PLAY AS THE ZONE OF PROXIMAL DEVELOPMENT:

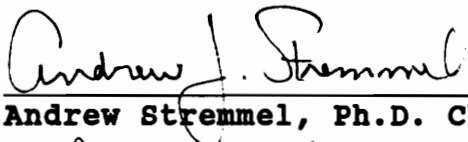## COLLABORATIVE CONSTRUCTIVE BLOCK PLAY

By

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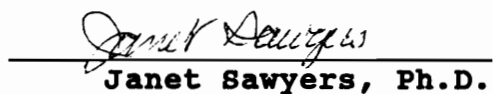(Child Development Option)

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COLLABORATIVE CONSTRUCTIVE BLOCK PLAY

by

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(ABSTRACT)

Based on Vygotsky's theoretical construct that play creates the zone of proximal development, this study was designed to examine the processes and outcomes involved in collaboration among dyads of 4-year-olds (matched for equal and unequal levels of play) in the context of constructive play with blocks. During the first phase of data collection, 100 4-year-olds were observed in naturalistic settings using the Play Observation Scale (Rubin, 1989). Play level, gender, and unfamiliarity were used to select 48 children to play with a peer in a laboratory setting. Play sessions were videotaped and coded for block play (Reifel & Greenfield, 1982), peer interaction (Rubin, 1989), and communication (Farver, 1992). Results of an overall multivariate analysis of variance (MANOVA) conducted for boys and girls found a significant interaction between treatment (play level) and gender. A follow-up MANOVA for girls was also significant. Subsequent univariate tests found significant differences in block play complexity

of girls in treatment groups. A separate pairwise MANOVA found that less-skilled girls engage in more-complex play when paired with more-skilled peers. Block play complexity and communication contributed to the differences among the groups. Results of a second pairwise MANOVA established that more-skilled girls display less-complex play behavior during play with less-skilled playmates. When considered separately, none of the dependent variables were responsible for the variance. Rather, all three contributed simultaneously to the significant overall multivariance. For boys, an overall multivariate analysis of variance was conducted but was not statistically significant. Boys do not alter their play during play with other four-year-old boys who display different levels of play complexity. Based on these findings, play actualizes the zone of proximal development for girls, not boys. Additional scholarship is needed in this area.

Dedicated to

my loving husband

Roger

and

our dear son

James

ACKNOWLEDGEMENTS

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INTRODUCTION

The concept that children learn from others, either with adult assistance or with the help of a more competent peer, is basic to Vygotsky's theory (Vygotsky, 1930/1978). This is reflected in his construct of the zone of proximal development (ZPD) which Vygotsky defined as the distance between what a child can do unassisted and what a child can do with the assistance of an adult or more competent peer (Vygotsky, 1930/1978). The zone of proximal development is created during instruction or play when knowledge is first constructed on a social plane (interpsychological) and then internalized or "appropriated" on an individual level (intrapsychological) (Moll, 1994; van Geert, 1994; Vygotsky, 1930/1978). Play, as the zone of proximal development, creates a situation in which, "the child always behaves beyond his [sic] average age, above his [sic] daily behavior; in play it as though he [sic] were a head taller than himself [sic]" (p.102). If play creates the zone of proximal development and more capable peers serve as mediators in assisting performance; then, observations of peer collaboration among children of different levels should provide a unique vantage point for viewing the relationship

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between social context and cognitive development. Further,
understanding the role of more skilled peers during play is
essential for understanding <u>how</u> individuals develop higher
level thinking skills.

Few Vygotskian-based studies have examined interactions
among peers in the context of play. The focus has been on
adult/child interactions during problem solving or play
activities (Fiese, 1990; Wertsch, Minick, & Arms, 1984;
Wood, Bruner, & Ross, 1976). Studies of adult/child
interaction during play provided support for Vygotsky's
contention that more competent others have a facilitating
effect on cognitive development during play (Ellis & Rogoff,
1982; Fiese, 1990; Radziszewska & Rogoff, 1988, 1991;
Rogoff, 1990). However, few studies examined cognitive
consequences of social interactions among children during
play, and even fewer documented interaction among peers who
display different play levels. One study was completed by
Howes and Farver (1987) who observed changes in structural
levels of representation (that is, social pretense, among
dyads). Vygotsky, however, focused on the interactive
processes involved in socially transmitting information.
Consequently, there is a need for studies that examine the
dynamic processes of peer collaboration during play.

Past studies of play have typically focused on symbolic
play during sociodramatic play (Howes, 1985; Howes, Unger, &

Matheson, 1992). Few studies have examined specifically the processes of constructive play with blocks (Christie & Johnson, 1987; Reifel & Yeatman, 1991). This study was designed to fill this void by examining the processes of collaboration or co-construction that occur among preschool peers within the context of constructive play with blocks. Further, it will begin to address the question, do four-year-olds play differently with peers who display varying levels of play behaviors.

CHAPTER II

REVIEW OF LITERATURE

Vygotsky's theory, which provides the conceptual framework for this study, will be explored in the first section of this review. Empirical studies that examine social interactions of peers, play, and peer play in the context of constructive play will then be discussed. Finally, a critical synthesis of the literature will provide support for the question and hypotheses of the study.

Vygotsky's Sociocultural Theory

At the core of Vygotsky's theory is the notion that there is a dynamic, interactive relationship between the social world and developing mental processes (Bidel, 1988; Vygotsky, 1930/1978, 1930/1988). For Vygotsky, social influences play a major part in development itself and social relations or interactions among people form the basis for higher level mental functions. Major components of his thesis include (a) internalization, (b) mediation, and (c) the zone of proximal development (Moll, 1994; Wertsch, 1991). These components and the interrelationship among these are discussed in the section that follows.

Internalization

Internalization occurs when knowledge construction

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moves from a social level (interpsychological plane) to an

individual level (intrapsychological plane), that is, from a

state of knowing with the assistance of others to a state of

knowing for oneself. The idea that mental growth occurs as

a result of social interactions without simultaneous

physiological or biological changes forms the nucleus of

Vygotsky's theory (1930/1978, 1934/1990). His view of

higher level thinking was influenced by both Marx and Kohler

(Wertsch, 1991) and was discussed by Moll (1994) in the

following statement.

> ... only human beings **qua** species have the capacity
>
> to operate with sophisticated linguistic signs (speech)
>
> in memory, voluntary attention, and other
>
> psychological functions. Even the sophisticated
>
> chimpanzee is naturally (that is, materially) distinct
>
> from humans in `the independence of [its] ...actions
>
> from speech.(p. 340)

Vygotsky believed that higher level thinking skills

allow individuals to use abstract or decontextualized

reasoning processes of self-questioning, recall, reflection,

planning, and remembering. He distinguished four criteria

in differentiating lower and higher level thinking. These

include (a) voluntary self-regulation, (b) conscious

realization, (c) social origins of higher level cognitive abilities, and (d) use of signs for mediation (Vygotsky, 1930/1978; Wertsch, 1991).

He maintained that the development of higher level skills radically changes the psychological functioning of the child and evolves from social processes with more capable peers or adults (Stremmel & Fu, 1993; Vygotsky, 1934/1991; Wertsch, 1979). Specifically, Vygotsky believed that the mechanism of individual change is rooted in culture and culture is ultimately the product of social activity (Vygotsky, 1934/1991; Wertsch, 1979; Wertsch & Tulviste, 1992). Understanding these changes requires an examination of interactions or processes. For this reason, interaction is not only the focus but also the unit of analysis in Vygotskian based research studies.

