

Peer learning in first grade: Do children communicate with each other during learning activities?

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Abstract

Children spend a great deal of time influencing and motivating their peers without any direct instruction on how to do so. This power of influence allows for the assumption that peers can collaborate and work with one another for the purpose of learning. However, with forty-two states within the United States participating in the Common Core State Standards, young children are now expected to understand and use peer learning (PL). The purpose of peer learning is to interact and collaborate when acquiring information and knowledge; however, the mechanisms and learning behaviors that are needed for successful interactions have not been identified for children in first grade. This qualitative study utilized a descriptive/exploratory, cross-sectional research design in order to identify the mechanisms and learning behaviors used when first graders complete a contrived learning activity. Four mechanisms were observed: Organization/Engagement, Scaffolding/Error Management, Communication, and Affect. The mechanism of Affect was found to be used the most by the dyads. Twenty-two different learning behaviors associated with the mechanisms were observed. Implications for anyone working with students are suggested.

Keywords: Peer learning, Common Core State Standards, Collaboration, First Grade

Introduction

Children spend a great deal of their time in the company of other children. What makes the time spent together so important is how much power and influence one child can have over another. As early learners, the metacognitive skills necessary to influence others are still developing. However, the time together allows for the assumption that peers can motivate, inspire, or even guide learning without even knowing it (Parr & Townsend, 2002). In school contexts, children interact with each other throughout the day in academic and non-academic scenarios. To that end, children as young as kindergarten are now expected to understand and use peer learning (PL) to interact and collaborate when acquiring information and knowledge from each other. Additionally, the metacognition necessary for working together has been reported to begin emerging during late elementary school (Veenman, Van Hout-Wolters, & Afflerbach, 2006).

To ensure the success of PL interactions, teachers and anyone working with students need to communicate. All parties need to share the information they gather from the behavioral observations of the students based on performance in the classroom. Teachers have the knowledge of the curriculum while clinicians have knowledge of the underlying language skills necessary for students to access the curriculum. Both need to collaborate to identify and understand the behaviors and processes that are foundational for creating a baseline for PL. Once the behaviors and

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processes are identified, the knowledge can be applied to any PL experience and/or classroom learning experiences.

Background

Peer Learning

PL is a widely accepted pedagogical framework in classrooms because of the social nature of learning (Kim & Baylor, 2006). The concept of PL is not new and has a long history (Topping, 2005). It is likely that everyone has some experience working with a peer on some learning task. Because of its wide usage, it is easy to assume we know how PL works; however, little is known about the reasons for its effectiveness (Sage & Kindermann, 1999). Most commonly, PL begins as peer tutoring where one participant serves as the tutor and the other serves as the tutee (Topping, 2005). What has been observed is children being paired together and from this observation educator assume learning has occurred.

What is known about PL is how increased engagement in the process fosters development. Perhaps PL is successful because of the influence, motivation, and contributions each peer brings to the learning process (Sage & Kindermann, 1999; Topping & Ehly, 1998; Topping & Ehly, 2001; Hanusheck, Kain, Markman, & Rivkin, 2003; Henry & Rickman, 2007). Additionally, PL takes advantage of the naturalness of student-centered learning (Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003). As there are numerous opportunities for learning and teaching throughout the school day, PL provides students with a variety of engaging interactions and opportunities for personal growth (Rohrbeck et al., 2003). Moreover, PL provides opportunities to develop students' inherent abilities to learn how to work with others and reinforce learning in the most natural of environments while also providing opportunities for additional practice, especially among older children (McMaster, Fuchs, & Fuchs, 2006; Fuchs & Fuchs, 2005). As an added benefit, PL will provide children with the prospect of having someone to practice newly learned skills without having to wait for a turn with their teacher (Topping & Ehly, 2001).

For the purposes of PL, a mechanism is defined as a category of learning behaviors that can work together (e.g., organization). Then, mechanisms comprise learning behaviors that are defined as what is happening during PL to cause learning to occur between the peers (e.g., making goals). The delivery of PL has children interacting and collaborating for the purpose of learning. However, what has been occurring in classrooms is children working together and teachers merely hoping that learning occurs. Identifying the mechanisms and learning behaviors children use when working together could strengthen PL interactions through the establishment of a model of best practices.

