacting with others in their family and community. She is also interested in the study of academic mentoring and high-impact engaged learning practices on college campuses.

Maureen Vandermaas-Peeler
2337 Campus Box
Department of Psychology
Elon University
Elon, NC 27244
vanderma@elon.edu

Appendix A:
Adult Recipe Cards

- Step #1: Ask your child if he or she has ever had crispy treats. Pour the entire box of cereal into the larger bowl and the bag of marshmallows into the smaller bowl.
- Step# 2: Melt three tablespoons of margarine in a large saucepan over low heat.
- Step #3: Add marshmallows and stir until they are completely melted.
- Step #4: Remove the pan from the heat. Add six cups of cereal and stir until well coated.
- Step #5: Use a spatula to press the marshmallows and cereal mixture into the pan.
- Step #6: Once the treats have cooled cut them into shapes using the cookie cutters provided. Are there any other times you've used cookie cutters together? Ask your child about these instances.

University of Illinois at Urbana-Champaign
College of Education
Early Childhood and Parenting Collaborative

ECRP