Mediation

Mediation is the second component of Vygotsky's sociocultural theory and is considered essential for internalization. Higher level mental functioning is "mediated" by tools and signs (Vygotsky, 1930/1978, 1930/1988). Through mediation, changes in higher level thinking skills occur as the individual is assisted (through the use of technical and psychological tools) in moving through the process of internalization. Gal'perin (1977)

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maintained that internalization occurs in three stages: (a)
awareness and observation of the action, (b) movement from
an interpsychological plane to an intrapsychological plane,
and (c) inner understanding of the event. Mediation has the
potential to affect internalization. The value of mediation
was observed by the author in a primary school that was
converting to computer assisted instruction (CAI). Adults
typically read manuals and worked on class assignments on
their own while the children played computer games with each
other. Adults who wanted to use the library system would
read the directions and attempt to follow them. If they
became frustrated, they would stop and state that they would
return later when they had more time. Children would
typically go to the library terminal in groups and assist
each other in getting on-line. At the end of the first
year, many of the adults indicated that they were frustrated
and would never use the library computer system to find
materials. The children, however, were computer literate –
using the computer to check out library books, write books,
and complete research reports. In this setting, adults
attempted to learn by using the manual as a tool for
mediation. For some, this was successful. For others, it
was not. Children used other children as mediators with
more capable peers providing assistive scaffolding. In this
setting, interactions with other children in the context of

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play provided more effective mediation than individualized
self-paced instruction. Conversations between children
(semiotic mediation) served as a psychological tool to
mediate activity. Although this was an informal
observation, it illustrates the value of mediation.
Investigating the role of mediation in the process of
internalization is crucial for understanding how children
think and learn.

Zone of Proximal Development

The zone of proximal development is the third major
component of his theory and combines internalization with
mediation. The child who is in the zone is assisted
(through the use of language and other communicative
strategies) in moving from a state of knowing with the
assistance of others to a state of knowing for oneself
(internalization)(Vygotsky, 1930/1978). This occurs during
instruction or play. During play, children enter an
"...imaginary, illusory world" in which they can achieve
with assistance what they can not master alone (Vygotsky,
1930/1978, p. 93). Peers who create the zone during play
scaffold their playmates to a higher level of cognition. In
the computer scenario described in the previous passage,
children created the zone during interactions with each
other. When they reached a point of not knowing what to do,

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they typically found another more-capable peer to answer their questions, thus creating new zones. When adults reached this point, however, they ended the session, thereby ending the zone. Examination of the processes of mediation and internalization within the zone of proximal development provides insight into how individuals think and learn and will be discussed in the context of peer play in the next section.

The Context of Peer Play

Peers

From a sociocultural perspective, knowledge is transmitted socially in the zone of proximal development. Understanding how peers use language to mediate mental functioning and action is crucial for understanding development. Therefore, the role of the peer as mediator will be examined in this section.

Peer interactions. Vygotsky's notion regarding the dynamic relationship between the social world and the developing individual has implications for examining the process of peer interaction. Past studies of interactions among peers did not typically focus on the relationship between peer interaction and cognitive development. (See Hartup, 1983, and Ladd & Coleman, 1993, for a full review). Rather, early scholars of peer interaction focused on

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sociometry and social interaction (Goodenough, 1928; Moreno, 1934; Thomas, 1929). This trend influenced studies of peer interaction throughout this century.

With the popularity of Piaget's theory, the focus moved from an examination of group processes to an emphasis on the individual's construction of knowledge during peer cooperation. Using this perspective, scholars viewed the social domain as a setting for cognitive development. Piagetians and neo-Piagetians believed that peer collaboration augments movement from non-rational to rational thought, thus, Piagetians and neo-Piagetians considered peer interaction, which involves cognitive conflict, essential for intellectual development. (Murray, 1982). Early Piagetian findings indicated that the benefits of peer interaction were optimal for children in the concrete operation stage. In his later work, Piaget maintained that young children benefit from peer interaction (Donaldson, 1978; Piaget, 1962b). Even though he acknowledged the value of peer interaction, scholars either directly or indirectly influenced by Piaget continued to focus on peer interaction among school-age children rather than preschool children (Perret-Clermont, 1980). These factors influenced scholars throughout the seventies and eighties and led to the sparse number of studies on peer interaction among preschool children.

Peers as mediators. Studies of peer interaction among older children found that peers serve as mediators for cognitive development (Bruner, 1974; Fiese, 1990; Rogoff, Ellis, & Gardner, 1984; Tharp & Gallimore, 1988; Wertsch, 1979; Wood, Bruner, & Ross, 1976). Azmitia (1988) found that preschool children could also benefit from peer collaboration during problem solving activities and that this behavior was generalizable to other problems in different contextual settings.

Recent empirical studies by Rogoff (1990), Tudge (1992), and Foreman and McPhail (1993) have examined the relationship between mediation and higher level thinking skills in a sociocultural framework. Rogoff (1990, 1993) examined assisted learning and the movement of knowledge from an interpsychological to an intrapsychological plane. In one study (1990), she investigated the effects of mediation on cognitive development and found that, in both Mayan and American communities', adults provide assistance to children as they problem solve. Later, she compared adult/child interactions with child/child interactions. Adults were able to assist children by using strategies that were much more beneficial than those used by more capable peers during problem-solving activities. The adult was also capable of altering strategies so that the child could achieve success. Not only did Rogoff validate the concept

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of assisted performance in the zone of proximal development,
she also differentiated between variations in the strategies
used in successful mediation.

To understand more clearly the effects of peer
collaboration on cognitive development, Tudge (1992)
investigated both the processes and outcomes of
interactions. Using Vygotsky's theory as a basis for
examining the relationship between social interactions and
higher level thinking skills, he studied the effects of
mediation on movement within the zone of proximal
development. In one study (1992), he examined a sample of
162 children whose ages ranged from 5- to 9-year-olds. He
used a pretest, treatment, posttest design to examine
children's problem-solving skills on a mathematical balance
beam task designed by Siegler (1981). During the pretest,
children were tested individually to assess their competency
in the use of Siegler's rules. This task was used because
the design of the balance beam required children to use
different levels of ability to solve the problems. During
the treatment, children of different levels of competency
were randomly assigned to work together to solve a set of
problems using the balance beam. The pair did not receive
any adult feedback during the process. After the treatment
the individuals were tested separately to determine their
skill level. Results indicated that some children were, in

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fact, adversely affected. Tudge (1992) found that

> ...children do assist each other's thinking in the
> course of collaborative problem solving, as predicted
> by both Piagetian and Vygotskian theory. However, in
> contradiction to the typically beneficial results
> reported (particularly by Piagetian scholars), these
> data indicate that there are circumstances in which
> children can adversely affect each other's
> thinking...the intersubjective understanding attained
> in the course of discussion was as likely to be in a
> regressive as in a progressive direction, with both
> regression (at least in the absence of disconfirming
> evidence) and development proving stable phenomena.
> (pp. 1376-1377)

Tudge reported that regression occurred among those children
who were paired with a more confident, less competent peer.
Vygotsky never alluded to bidirectional movement in his
discussion of peer collaboration or cognitive development.
Consequently, Tudge suggests that the current definition of
the zone of proximal development does not fully explain this
phenomenon. Either the conceptualization of the zone needs
to be extended to incorporate bidirectional movement or
another way of thinking about how social factors influence

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cognitive development needs to be considered. On the basis

of these studies, there is a real need to examine changes in

cognitive development that result from social interactions

with peers who display varying levels of cognitive ability.