While there is some literature describing these mechanisms for older children and adults, particularly in medical education, doctoral education, and higher education, only one study has addressed the mechanisms and behaviors observed in kindergarten aged children. In an exploratory study, Mlawski, DeLuca, Cahill, and Zipp (2017) described a learning mechanism that was observed across all the dyads in their study: observation. Five behaviors were associated with how kindergarten children observed their peers during a contrived learning activity: modeling, imitation, prompting, self-reinforcement, and feedback (see Table 1). Dyads of kindergarten children were found to use the behavior of prompting the most and modeling the least (Mlawski et al., 2017). Additionally, verbal feedback used between the peer dyads was more negative than positive (Mlawski et al., 2017).

Table 1: *Definition of Behaviors Associated with Observation*

Behaviors Observed	Definitions
Modeling (verbal or non-verbal)	Behavioral, cognitive, or affective changes that result from watching another person
Imitation	Following the lead of another participant
Prompting (verbal or non-verbal)	Indicating to another to participate in the activity
Self-reinforcement	Cheering for themselves during the activity
Feedback (positive or negative)	Providing either positive or negative comments regarding the toss that was made

Link to the Common Core State Standards

PL is now an expectation for implementing the Common Core State Standards (CCSS) in the United States of America and is changing the face of learning in schools. With forty-two out of the fifty states adopting at least part of the CCSS, speech language pathologists and teachers need to embrace how to promote successful learning interactions between peers (Common Core, 2010). Speech language pathologists are included due to their place working with students preparing to meet the CCSS (ASHA, n.d.). As a result, the CCSS has elevated the importance of identifying and understanding what mechanisms are at play during PL interactions (Common Core, 2010). To magnify the importance of the CCSS requirements, the standards begin at the kindergarten level and continue to spiral through to the twelfth grade (Power-deFur, 2016).

As per the CCSS, by the end of first grade children are expected to participate in collaborative conversations with diverse partners about first grade topics and texts with peers and adults in small and larger groups (Common Core, 2010). As all standards are spiraled from year to year to address the developmental growth of learning from grade to grade (Common Core, 2010), the goal of PL is to improve all facets of language and communication between learning partners. But what needs to be addressed is how children continue to grow while the standards remain the same. The ability to collaborate with peers is embedded into the fabric of learning now. Likewise, clinicians and teachers need to be mindful of the Common Core State Standards (CCSS) requirements for students to come together to achieve specific standards, especially in speaking and listening which are directly related to PL (Common Core, 2010). One challenge to PL is blending a speech language pathologist's (SLPs) knowledge of speaking and listening with a teacher's expertise of the curriculum.

Peer to peer learning begins early in a child's development without formal instruction. However, little is understood or reported on how dyadic interactions occur from a learning perspective. Even though behaviors and processes have been identified with older students and adults during PL, the literature is quiet about identifying the behaviors and processes for school-age children beginning their academic careers (Parr & Townsend, 2002; Topping & Ehly, 2001). Even though studies by Rohrbeck et al. (2003) and Topping and Ehly (2001) have provided some suggestions as to the behaviors and processes being used by school-aged students, there are no studies that have discovered the baseline behaviors first-grade students use during dyadic PL.

Purposes of the Study

PL is based on two theories coming together to define how children learn from one another. First there is the Social Learning Theory (Bandura, 1977) that explains how learning is social and is based on attention, retention, reproduction, and motivation upon the part of the learners. Second, Social Constructivism describes learning as active knowledge construction (Vygotsky, 1978). For the purposes of PL in a classroom setting, three individuals come together: the student, the class member that serves as the learning partner, and the teacher. Additionally, when everyone comes together, prior knowledge, experiences, and attitudes are also brought into the learning interaction (see Figure 1). The combination of knowledge, experiences, and attitudes needs to occur without becoming a hurdle to the experience