The effects of sociohistorical factors on peer

mediation during problem solving were investigated by Forman

and McPhail (1993). In their study, two adolescents were

first given several problems to solve. Afterwards, the

impact of sociohistorical factors on the

pretest-to-posttest changes was examined. In this way,

their "...goals, attitudes, and understandings were

established, negotiated, and modified before and during

collaboration" (Forman & McPhail, 1993, p.225). They found

that the individual history of each participant influenced

how they solved problems together. Forman and McPhail

purported that understanding the way in which peers achieve

a shared consensus is vital for understanding how they

collaborate and, in turn, is essential for understanding how

higher level thinking skills develop through mediation.

Given that peer interaction facilitates cognitive

development and peer competence affects interaction

(Azmitia, 1988; Forman & McPhail, 1993; Perret-Clermont,

1980; Rogoff, 1990; Tudge, 1992), scholars have had a

tendency to focus on outcomes, especially among older

children (Forman & McPhail, 1993; Rogoff, 1990; Tudge,

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1992). A challenge must be extended to examine not only outcomes but also the processes of interactions among young children and to find alternative ways to observe developmental changes. Play among preschool children presents one possible alternative and is presented in the next section.

Play

The study of play from a sociocultural perspective provides a unique framework for examining the interaction of social context and cognitive development. This will be discussed in the section below.

Play as the zone of proximal development. From a sociocultural perspective, play is a social activity. For Vygotsky (1930/1978), play creates the zone of proximal development. Children who play with more capable peers are viewed as being assisted to higher levels of mental functioning. Even the child who plays alone is not engaged in a "lone venture" but is in an intrapsychological state that reflects the culture of both society and family (Bruner, 1983; Stremmel & Fu, 1993). This was observed by the author in a preschool classroom during a set of interactions between two five-year-olds who were engaged in social pretense involving a pirate theme. One child verbalized the need for a treasure map. The less-skilled

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player questioned the need since they could not make a map.

The more-skilled child attempted to convince the other child

of the need for the treasure map and began drawing the map.

Still, the other child did not understand the concept. The

more capable partner walked over to a floor map of a make-

believe neighborhood; showed the less skilled partner the

map; and proceeded to explain how to draw a map to his house

(where the treasure was buried). After the explanation,

they both engaged in drawing treasure maps. After school,

the less-skilled child continued to create treasure maps.

Even though the child played alone, he used schemes that had

been constructed in a social situation. This is typical of

how children move from a state of knowing with the help of

others to a state of knowing for oneself. In this way, play

served as a vehicle for developing higher mental functions.

When the less-skilled child drew maps alone, he demonstrated

that he had internalized the process of map drawing that he

had engaged in earlier with a more-skilled peer. In this

way, play actualized the `zone of proximal development'

(Nicolopoulou, 1993; Vygotsky, 1930/1978).

Although the study of play has a long history (See

Rubin, Fein, & Vandenberg [1983] and Pelligrini & Boyd

[1993] for a full review), research on play has generally

been influenced by the way individual scholars view

development. For example, followers of Piaget base their

studies of play on Piaget's theory of cognitive development as well as his subsequent play studies (Bretherton, 1984; Piaget, 1923/1959, 1952/1974). Piaget's focus was on objects within the social context of play and the child's interaction with physical objects in the development of higher modes of thinking. The reason the effect of social context on play has not been examined more widely is because Piaget's focus was on objects within the social context of play while Vygotsky saw children's actions on objects as beneficial but secondary to the importance of peers who mediated play through communicative interaction. For Piaget, it was the peer who was of secondary importance. Peers served only to create cognitive dissonance but were not integral to the learning process (Piaget, 1923/1959).

Those who subscribe to Erikson's (1950/1963) theory examine play from a psychosocial perspective. Through play, tensions are alleviated and reality mastered. Interpretation of the earlier scenario of pirate play from a psychosocial perspective would focus on the more-skilled child's need to draw a map of his home. Given the vastness of play research, it is, indeed, unusual that the effects of the social context on play have not been more thoroughly examined. Vygotsky's theory may provide an impetus for change.

A sociocultural perspective of play views play as a

social activity which leads development and has two defining
characteristics: decontextualization and rule usage.
Decontexualization occurs when the child acts independently
of what he/she sees in reality. The play of the very young
child is guided by the object, whereas older children are
capable of transforming objects. In this way, play provides
the stage for a transformation from an emphasis on the
object to an emphasis on the action, thus creating the
imaginary situation.

Rules also define and guide play. During play, rules
are used overtly. For example, the child might say, "This
[block] is the lid of the treasure chest. Don't touch it!".
The use of rules by the child reflect the child's self-
control. In fact, Vygotsky stated that children display the
most self-control during play. That is, rules serve as
boundaries for action in the imaginary play world.
Examination of decontextualization and rule usage does not,
however, constitute the essence of play. To understand play
from a Vygotskian perspective requires an understanding of
the way in which his major theoretical tenets are reflected
in his view of play. Specifically, the study of play can
not be examined using reductionist techniques but must be
examined as a process. This requires a focus on the
interactive social processes that occur within the context
of play and presents a new way of thinking about play. That

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is, language and tool usage during play lead to higher level
thinking and can only be facilitated by peers (objects used
in play are of secondary importance). A discussion of this
perspective follows.

Peer Play

Peer play will be examined in the section that follows
and will be followed by an in-depth look at the effects of
peer variance on play.

Peer interaction during play. The use of a
sociocultural lens alters the study of peer play. A look at
past studies that have used other perspectives will
illustrate this point. Initial attempts to understand peer
play can be traced to studies completed during the early
part of this century (See Hartup [1976, 1983] for a full
review). Early scholars noted the value of peer
interactions during play but focused on group dynamics and
sociometric properties (Goodenough, 1928; Moreno, 1934;
Thomas, 1929). A now classic study completed by Parten
(1932) represented the first attempt to look at the
relationship between social interaction and play. The
effect of age difference on social interaction was examined
by using a time-sampling method. One minute observations of
the child's interactions during play were made on a daily
basis. These observations continued until sixty

observations were collected on each child. Categories used
to classify social participation during play included
unoccupied, solitary, onlooker, parallel, associative, and
organized supplementary play. Rogers and Sawyers (1988)
described these as

1. Unoccupied-- Children watch others at play but do
not enter the play. Unoccupied children may just stand
around or move about the area.

2. Onlooker-- Children watch others play, may talk to
them or ask questions, and seem to move closer to a group,
rather than watching what ever momentarily catches their
attention.

3. Solitary independent play--A child plays alone
with objects. Even if the child is within speaking distance
of others, the child does not alter her or his play, or
interact with others.

4. Parallel activity-- A child plays with toys like
those used by nearby children. The child does not try to
influence the other children's activities. "He plays **beside**
rather than **with** the other children" (Parten, 1932, p.250)

5. Associative play--Common activities occur between
children. They may exchange toys and/or follow one another.
Although all the children in the group are doing similar
activities, specific roles are not defined, and there is no
organized goal (such as building or playing a game with

rules).

6. Cooperative or organized supplementary play--
Children cooperate with others to construct something, hold
competitions, produce dramas with coordinated roles, or play
games with formal rules. Group membership is defined,
usually by one or two powerful leaders. (p. 20)

The degree of leadership fell into five categories: (a)
following, (b) independent pursuit, (c) following some and
directing others, (d) sharing leadership with another, and
(e) directing alone. Results of the study revealed that
social participation increases with age. Specifically,
Parten (1932) found that three-year-old children engage in
more solitary play, four-year-old children display more non-
interactive parallel play, and five-year-olds are involved
in more reciprocal play.

The results obtained by Parten have not remained
untouched by criticism (Rubin, Maioni, & Hornung, 1976;
Rogers & Sawyers, 1988). The idea that solitary play is a
less mature form of play than parallel play has been
questioned. Rogers and Sawyers (1988) noted that
"...researchers are now questioning whether Parten's levels
actually constitute a continuum, however, and have proposed
alternate views of solitary and parallel play instead "(p.
33). Children who play alone may be choosing not to
participate and may be engrossed in their own agenda whereas

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children engaged in parallel play may not have the social

skills to enter play. In fact, Bakeman and Brownlee (1980)

have suggested that parallel play may serve as a bridge to

cooperative play rather than a separate stage. Although

Parten (1932) examined the frequencies of social

interaction, she did not examine the processes involved in

social interaction or collaboration. For example, her

comments concerning social interactions during block play

were limited to the following statements, "Blocks afforded

all degrees of social participation. They were played with

by boys 71 percent of the time they were used" (p. 94).

In spite of the criticism, Partens' scale is considered

a classic and continues to be used as the standard for other

instruments. Recently, the caliber of Parten's measure was

acknowledged in a study by Odum and Ogawa (1992). They

examined 51 studies that utilized methods of direct

observation. Every study included in the analysis had been

reviewed and published in referred journals. Odum and Ogawa

(1992) concluded:

Perhaps ironically, the Parten scale, developed at the

beginning of this research movement, continues to serve

as the system upon which many researchers build their

observational instruments. It may be the best example

of a standard system for assessing social play that

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currently exists. (p. 432)

The continued reliance on Parten's scale is a testimony to the caliber of her work. Parten's scale has enabled researchers to collect a remarkable amount of information about how children spend their time in preschool classrooms (Odum & Ogawa, 1992; Pelligrini & Boyd, 1993). Even though the Parten scale provides information about the frequency of play encounters, it fails to provide information about **how** peers collaborate during play. Understanding more about **how** children play together will add to our knowledge of the process as well as the frequency of play.

Interest in the study of social participation was stimulated by Smilansky's (1968) study. In 1976, Rubin, Maioni, and Hornung combined Piaget's (1962a) classification system of play with Parten's (1932) scale for measuring social participation. Rubin used Smilansky's elaboration of Piaget's classification system to create the Parten/Piaget hierarchical scale for measuring social participation and cognitive development during play. Smilansky's (1968) system included:

1. Functional play – simple repetitive muscle movements with or without objects.

2. Constructive play – manipulation of objects to construct or to "create" something.

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3. Dramatic play – the substitution of an imaginary situation to satisfy the child's personal wishes and needs.

4. Games with rules – the acceptance of prearranged rules and the adjustment to these rules (p. 414).

Rubin combined Smilansky's categories (See previous list) with Parten's (1932) work which follows

1. Solitary-functional, solitary-constructive, and solitary-dramatic.

2. Parallel- functional, parallel-constructive, and parallel-dramatic.

3. Associative-functional, associative- constructive, and associative-dramatic,

4. Cooperative-constructive, cooperative-dramatic, and cooperative-games. (p.416)

Using this multiple classification scheme, Rubin, Maioni, & Hornung (1976) created a new play observation scale. Rubin updated the Play Observation Scale (POS) in 1989. The findings of Rubin et al. (1976) supported the work of Parten (1932) and Barnes (1971) (even though the replication by Barnes (1971) contradicted some of Parten's (1932) result). Rubin surmised that differences between Barne's (1971) and Parten's findings could be found in the social class of the sample. Parten used a middle- and upper-class group and Rubin used a sample composed of children from lower-, middle-, and upper-class homes.

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Barnes, however, failed to report the SES of his sample.

When examining children from middle- and upper-class homes,

Rubin found that approximately 40% of the 3- and 4-year-olds

engaged in associative and cooperative play. These results

were consistent with those obtained by Parten. In contrast,

Rubin's results with lower socioeconomic levels matched the

results reported by Barnes. Barnes reported that only 25%

of the 3- and 4-year-olds engaged in associative and

cooperative play. Rubin proposed that perhaps Barnes' had

worked with a lower socioeconomic group. The failure by

Barnes to include information concerning the SES of his

sample limits the knowledge that can be gained from his

study.

The Play Observation Scale (POS) which nests Piaget's

stages with Parten's classification has also received

criticism. Takhvar and Smith (1990) reviewed Rubin's scale

for measuring peer play interactions and noted several areas

of concern. First, they contend that the use of the

"classificatory device" as a hierarchical model is not

justified. While many notable scholars have labored under

the assumption that these scales provide a hierarchical

classification scheme (Campbell & Frost, 1985; Mounts &

Roopnarine, 1987; Pelligrini, 1982), little attention has

been paid to the validity of the scale. Further, Takhvar

and Smith (1990) noted that (a) the category definitions

were imprecise, (b) the classification categories were too
limited, and (c) differentiation between symbolic and
non-symbolic play was too problematic. They do, however,
acknowledge the value of the classification scheme and note
that, regardless of it's fallacies, it can be used reliably.
To strengthen the information obtained from the scale, they
recommend the use of interviews with children to supplement
direct observation.

Obviously, to observe and attempt to measure peer
interactions during play is to enter an area fraught with
controversy. The problem may lie in the use of only one
measure to examine peer interactions during play. To
adequately assess social interactions during play, multiple
measures may be needed.

Play variance. Previous studies of peers have followed
the path of play studies which relied on one measure to
assess social interactions during play. If, as Vygotsky
maintained, peers serve as mediators during play; then
examining the effect of peer variance among playmates is
necessary for a complete understanding of peer play. In
past studies, peers have been viewed as a monolithic entity.
That is, a peer has been defined as anyone who is within
twelve (plus or minus) months of the target child's age and
the assumption has persisted that all children in one age
group are similar. Even though four-year-olds do tend to

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share particular developmental characteristics, variations within the age group still exist; therefore, chronological age can not be substituted for developmental level.

The assumption that all four-year-olds are alike has guided past research. Studies of the same age group constitute 88% of the literature (Mounts & Roopnarine, 1987). Few studies have examined the effect of peer variations on play and those that have done so have relied on chronological age as a descriptor (Katz, Evangelou, & Hartman, 1990). In a review of literature, Katz et al., (1990) found only four studies of mixed-age play even though most children spend the majority of their play time with older or younger children. In limiting the study to same-age peers, scholars may believe that they are placing parameters on the developmental levels that exist in a group. This is not completely accurate. Even though same-age peers are viewed as homogenous when selected for studies, varying developmental levels exist. For this reason, developmental differences should be considered when examining peer interactions. Age should not serve as the sole assessment for developmental level; other criteria for identifying developmental levels must be considered.

Although the only studies that examine the effects of peer variations on play use age as the differentiating criteria, these studies still serve to inform us of the

effects of peer variability on play. Results of a small

number of studies on mixed-age play, however, provide

conflictual findings. For example, Goldman (1981) and

Mounts and Roopnarine (1987) examined social participation

in same- and mixed-age classrooms. Goldman adapted Parten's

(1932) scale and used time sampling procedures to observe

three classes of 3-year-olds, three classes of 4-year-olds

and three mixed-age classes. The results revealed that

children in mixed-age groups (1) spend more time socializing

with each other, (2) less time socializing with the teacher

and, (3) 3-year-olds spent less time in parallel play.

Overall, she found that mixed-age groupings facilitated

social participation for all age groups and that age did not

influence the choice of playmates.

The advantages of mixed age grouping were also

affirmed by Mounts and Roopnarine (1987). They found that

mixed-age groupings facilitate social play but found no

evidence of age or gender preference in playmate selection.