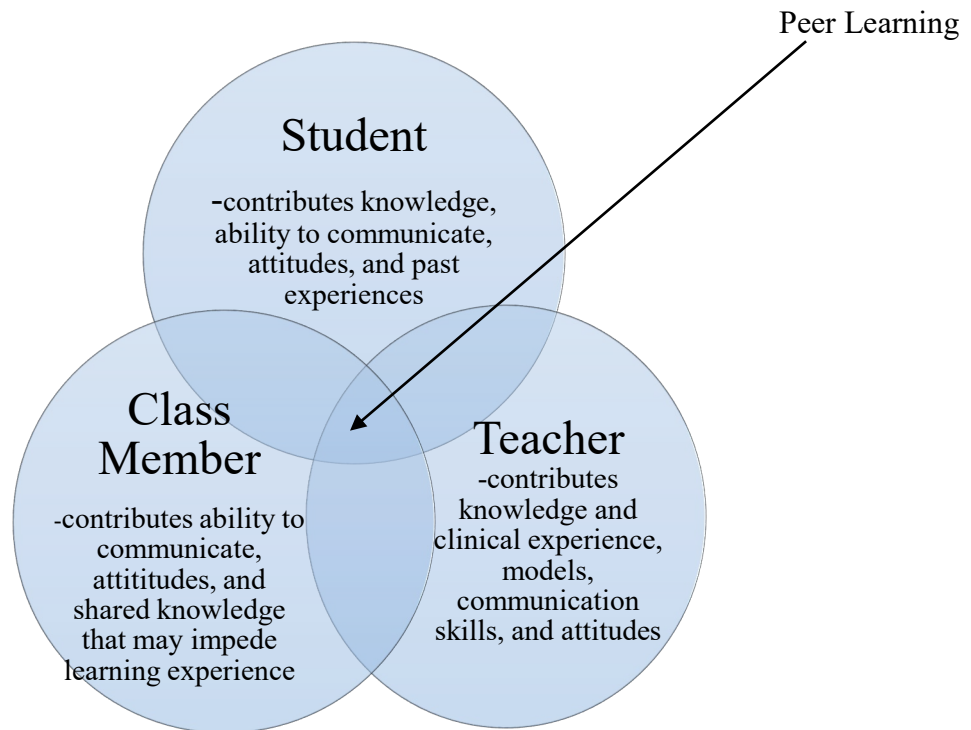


Figure 1. Constructivist Knowledge Sharing for Peer Learning (Mlawski, DeLuca, Cahill, & Zipp, 2017)

Developing an inventory of behaviors and processes needed for successful PL interactions will have implications for future classroom success. With the CCSS mandating PL starting in kindergarten, working together for the purpose of learning will always be a component of classroom learning (Common Core, 2010). This study will address the following research questions:

1. What are the verbal and non-verbal mechanisms that contribute to PL outcomes in the context of collaboration?
2. What are the verbal and non-verbal learning behaviors associated with the mechanisms that contribute to PL in the context of collaboration?

Once the mechanisms and specific learning behaviors are identified, teachers and other related service providers who work with students can work together to become responsive

educators who can collaborate for the main purpose of helping students best achieve the mandated CCSS goals for PL.

Methods

A descriptive/explorative, cross-sectional research design was utilized to answer the research questions. This design was the most conducive for the primary investigator (PI), a speech-language pathologist, to understanding the dyadic interaction that occurs when first graders are working together for the purpose of learning. Using a qualitative design allowed the PI to observe the behaviors as they naturally developed during the contrived dyadic learning activity. Additionally, the interaction occurred in an actual setting where PL was their assigned learning task.

Participants

Participants were recruited from one school district in Central New Jersey within the United States. The sample included sixteen students ranging in age from six years, seven months old to seven years, three months old, with equal distribution of males and females. The participants were from two classrooms in the same school building and had been in school for four months. The two first-grade classrooms were chosen by the school principal to participate in the study.

The district where the data was collected serves children from pre-kindergarten through the twelfth grade. During the 2015 school year, the school where the data was collected comprised a variety of ethnic groups with children of Hispanic decent making up the majority at 58.3% of the students. Additionally, 89.3% of the 859 students enrolled receive free/discounted lunch. Before beginning the study, the Superintendent of the school district provided permission to collect data and Institutional Review Board (IRB) approvals were sought and received.

Upon receiving IRB approval, forty packets were distributed to the two different classrooms at the school. Included in the packet sent home to the students' parents requesting their child's permission to participate were a letter of solicitation, letter of informed consent, and a short demographics survey for introductory background information that were all translated into English, Spanish, and Portuguese. Following receipt of parental consent, all of the children whose parents provided permission were asked if they assented to participating.

Twenty-two packets were returned, assigned identification numbers for the protection of the participants' confidentiality, and verified for completeness by the PI. Twenty-one of the packets were found eligible for further inquiry to determine if they were candidates for participation.

Inclusion/Exclusion Criteria

Since the behaviors and processes for first grade PL in the context of collaborative classroom learning tasks has not previously been studied, only typically developing children were included. Only children who speak English in school as reported by their parent/caregiver on the questionnaire in the initial packet were considered for the study. Additionally, each potential participant was evaluated for basic English proficiency and vocabulary using the Peabody Picture Vocabulary Test-4 (PPVT-4) (Dunn & Dunn, 2007) prior to participants being accepted for the study. The PPVT was chosen to determine if the participant's receptive language was within normal limits. Any child who scored below normal limits on the PPVT was excluded.

Additionally, the participating children needed to have been enrolled in school for at least six months, so that they understand a teaching environment. Exclusionary criteria included

children younger than six years-five months due to the possibility of a limited vocabulary secondary to their age, abilities, and experience and older than eight year-old due to the possibility of an increased vocabulary as a result of their added maturation secondary to age, abilities, and experience. Children were also excluded from the study if they have any reported disabilities as identified by the parents on the questionnaire that may interfere with the study, such as autism, Down syndrome, or a speech and language delay/disorder. Also, children who do not speak English were excluded from the study.

Procedures

Following assent from the children whose parents provided written informed consent, twenty children agreed to participate. Then each child was individually assessed by the PI to ensure the children were of similar ability for both English proficiency and receptive vocabulary using the PPVT-4. After testing was completed, the scores from sixteen children who met the inclusion criteria were used to create the dyads. The dyads were fashioned by first ranking the PPVT-4 scores from highest to lowest scores (see Table 2). Dyads were created by pairing scores beginning at the highest performance for participants to work and learn from a peer with a vocabulary score like them.

Table 2: *Organization of Dyads*

Dyad #	1	2	3	4	5	6	7	8
Participant ID	7/3	20/6	1/17	11/21	8/16	10/12	19/9	4/15
Numbers								
Corresponding PPVT-4 Scores	112/108	106/105	104/99	96/94	94/93	92/92	90/89	88/87

The Contrived Learning Activity

The activity chosen for the study was manufactured to simulate an activity completed in the classroom. By controlling the environment in the classroom through the use of a contrived learning activity (an activity that is clinician centered and created for the child) (Fey, 1986), the process of PL becomes the main focus of understanding for both the professionals working with the students as well as the students themselves.

The study began with the first dyad being introduced to a book sharing activity (e.g., Let's look at the book, *Frog, Where Are You?*). The story is a wordless picture book and the students were instructed to look at read the story together. Both students looked at the book at the same time. At the conclusion of looking at the book, the students were provided with directions to the collaborative learning activity (e.g., "Now you are going to make a picture and write a sentence together. The picture and sentence should be about something you remember from the book. Remember, you need to make the picture and a sentence together."). The activity was chosen because reading books and demonstrating comprehension is a developmentally appropriate activity completed at this age (CCSS.ELA-Literacy.RL.1.2 Retell stories, including key details, and demonstrate understanding of their central message or lesson). The PI then moved away from the dyad but remained within eyesight. Introducing the activity to the children served as a means for beginning the interaction between the peers. The interaction continued until the picture and sentence was complete or approximately ten minutes. At the conclusion of the ten minutes, the students in the first dyad were thanked for their participation and asked to return to their class.

The procedures were repeated until all eight peer dyads had participated in the collaborative learning task.

Data Collection and Analysis

An inductive approach to data collection was utilized to develop a theory about PL as the data was collected, coded, and analyzed simultaneously (Creswell, 2013). Using an inductive process facilitates identification of behaviors while also identifying theoretical concepts grounded in what the PI observed from the dyads. To answer both of the research questions, data was collected through observation and videotaping of naturalistic peer dyadic interaction in the context of a collaborative learning task. The PI collected, transcribed, and analyzed the data from the videos and transcribed verbatim for analysis. The data was anonymized by assigning numbers to each participant to protect identifiable information. Then, the PI coded and explored each dyad's transcript in order to describe the experience of PL based on the behaviors identified by Topping and Ehly (2001). Additionally, the PI created an a priori list of codes that were commonly found in the literature for PL (expansion, recasting, commenting, following the child's lead, and using more referential language) (Chapman, 2000; Topping & Ehly, 2001; Girolametto & Weitzman, 2002). This was an inductive approach to coding the transcripts as the codes assigned were based on predetermined themes and categories but also looked for emerging data not defined by Topping and Ehly (2001). Qualitative data is unique in its own right as there is not uniformly derived means by which to assign those codes.

To answer both research questions, the transcribed data was reviewed by the primary investigator to determine what verbal and non-verbal mechanisms and what verbal and non-verbal processes contribute to PL outcomes. Transcripts were coded and explored for evidence that suggests specific mechanisms (e.g., engagement, communication, scaffolding of information, and affect) as well as emergent, unanticipated mechanisms related to one of the children assuming a leading position in the interaction. Transcripts were also coded and explored for evidence that suggested specific processes (e.g., modeling, asking for clarification, setting goals, and planning). Additionally, the data concerning the reactions of the children during these interactions was coded and analyzed to determine if children react in similar ways during PL in the context of a collaborative learning task. Data was finally evaluated to determine the most salient mechanisms and processes that the children utilized.