Like Goldman (1981), Mounts et al., (1987) observed three-,

four-, and five-year-old children in mixed-age classrooms.

In contrast to Goldman, they used a scale developed by

Rubin, Maioni, and Hornung (1976) which combined Parten's

social categories with Smilansky's cognitive play

categories. The researchers found that in mixed-age 3's and

4's rooms (1) 3-year-olds engaged in more complex play and

(2) developmental differences were more evident. They

theorized that this was a result of the three-year-olds

imitation of the four-year-olds in the mixed-age classroom.

Although these studies were not in complete agreement, both

studies support the view that younger children benefit from

playing with peers who display higher developmental levels.

In addition, the effects of age on social interaction

have been examined by Howes and Farver (1987). Whereas

Goldman (1981) and Mounts and Roopnarine (1987) studied

children in naturalistic settings, Howes and Farver (1987)

looked at interactions among dyads in a laboratory setting.

The effects of mediation on less capable peers were examined

in an attempt to investigate Bruner's concept of how

experienced partners serve as scaffolds for those less

experienced (Howes & Farver, 1987). To accomplish this

goal, they examined the dyadic interactions of pairs of two-

year-olds, five-year-olds, and mixed-age children during

play with a fifteen piece camping set. The complexity of

social pretense was analyzed by using a scale developed by

Howes (1985) which rated social pretense as either simple or

cooperative. Results of repetitive t-tests confirmed that

when two- and five-year-old children play together, (1) two-

year-olds participate in more cooperative social pretense,

(2) five-year-olds use more verbalization and, (3) two-year-

olds use more imitation. When children play with same-age

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peers, however, they use more verbal metacommunication,
directing, and teaching behaviors.

Howes and Farver (1987) found evidence to support their
hypothesis that more capable children assist less capable
children during play. They did not, however, examine the
processes used by the more capable child. Moreover, the
wide difference in the ages of five- and two- year-olds
served as a limitation. Would the same results be obtained
with children who are closer in age? How do children play
with peers who display different levels of competencies
during play? To answer these questions, more scholarship is
needed on peer collaboration among children who display
different levels of play.

Peer Play in the Context of Constructive Block Play
Constructive Play

In the same way that different developmental levels
affect play behaviors, different contextual settings also
affect play. Constructive play offers a distinctive context
for play and will be discussed in this section.
Constructive play has been defined as play that occurs when
children use materials to create something (Christie &
Johnson, 1987). Understanding constructive play, however,
has presented a challenge to play scholars (Christie et al.,
1987). In an attempt to clarify constructive play, a

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theoretical framework will be set forth below. This will be

followed by an investigation of constructive block play and,

more specifically, collaborative constructive play with

blocks. Finally, the effects of peers who display different

play levels on children will be examined in the context of

block play.

Theoretical perspectives. Though peer play has been

examined in both classroom and laboratory settings, the

context has typically been restricted to social pretense

in the dramatic play area. This limits our understanding of

how children interact in different contextual settings found

within the parameters of the classroom. Studies of

collaborative play in different contextual settings, though

sparse, have added to our knowledge of how children think

and learn during play (Caldera, Alvarez, & Truglio, 1987).

For this reason, continuing investigations of constructive

play are valuable, particularly those that are theory

driven. Several theoretical interpretations of constructive

play are discussed in the following section.

Piaget. Piaget's view of constructive play has served

as the basis for many studies of constructive play. He

postulated that constructive play was located on the

continuum between play and adaptive intelligence. In fact,

Piaget (1962b) stated that

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Making a house with plasticine or bricks involves

both sensory-motor skills and symbolic representation,

and, like drawing a house, is a move away from play, in

the strictest sense, towards spontaneous intelligent

actions. (p. 109)

Piaget did not view constructive play as a stage of play.
He developed the stages of play (functional, dramatic, games
with rules) by juxtaposing the stages of intelligence
(sensorimotor, pre-operational, concrete operational) on
play. In his view, "constructive games constitute the
transition from all three [practice games, symbolic games,
and games with rules] to adapted behaviors" (Piaget, 1962b,
p.110). Piaget's work in the area of constructive play
provided the basis for the work of early play scholars and
continues to influence studies of constructive play
(Christie & Johnson, 1987; Forman, 1982; Rubin, Fein, &
Vandenberg, 1983).

Smilansky. The view of constructive play as a separate
stage of play evolved from Smilansky's (1968) work with
disadvantaged children. She viewed constructive play as a
separate stage and wrote

....at this stage he [she] learns the various uses

of play material; he [she] moves from functional

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activities to activities that results in a

"creation"...Development from functional play to

constructive play is progression from manipulation

of the form to formation...The next stage in play

development is symbolic play, which appears in the

dramatic play of the child. (p. 6)

Smilansky's definition of constructive play has been deemed

problematic and has received criticism from several scholars

in the field (Rogers & Sawyers, 1988; Takhvar & Smith,

1990). The concept that play is hierarchical and sequential

and that constructive play serves as a precursor to dramatic

play has been questioned. Takhvar and Smith (1990) noted

that there is little evidence to justify the classification

of constructive play as a less mature form of behavior.

Rather than viewing constructive play as a separate stage

that occurs prior to dramatic play, there appears to be

justification for a return to the conceptualization of

constructive play proposed by Piaget. Consideration of

constructive play as an intersection of the domains of play

with adaptive intelligence alters the way constructive play

is perceived and is consistent with the definition of play

espoused by Vygotsky (1930/1978), Christie and Johnson

(1987), and Rubin, Fein and Vandenberg (1983).

Vygotsky. Vygotsky believed that play could be defined

as an imaginary situation bounded by rules. This might

appear to serve as a stimulus for the multiplicity of

studies on social pretense (See Rubin, Fein, & Vandenberg,

1983) and would seem especially relevant given the surplus

of social pretense studies that developed from an emphasis

on nonliterality (Bretherton, 1984; Pelligrini & Boyd,

1993). Indeed, Vygotskian scholars have joined other play

scholars in examining social pretense (Howes, Unger, &

Matheson, 1992). Nonetheless, Vygotsky's sociocultural

theory should provide an impetus for the study of

constructive play. Past studies of peer variations were

influenced by stage definitions. Vygotsky's view of play as

an imaginary situation removes these barriers. In this way,

constructive play provides a way to examine social pretense.

For example, Vygotsky (1930/1978) posited that, "Play

provides a transitional stage in this direction whenever an

object (for example, a stick) becomes a pivot for severing

the meaning of horse from the real horse" (p. 97). The

child may see one thing, but act as though he/she sees

something else. This provides an excellent rationale for

block play since the child who plays with blocks sees an

object but pretends as though he/she sees something quite

different. Whether purposeful or not, materials in dramatic

play centers affect the play and themes used in social

pretense. Blocks, however, would seem to be more in line

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with what Vygotsky envisioned since they are open ended.
When the child sees a block and uses it as a vehicle, he/she
is required to separate the meaning from the object.
Playing with prop boxes that reflect reality (Pizza Hut) may
not require the cognitive leap that pretending a block is a
car necessitates. This is not to deny the value of social
pretense but rather to suggest that the study of social
pretense might be better served by studying social pretense
in the block area instead of the sociodramatic play area.