Reliability

To bolster the validity of the coding process, a peer reviewer was added to review the transcripts. As defined by Merriam (2001), a qualitative expert such as a peer examiner or peer reviewer adds to the trustworthiness and internal validity of the data. The role of the peer reviewer was to evaluate the codes developed to confirm whether they accurately represent the interactions. At the end of the review process, discussion followed regarding any emerging themes, and modifications were made to the codes if needed. For potential commonalities among learning mechanisms or questions, the primary investigator served as the mediator for consensus. Four predominant themes with twenty-two learning behaviors emerged from the initial coding and peer review.

Results

Mechanisms and Learning Behaviors

In the context of collaboration, four mechanisms were observed to be used by the first-grade students: Organization/engagement, scaffolding/error management, communication, and affect (see Table 3). Mechanisms are defined as a category of specific learning behaviors (e.g., organization) that can be both verbal and/or non-verbal. Learning behaviors are the identifiable and observable components of a mechanism that caused learning to occur between the peers (e.g., making goals) that can also be both verbal and/or non-verbal. In the following section, mechanisms and the learning behaviors associated with them will be discussed.

Table 3: *Observed First-Grade Mechanisms*

Mechanisms	Organization/ Engagement	Scaffolding/ Error Management	Communication	Affect
Times Used	33	211	222	276

Mechanism of Affect

The mechanism that was used the most across the dyads was **affect** (see Table 4). The affective component of a PL relationship is the foundation upon which the interaction is based, as this is the trust, enthusiasm, and competence that each student brings to the interaction. Six learning behaviors associated with affect were observed as well during the contrived learning activity: Self-reinforcement, negative affect, positive affect, ownership, cooperation, and self-disclosure (see Table 4). The most used affective learning behaviors were **negative** and **positive affect**. These learning behaviors were also observed in all of the eight dyads. Negative affect, used eighty-nine times, was observed as both verbal and non-verbal behavior, such as ignoring their partner or using negative language that closed them off from interaction. This was best illustrated by dyad one when participant seven exhibited the following behaviors: 1. Resting his head on his hand and 2. Sighing and readjusting himself in his chair. Negative affect was used the most by dyad one. The learning behavior of **positive affect** was observed eighty-five times, almost as much as negative affect. As observed, positive affect can also be either a verbal or non-verbal behavior, such as laughing, smiling, joking, or providing verbal encouragement. Participant six from dyad two exhibited this behavior when during the activity the participant leaned the book that was being shared more towards the middle of both of the participants.

Cooperation was the next most used learning behavior associated with affect. This was observed when partners worked together which is the ultimate goal of a successful PL experience. An example of cooperation was viewed during an exchange between participants nineteen and nine. Participant nineteen flipped through the pages of the book while participant nine held the pages back so they both could see.

Ownership and **self-disclosure** were observed almost equally at eighteen and nineteen experiences, respectively. Ownership, the act of taking something, could be either a positive or negative experience. This was witnessed during the interaction of dyad five when participant eight grabbed the book from participant sixteen and pulled it closer. Self-disclosure, the provision of providing personal knowledge of what was being discussed or learned during the activity, was the last affective learning behavior. This was observed in dyad two when participant twenty discussed with participant six a trip they had taken: "It's so cool. I stayed in Cancun. It's so good."

The least used affective learning behavior was **self-reinforcement**, or support for themselves during the activity was the least observed learning behavior. Self-reinforcement was only used one time each by three out of the eight dyads. One instance of self-reinforcement occurred with dyad two when participant twenty provided support by stating, “Look at our picture now. Pretty good.”

Table 4: *Affective Learning Behaviors*

Learning Behavior	Self-Reinforcement	Negative Affect	Positive Affect	Ownership	Cooperation	Self-Disclosure
Times Used	3	89	85	18	62	19
Dyad Used the Most	2,5,7	1	2	3,5,6,7	2,7	2

Mechanism of Communication

The next most used mechanism across the dyads was **communication** (see Table 3). Eight learning behaviors were associated with the mechanism of communication: Asking for clarification, observation/commenting, negative feedback, prompting, explaining/clarifying, speculating, suggesting, and negotiating (see Table 5). Observed the most at seventy-two occurrences in the area of communication was the learning behavior of **observation/commenting**. This was observed when one member of the dyad looked at what their partner was doing and provided additional information. In the following example from dyad five, participant sixteen turned to participant eight and commented that what was drawn in their picture “looks a little sad.”

Asking for clarification and **suggesting** were the next most observed learning behaviors associated with communication. Asking for clarification was observed when one of the partners would ask the other for help. As observed in dyad eight, participant four asked participant fifteen “where are the clouds?” when referring to their collaborative work. The learning behavior of **suggesting** occurred when a member of the dyad put a plan forward to their partner for consideration. An example of suggesting occurred in dyad four when participant eleven stated to participant twenty-one, “Maybe you can put some flowers on here, or some apples?”

Explanation, negotiation, and prompting were less used learning behaviors for communication. An example of partners providing an explanation for what was happening during the contrived learning activity was best observed when participant six from dyad two turned to his partner to clarify information about Brazil (e.g., “It’s almost like the United States.”). Negotiation was used the most by dyad two (seventeen times) but then only used four times in total by dyads five, seven, and eight. Negotiation was observed when a discussion occurred between dyad members aimed at reaching an agreement. This was best illustrated by dyad two during the following interaction:

Participant six stated: “He was in my class last year.” Participant twenty continued: “No. I was by your class.”
Participant six finished the interaction with: “No, you weren’t.”

The learning behavior of prompting served as an indicator between partners to participate in the activity and/or direct their partner to look at or complete the task at hand. Only observed in

three out of the eight dyads, one instance of prompting was when participant twenty pointed to a picture in the book that both partners were looking at and said “Oh, look at that.”

The least used learning behaviors associated with communication during the contrived learning activity were **negative feedback** and **speculation**. Negative feedback was observed when one partner used an unkind or unsupportive word or statement to the other partner during the course of the contrived learning activity. Only observed in two of the eight dyads, this was best observed in dyad five when participant eight referred to participant sixteen’s drawing by stating “This isn’t how you make a dog” without providing any corrective feedback. Speculation, which was defined as when one or both members of the dyad formed their own theory or conjecture about the task they were working on without firm evidence, was the least used learning process for communication. Also only observed in two out of the eight dyads, speculation was best illustrated by dyad five when participant sixteen provided the following information: “I don’t know, I don’t know. That’s how you make, uhm, shirts. Kind of.” Dyad three did not apply any learning behaviors associated with communication during the contrived learning activity. Dyads one and six only used the learning behavior of observation/commenting.

Table 5: *Communication Learning Behaviors*

Learning Behavior	Ask to clarify	Observe/ Comment	Neg. Feedback	Prompt	Explain	Speculate	Suggest	Negotiate
Times Used	42	72	7	13	21	3	41	23
Dyad Used the Most	8	2, 5	5	2	2	5	4	2

Mechanism of Scaffolding/Error Management

The next most used mechanism was scaffolding/error management (see Table 6). Seven learning behaviors were associated with the mechanism of scaffolding/error management: modeling, correction, imitation, error management, directing, self-monitoring, and time management (see Table 6). The most observed learning behavior from scaffolding/error management was **directing**: when one member of the dyad took the lead and explicitly instructed the other member of the dyad during the activity. Notice that directing was observed 110 times overall during the ten-minute activity and the most by dyad two. The following exchange is an example of directing that was observed in dyad two:

Participant six directed twenty “Now draw the dog with the can.” Participant twenty drew while six watched. Participant six continued with “And make the can on his head.”

After directing, **self-monitoring** and **correction** were the next most observed learning behaviors for the mechanism of scaffolding/error management. Self-monitoring was defined as members of the dyad regulating their own behavior during the activity. This was applied thirty-eight times with dyad seven utilizing self-monitoring the most at sixteen occurrences. Self-monitoring was observed thirty-eight times overall in five out of the eight dyads. An example of self-monitoring occurred when participant nine stopped writing and read over the sentence. The learning behavior of **correction** was observed twenty-nine times by only five out of the eight

dyads. Correction was defined as one member of a dyad verbally correcting the other member of the dyad. Dyad two was observed to use correction the most. An example was observed during the following exchange:

Participant twenty said “The bees knocked him out.” Participant six responded by saying “No. He got scared of the owl, so did the frogs.”

Error and time management were sparsely used learning behaviors. Error management was observed fourteen times in total when dyad participants made a change during the activity without verbal correction by their partner and used by five of the eight dyads. An example of this was observed in dyad two when participant twenty fixed what participant six drew while participant six watched. Time management was only observed eleven times by two of the eight dyads. This was observed during the following exchange by dyad eight:

Participant fifteen said to participant four “We won’t have enough. Will we have more time?” Participant four responded with “We have only got seven more minutes until we go to lunch.”