Although there are an overwhelming number of studies on
social pretense, few studies have examined social pretense
in the context of constructive play (See Rubin, Fein, &
Vandenberg, 1983, for a full review). This is not
consistent with Vygotsky's view of play (an imaginary
situation bounded by rules). Vygotsky (1930/1978) did not
favor the use of the term "symbolic" to describe play
behaviors, "First, if play is understood as symbolic, there
is the danger that it might come to be viewed as an activity
akin to algebra" (p.94). Further, it is not consistent with
either past or current views of play (Christie & Johnson,
1987; Nicolopoulou, 1991b). Play occurs "in a variety of
contexts" and, in fact, children spend over half of their
play time, 51%, engaged in constructive play (Christie &
Johnson, 1987; Guanella, 1934; Pratt, 1924; Rubin & Krasnor,
1986). Clearly, there is a need to refocus our view of

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play; to examine constructive play as rigorously as we have
examined social pretense in the past.

Constructive Play With Blocks

Overview. Constructive play has been defined as play
that occurs when children use materials to create something
(Christie & Johnson, 1987). This can occur through
different media which may include – but are not limited to–
play dough, blocks, and legos. For this study, constructive
play was operationally defined as using blocks to create
something during play.

In contrast with the current state of block play
studies (Christie & Johnson, 1987), play scholars during the
early part of this century focused on constructive play with
blocks (Guanella, 1934; Johnson, 1933/1984). They
maintained that block play was important for growth and
development. For example, Johnson (1933/1984) noted three
positive effects of block play: (a) the child is empowered
to deal with the environment, that is, the child controls
the setting, (b) there are unlimited ways in which the child
can express "rhythm, pattern, and design", and (c) children
can use the materials to "review, rehearse, and play out
their past experiences" (pp 183-189). Advantages cited by
early scholars (Guanella, 1934; Johnson, 1933/1984; Pratt,
1924) are beginning to resurface in more recent reviews of

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block play (Hirsch, 1984).

Dimensions. Differentiations among children during
block play were first noted by Johnson (1933/1984). She
identified and described different dimensions of block play
as repetition, vertical towers, horizonal rows, bridges,
enclosures, patterns, and representations. She believed
that these developed in a progressive sequence and described
the progressive developmental sequence in her studies of
block play. Hirsch (1984) distinguished seven distinct
stages of block play in Johnson's (1934/1984) study and
described these as:

1. Blocks are carried around, not used for
construction. This applies to the very young child.

2. Building begins. Children make mostly rows, either
horizonal or vertical. There is much repetition in this
early building pattern.

3. Bridging: two blocks with a space between them,
connected by a third block.

4. Enclosures: blocks placed in such a way that they
enclose a space. Bridging and enclosures are among the
earliest technical building problems that children have to
solve. They occur after a child begins to use blocks
regularly.

5. When facility with blocks is acquired, decorative
patterns appear. Much symmetry can be observed. Buildings,

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generally, are not named.

6. Naming of structures for dramatic play begins.
Before that, children may also have named their structures,
but the names were not necessarily related to the function
of the building.

7. Children's buildings often reproduce or symbolize
actual structures they know, and there is a strong impulse
toward dramatic play around the block structures. (p.103-
109)

Developmental differences were also studied by Guanella
(1934), a student of both Johnson (1933/1984) and Pratt
(1924). Guanella's aim was to examine the developmental
differences displayed in the context of block play. To this
end, she studied the time, purpose, dominance of purpose,
interest, and constructive ability of children when playing
with blocks. The study which was conducted in both the
classroom and laboratory included children who were 3-, 4-,
5-, and 6-year-olds. The results confirmed her hypothesis
that each child develops differently and sequentially in a
more mature and complex way and that developmental
differences are reflected in block constructions.

Bailey (1933) also studied block play, but unlike her
peers, she looked for a way to standardize the measurement
of block constructions. Bailey (1933) designed a scale that
could "be used as a measuring device to evaluate

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constructive and manipulative abilities of children of
nursery school and kindergarten age" (p. 121). The
techniques she used were based on techniques pioneered by
Kelly (1916) and Thorndike (1910). Bailey (1933) examined
block play of children who ranged in age from two-years,
two-months to nine-years, eight-months, in a laboratory
setting. Children were invited to play with a regular set
of unit blocks alone. At the end of the thirty-minute
session, a picture was taken of their block construction.
Afterwards, photographs of the block constructions were
ranked on a ten-point scale by 109 adults who had expertise
in child development. To guard against the halo effect,
each rater made two passes. The results of the study
provided both a scale for rating block constructions as well
as knowledge about constructive play. She found two
distinct dimensions in block play. One dimension involved
planning and implementing the construction (symbolism) and
the other dimension involved the symmetry of design and
precise placement of blocks (spatial relationships).

Unfortunately, the popularity of studies of
constructive play with blocks pioneered by Bailey (1933),
Johnson (1933/1984), Guanella (1934) and Pratt (1924)
dissipated quickly. In 1983 Rubin, Fein, and Vandenberg
noted the scarcity of studies in this area and encouraged
investigators to explore this area. The authors suggested

that constructive play might be "viewed as belonging to some

other coding schemes [other than the one used by

Piaget/Parten]" (Rubin et al., 1983, p. 717). Although

studies of block play have resurfaced and the knowledge base

has improved (Christie & Johnson, 1987; Nicolopoulou, 1991a;

Reifel & Yeatman, 1991; Rogers, 1982, 1985), these studies

cannot begin to compare with the vast number of studies that

have been conducted on social pretense. Certainly, there is

a need to extend and expand our knowledge of constructive

play with blocks.

Collaborative Constructive Play

Peer variance in block play. Many scholars today, like

their predecessors, are interested in developmental

differences and changes that can be observed in the block

play of young children (Nicolopoulou, 1991a; Reifel &

Greenfield, 1982). Building on past studies of constructive

play, Reifel and Greenfield (1982) developed a scale for

evaluating block constructions in laboratory studies. In an

attempt to confirm the existence of variations in

development, they studied 4- and 7-year-olds. They used a

method that involved both story telling and block play.

First, the investigators read a story to twenty 4-year-olds

and twenty 7-year-olds. After reading the story, the

children were asked to use a set of table blocks to, "Show

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me the story of <u>Little Red Cap</u>" (Reifel & Greenfield, 1982,

p. 208). Children built representations of their

understanding of the story. These constructions were then

coded for two dimensions of spatial relationships, that is,

hierarchial integration and dimensionality. The results of

the study indicated that developmental differences exist in

the block constructions of 4- and 7-year-olds. The scale

used in this study was devised by Reifel and Greenfield

(1982) and based on prior research by Greenfield (1978),

Guanella (1934), and Johnson (1933/1984). Reifel and

Greenfield (1982) postulated that complexity in block

constructions could be examined by looking at two areas of

block play, hierarchical integration and dimensionally.

Integration was defined as the ability to "tie together"

other blocks. The levels of dimensionality were based on

plane geometry. They also found that hierarchical

complexity becomes more complex with age and thus reflects

changes in cognitive structures (Greenfield, 1978). To

measure the different levels of block play complexity, they

used the categories described in Appendix D.

Developmental changes in the block play of 3-, 4-, and

5-year-olds were also observed by Nicolopoulou (1991a). She

examined the integration of both spatial and symbolic

relationships and postulated that understanding spatial

relationships and symbolism used during block building were

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crucial for understanding the child's view of the physical
world. Spatial relationships reflect the child's knowledge
of the world and the way in which the child manipulates
materials to reflect that conceptualization. Symbolism
reflects how the child uses abstract material to represent
his/her understanding of the world. To examine both spatial
relationships and symbolism, Nicolopoulou (1991a) created an
original set of sixteen, colored, 1/4" thick, cardboard
blocks. Twenty-four 3-, 4-, and 5-year-old children were
observed while playing individually with the blocks.
Children were invited to "make something" with the blocks
and were then allowed to continue playing as long as they
desired. When they finished, they were invited to talk
about their construction. The results indicated that
developmental differences exist between 3-, 4-, and
5-year-olds. The attention span of the 3-year-olds was very
short and their creations typically reflected aesthetic
principles of symmetry, harmony, repetition, and
alternation. Older children had a longer attention span and
could examine both general and specific patterns. Salient
among the findings was the interdependence between spatial
and symbolic expressions. Not only did she confirm the
findings of previous block scholars (Bailey, 1933; Guanella,
1934; Johnson, 1933/1984; Pratt, 1924), but she plotted a
course for future scientists when she recommended that

future studies of block play include both spatial and
symbolic expressions.