Modeling and imitation were the least observed learning behaviors of the scaffolding/error management mechanism. Modeling was observed four times when behavioral and/or cognitive changes resulted from watching their partner during the dyadic interactions. The learning behavior of modeling was only observed in three out of the eight dyads. An example of modeling occurred in dyad eight when participant fifteen pointed to the book and participant four stopped and did the same. **Imitation** is a learning behavior that is observed when one participant in a dyad follows the lead of their partner. Imitation was observed only three times overall, but was observed in the following example by dyad two:

Participant twenty pointed to the page. Participant twenty said “Look at the dog’s eyes.” Participant six continued “He like...” while imitating the dog. Participant twenty then imitated the dog just like participant six did.

For the learning behaviors associated with scaffolding/error management, dyad three was not observed to use any while dyad six only applied directing one time.

Table 6: Scaffolding/Error Management Learning Behaviors

Learning Behavior	Modeling	Correction	Imitation	Error Management	Directing	Self-Monitoring	Time Management
Times Used	4	29	3	14	110	38	11
Dyad Used the Most	8	2	1, 2, 7	2	2	7	8

Mechanism of Organization and Engagement

The mechanism that was used the least was **organization/engagement** (see Table 7). Only one learning behavior was associated with Organization/Engagement: Setting/making goals/planning (see Table 7). With this learning behavior, the partners would be observed setting a goal for themselves. This behavior was also observed when the partners elaborated on the plans they already put in place. Only five out of the eight dyads were observed to set goals prior to

beginning or during the contrived learning activity. Dyad two set the most goals (14) and was observed planning their activity during the following exchange:

Participant six said “I’m gonna do the sky.” Participant twenty responded “I’m gonna make the plants black.” Participant six continued “Tell me where you’re gonna make the plants because I’m gonna do it up here.”

Table 7: Organization/Engagement Learning Behavior

Learning Behavior	Setting/making goals/planning
Times Used	33
Dyad Used the Most	2

Discussion

This study set out to identify the verbal and non-verbal mechanisms and learning processes first grade students use when working together for the purpose of learning. What was identified were mechanisms that had not been identified before for first grade students. As stated earlier, PL is social in nature and may be successful because of the influence, motivation, and unique contributions each of the peers brings to the learning process (Sage & Kindermann, 1999; Topping & Ehly, 1998; Topping & Ehly, 2001; Hanusheck et al., 2003; Henry & Rickman, 2007). Through observation, this study identified and described what happened during the learning process when peer dyads were observed. If teachers and other professionals working with students share the behaviors they are observing, performance in the classroom could be strengthened.

In the study by Mlawski et al. (2017), only the mechanism of observation was observed during the kindergarten children’s PL interactions. However, first grade PL yielded additional mechanisms: Organization/engagement, scaffolding/error management, communication, and affect. These mechanisms were also identified by Topping and Ehly (2001) in their theoretical framework for peer-assisted learning during literacy activities. For this study, observation was a learning behavior found within the mechanism of communication.

The difference between the mechanisms identified by Topping and Ehly’s (2001) framework and what was observed in this study rests on how the mechanisms were identified. Topping and Ehly (2001) synthesized existing research into a single theoretical model (Topping, 2005) whereas this study utilized descriptive observations to detail what exactly the peers were doing. The use of observational research filled a gap where no one looked before.

One explanation for the additional mechanisms from kindergarten to first grade may be due to increased cognition secondary to maturation. Skills learned build upon each other from one grade to the next and a first grader has had an additional year of practice. However, what is most interesting about the mechanisms identified in this study is the inequality in the use of the mechanisms. In Topping and Ehly’s framework (2001), there appears to be five mechanisms that are equally distributed for the PL to occur; however, the findings from this study reflect a different distribution pattern. The mechanism of cognitive conflict was not observed in any of the dyads. During the contrived learning activity, there was never any challenging of competency between the peers. Out of the remaining four mechanisms, affect was used the most (276 times) while organization/engagement was used the least (33 times). This suggests that children could use additional support such as teacher modeling of successful interactions or talking through a PL experience in order to meet the demands of working collaboratively with another student.