Contextual influences on block play. Having previously
conducted a study that found developmental differences in
the block play of young children (Reifel & Greenfield,
1982), Reifel joined Yeatman to study how sociocultural
factors impact the child's constructive play in the block
area (Reifel & Yeatman, 1991). In addition, they wanted to
fully understand the relationship between the signifier and
signified. In essence, where do children get their ideas
for block play and how do they represent these ideas in
play? The study involved observations of sixteen children
(8 girls) over a period of seven days. The procedure
involved the placement of a tape recorder in the block area.
This allowed the conversations of the play participants to
be audiotaped. A total of four and one-half hours of tape
recordings were collected and transcribed. The authors used
qualitative coding techniques to discern themes. As themes
began to emerge, it became apparent that materials, ideas,
and people in the classroom influenced the child's play.
However, contextual factors affected children differently.
This was reflected in the children's talk and action. Among
the most important findings of their study was the
difficulty involved in separating the interaction of ideas,
peers, and materials during collaborative block play. The

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results of the study suggest that both action and talk must
be analyzed in studies of block play. Since only one
classroom was examined, generalizations of these findings to
other situations may be limited. Nonetheless, this study
does suggest the importance of understanding the
relationship between action and talk during constructive
play with blocks.

The impact of sociocultural factors on peer interaction
during play has also been examined by Rogers (1982, 1985).
In one study (1985), he examined the effect of different
types of blocks, that is, hollow or unit, and gender on
social relations among four- and five-year-old children.
The study took place in a university laboratory school. The
children in the class were divided into four groups in which
there were two girls and two boys. Each group rotated in
and out of the block center on a regular basis. This
provided a context in which the effect of gender and block
size (unit or hollow) on social interactions could be
analyzed. Rogers (1985) measured social participation on
the Rubin (1980) Piaget/Parten scale but designed a scale to
measure verbal action or facial expressions and expressive
vocabulary. He found that block type does affect the
child's level of social interaction. Children who used unit
blocks participated in more solitary and parallel play while
children who used hollow blocks engaged in more group play.

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He also found no gender differences in block play. The
level of social participation with different types of block
was the same for boys and girls. This study extends our
knowledge of social participation during block play, but
fails to enhance our understanding of the processes.

Peer collaboration during block play. To the writer's
knowledge, there are no studies that investigate **how**
children play with peers during self-selected play with
blocks. Considering the limited number of studies on
constructive play, it is not surprising that few are
Vygotskian-based. A Vygotskian scholar of play should be
especially cognizant of constructive play for, "It is during
this period of "constructing" that problem finding is likely
to occur" (Tegano, Lookabaugh, May, & Burdette, 1991, p.28).
Subsequently, there is a need for Vygotskian-based studies
of constructive play.

Perhaps Vygotsky's theory can provide a different way
of thinking about the relationship between peer interactions
and play with blocks. If, as Vygotsky stated, play creates
the zone of proximal development and more capable peers
serve as mediators in assisting performance, then, observing
peer collaboration among children of different levels can
provide a vantage point for viewing the relationship between
social context and cognitive development. For these
reasons, this study was designed to examine **how** children who

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display different levels of play collaborate during play
with blocks.

Purpose and Hypotheses

This study was designed to examine the processes and
outcomes of collaboration or co-construction that occur
among peers who display different levels of play during
constructive play with blocks. The major research question
was based on the premise that play creates the zone of
proximal development and mediators in the zone facilitate
development (Vygotsky, 1930/1978). It was also established
that the level of complexity exhibited during constructive
play with blocks is developmentally hierarchical (Reifel &
Greenfield, 1982). Therefore, the question examined was, Do
four-year-olds who display more complex skills during
constructive block play provide assistance to less skilled
partners?

Emanating from Vygotsky's conceptualization of the zone
of proximal development and building on the work of Tudge
(1992), this study examined movement within the zone. The
first hypothesis examined movement to a higher level of
understanding. Theoretically, when children are in the zone
of proximal development, more capable peers assist less
capable peers. This is actualized during play interactions
(Goldman, 1981; Howes & Farver, 1987; Mounts & Roopnarine,

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1987; Vygotsky, 1930/1978). Therefore, it is hypothesized

that four-year-olds who display less-complex play behaviors

attain higher levels when engaged in play with peers who

display more-complex levels of play.

Finally, if play creates the zone of proximal

development, does movement occur only in a positive

direction? If bidirectional movement occurs as children

adapt to the level of others in the zone, then it is

hypothesized that four-year-olds who display more-complex

behaviors adjust their play to meet the level of peers who

display less-complex play behaviors? These questions and

hypotheses will be investigated in the following chapters.

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CHAPTER III

METHOD

This study was implemented in two distinct, sequential stages. Phase One involved naturalistic observations in preschool classrooms. One hundred preschool children were rated on their sociocognitive play competencies while playing in their own classrooms during free play time. In Phase Two, a quasi-experimental design with random assignment was used in a laboratory setting. Forty-eight children from Phase One were randomly selected to play in dyads with unfamiliar peers of the same gender. Dyads were examined for block play complexity, peer interactions, and communication during constructive play with blocks. The details of both stages are discussed in the following section.

Phase One

Sample

Subject selection. The sample was selected from the population of 4-year-olds in day care settings in a small rural town surrounding a major research university located in southwest Virginia. The population reflected the ethnicity and culture of the university population. Five centers were involved in the study. One center was located on the campus of the university and four other centers were located within two miles of the campus. Contact with the

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administrators of nine child-care centers was initially made
via phone calls. Appointments were scheduled and letters
sent to the directors detailing the purpose and procedures
involved in the study (See Appendix A). Classroom teachers
were informed of the nature of the request and encouraged to
attend a meeting with the principle investigator (See
Appendix A). The center directors and teachers had
previously participated in research studies on a regular
basis and were familiar with research procedures. To
protect the clientele, center directors placed specific
restrictions on the investigator. First, no phone calls
could be made to parents who were non-respondents. In
addition, the number of times that observers could visit the
classroom were restricted to two visits per child rather
than daily observations as originally planned. After these
conditions were met, five centers agreed to join the study.
Three centers chose not to participate. Reasons for non-
participation were based on their concern that the children
had been disturbed by too many observers in the classroom.
They indicated that the children had recently been observed
by high-school students, community-college students and
undergraduates from two major universities. The directors
also shared their concerns that too many people had observed
the preschool children and that the need was increasing
rather than decreasing. (This phenomenon appears to be a

real concern among center directors and the subsequent

effects on children and research may need to be addressed in

future papers.)

After initial conferences were completed and paper work

processed, five centers agreed to participate in the study.

Letters informing the parents of the study and requesting

parental consent were sent to each child's home (See

Appendix B). Parental response to the request was not

evenly distributed among the centers, that is, there were 26

children in two classrooms in Center A, 7 from center B, 17

from Center C, 16 from Center D, and 17 from Center E. In

an attempt to ensure equitable distribution across the

cells, a decision was made to identify the children by

groups rather than centers or rooms. Five rooms had

populations that allowed them to be included as intact

groups. There were two classrooms, however, that did not

have a population sufficient to warrant separate treatment.