Topping and Ehly’s (2001) theoretical model of peer-assisted learning identified learning behaviors that provide influence on each of the mechanisms. For the mechanism of organization

and engagement, learning behaviors such as time on task, making goals and plans, and interactivity were identified as influencing factors (Topping & Ehly, 2001). However, for this study the only observed learning behaviors the first-grade students used for the mechanism of organization and engagement were setting/making goals/planning. Even more important, these learning behaviors were only observed 33 times across the eight dyads which was low in comparison to the other mechanisms.

For the mechanism of scaffolding and error management, the learning behaviors identified by Topping and Ehly (2001) were also observed. However, for this study some of the learning behaviors were observed far more frequently than others. For example, the peers were observed to direct each other in what to do much more than they were observed to be worried about time management or modeling what their peer should be doing. This appears to be a learning opportunity for educators since children learn the most through observation. Educators could incorporate how to create time management schedules as well as model how to help others, which was a mechanism not often utilized by the students.

Similar outcomes were observed for the learning behaviors associated with communication. The learning behaviors identified by Topping and Ehly (2001) were also observed, but some were observed more than others. The peers were observed to comment upon what their partner was doing more than they speculated about what they should be doing. Speculation requires a higher level of thinking to which most first graders will require additional support to learn how to utilize the skill. The peers were also less frequently observed providing explanation as they were observed completing the activity. Providing explanation is another higher-level thinking skill that requires the child to put their thoughts into language. For PL to be the most successful, children need to learn how to clearly explain what they are doing to ensure everyone is working at the same level.

An interesting observation relates to the learning behaviors associated with the mechanism of affect. While the same learning behaviors as Topping and Ehly (2001) were observed, it could not be determined whether there was a trusting relationship between the peers secondary to the limited interaction time. The affective component of a PL relationship is the foundation on which the interaction is based, as this is the trust, enthusiasm, and competence that each student brings to the interaction. Since PL relies on the ability to effectively communicate with your partner, it is not unexpected that the dyads were not observed creating a plan or developing a strategy by which they would complete the contrived learning activity. In the context of collaboration, each of the four mechanisms that were observed in the dyads had both verbal and non-verbal learning behaviors associated with the mechanism. The learning behavior observed the most was negative affect such as ignoring one another and exercising body language that closed them off from the interaction at hand. This could indicate the need for teachers to identify the benefits of working together since children do not really understand the benefits of PL. Moreover, with affect being a skill needing more direct instruction, teachers also need to recognize that metacognition seems to be more of a sophisticated skill than a first grader can execute outside of formal instruction.

What was observed during the dyadic experiences was the Social Learning Theory (Bandura, 1977) and Social Constructivism working in tandem. Both theories posit that working with a peer is social and is based on attention, retention, reproduction, and motivation upon the part of the learners. Additionally, based on observation, the dyads made active decisions during their interactions (Vygotsky, 1978).

Another interesting observation relates to the dyad that used the most learning behaviors. Despite each of the dyads being its own unique learning group, one dyad appeared to work best

for the purpose of learning together. Based on vocabulary, one may assume the dyad with the highest PPVT scores would have an easier time retrieving/recalling words to communicate with their partner for the purpose of learning. However, this was not observed. The dyad that was observed to use the most learning behaviors was dyad 2. This dyad was observed to use the most learning mechanisms across all the four major areas: affect, communication, scaffolding/error management, and organization/engagement.

Implications

Based on the behavioral observations of this study, some children are not yet at the developmental level to effectively use metacognitive thinking independently. Metacognition seems to be more of a sophisticated skill than a first grader can execute outside of formal instruction in this area. Any educator working with first grade students needs to directly teach the learning behaviors associated with metacognition that were used by the more successful dyads (see Table 8). Additionally, if they observe PL groups to continue to have difficulty, the educators may need to scaffold or model the best practice skills for the students to learn.

Table 8. Suggested Learning Behaviors to help with Metacognition

- Setting/making goals/planning
- Providing corrective feedback
- Teaching through imitation
- Time management
- Speculation
- Negotiation
- Providing explanation
- Reduction of negative affect

Further Research

Due to the scant literature available on the mechanisms that children use, the next steps would be to continue this line of research on the mechanisms children use in later elementary school, middle school, high school, and within higher education. Knowing the mechanisms and learning behaviors used by students will help with the creation of guidelines and/or best practices for teachers, clinicians, and other support staff to use when students are beginning to work with their peers. Also, knowing the mechanisms that typical students use will help to identify the mechanisms that children with disabilities are not using. This could potentially keep a child with learning disabilities in the classroom with their typically developing peers and in the least restrictive environment. Ultimately, this knowledge would help to strengthen the collaboration process that continues on throughout schooling as well as future career opportunities.

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