Since Center A contained one classroom with sixteen children

and another with ten children, the second classroom in

center A that contained ten children was combined with the

classroom in center B which had seven children. These two

classrooms from two different centers were collapsed

together to form one group, Group B. This provided a

relatively comparable number in each group so that random

distribution across cells could be accomplished. That is,

Groups A and E were composed of sixteen children while there were seventeen children in Groups B, C, D, and F. Altogether, one hundred four-year-olds from five different centers were involved in the initial stage of the study.

Subject characteristics. The ages of the children ranged from four- to five- years old. The mean age of the children in the study was four-years, seven-months. The selection of the age range was based on findings of past research which indicate that constructive play first appears around the age of two and peaks at about age seven (Reifel & Greenfield, 1982). Although four-year-olds are just beginning to develop collaborative play skills, studies of peer play have typically examined younger children (Howes, Unger,& Matheson, 1992). Consequently, there is a need to examine how older preschoolers play with peers. Given that a peer is defined as a child within twelve (plus or minus) months of the target child (Hartup, 1983), the peer group included an age range that extended from 48 to 60 months of age.

Due to the cost of attendance, these centers served a middle-class population and reflected the ethic and cultural composition of the university and town population.

Instrument

Play Observation Scale. The child's play level was

assessed using the Play Observation Scale (POS) (Rubin,
1989). Rubin (1989) designed the POS to rate the frequency
of play behaviors that reflect social and cognitive domains
of play. Standardized measures of cognitive ability (that
is, Wechsler Preschool and Primary Scale of Intelligence
(WPPSI)(Sattler, 1992)) were not used since the goal of the
study was to examine the effect of the child's play level on
constructive block play. Scores on formal tests of
cognition do not reflect the child's play level (Rubin,
Fein, & Vandenberg, 1983). As a result, the POS was used to
assess the level of social interaction and cognitive
development displayed by the children during play (Parten,
1932; Piaget, 1962a, 1962b; Rubin, 1989; Smilansky, 1968).
Selection of this measure was also based on the frequency of
use in past studies (See Pelligrini and Boyd, 1993). The
POS subsumes the work of Parten (1932) and Piaget (1962a,
1962b). Their works have been described as "sequential,
developmental hierarchies" which "have often been taken as
normative" (Rubin & Krasnor, 1986, pp. 278, 281). Given
that the Parten (1932) and Piaget (1962a, 1962b) scales have
long distinguished research records, the combination of the
two in the POS by Rubin seemed appropriate.

Creation of the POS involved an intersection of the
social dimensions as measured by Parten (1932) with the
cognitive dimensions as measured by Piaget (1962a, 1969b).

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In Parten's (1932) work, she found that children used six
different types of social participation categories. These
sequential stages of social participation have been
described by Rogers and Sawyers (1988, p. 20) as unoccupied
behavior, onlooker behavior, solitary independent play,
parallel play, associative play, and cooperative play (See
Appendix E). Smilansky also constructed a scale to measure
the cognitive dimension of play. Smilansky's (1968) scale
was based on her own elaboration of Piaget's stages of play
and included functional play, constructive play, dramatic
play, and play with games. By nesting these two scales
together, Rubin created a scale that measures both the
social and cognitive dimensions of play. Rubin's categories
include unoccupied and onlooker non-play behaviors,
solitary-functional, solitary-constructive, solitary-
dramatic, parallel-functional, parallel-constructive,
parallel-dramatic, associative-functional, associative-
constructive, associative-dramatic, cooperative-
constructive, cooperative-dramatic, cooperative-games (See
Appendix D).

   To obtain a score on Rubin's scale, each child was
observed during play on two different occasions. Details of
the coding process are described in the measurement section.

Setting

   The first phase of the study occurred in a

naturalistic setting in the child's classroom. All classrooms involved in the study were equipped with standard play equipment typically found in preschool classrooms (that is, blocks, sociodramatic materials, manipulatives, and art activities). All centers involved were licensed by appropriate state agencies.

Materials

Materials in the classrooms were typical of those found in licensed day care centers. Classrooms were equipped with blocks, sociodramatic materials, books, manipulatives, art materials and a variety of small toys.

Procedure

Observations. Each child who had permission to participate in the study was observed twice in vivo (that is, directly observing children as they interact). These observations were made by trained observers for a period of eight minutes on two separate days. Children were observed during a block of time commonly referred to as free play or center time. During this time period, play is considered an acceptable and appropriate behavior. Each observer watched each child for a period of thirty seconds prior to recording. After the initial thirty seconds, the observer observed ten seconds of play and then recorded for a period of five seconds, observed ten seconds, recorded five

seconds, etc. Each minute of recorded play required one
minute and thirty seconds to complete. So, each five minute
section required seven minutes and thirty seconds. When
this time was added to the amount of time that the observer
watched the child prior to observation (thirty seconds),
each observer observed each child for eight minutes. A
total of sixteen minutes of uncoded play (ten minutes of
coded play) was tabulated on each child.

  Reliability. Prior to data collection, two graduate
students were trained to use the POS scale in the classroom.
Both observers had completed the same graduate program in
child development and were naive to the purpose of the
study. Videotapes of children attending the university lab
school but not included in the study were used to train the
raters. Prior to data collection, reliability was
established at $\underline{k}$ = 92%. Kappa is an agreement statistic
that controls for chance (See Cohen, 1960).

Measurement

  Data collection. All coding was based on observations
made in the classroom using the POS scale (Rubin, 1989).
The unit of behavior measured included both the social and
cognitive dimensions of play as described in the subscales
previously listed (See Appendix D). Time-frame sampling was
used to record the play behaviors. The play behaviors of

the target child were observed for a period of 10 seconds

after which the dominant behavior was recorded during a five

second interval. This resulted in six recorded observations

per minute or a total of 60 per ten-minute session. These

time intervals were tested prior to the study and provided a

good reflection of the behavior under investigation.

Data coding. After the data were collected, raw scores

were tabulated by calculating the average play behaviors for

each child during ten minutes of play. This was

accomplished by first counting the frequencies of specific

play behaviors during ten minutes of play (See procedure

section above). The frequencies were tallied in accordance

with recommendations suggested by Rubin (1989)(See POS

author, Rubin, 1989, for specific coding details)(See

Appendix D for scale). Next, the frequency score was

multiplied by a predetermined weight. The predetermined

weights were based on the assumption that play develops in a

hierarchical order (Parten, 1932). For this reason, a code

of one was assigned to behaviors that were considered to be

non-play, two was given to solitary play, parallel play

received assigned three, and group play was assigned four.

Each social category was further differentiated by the

cognitive levels within each category. Within the non-play

categories, the behaviors were coded as Transition 1,

Unoccupied 2, Onlooker 3, Aggression 4, Teacher Conversation

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5, Peer Conversation 6. Within each level of play,

behaviors were differentiated as Functional 1, Exploratory

2, Reading 3, Constructive 4, Dramatic 5, and Game 6. The

same coding scheme was used for Solitary, Parallel, and

Group play. An example of the calculation process can be

seen in the following example. If a child engaged in

solitary-constructive play for six intervals or one minute

and thirty seconds, the child's score would be calculated by

first counting the frequencies, six, by the weight. The

weight would be determined by multiplying the social domain

times the cognitive domain, that is, solitary (2)-

constructive (4) play would be tallied by multiplying two

times four for a total of eight. This score, eight, would

then be multiplied by the frequency, six. The score for one

minute would be forty-eight. By adding the scores of the

entire ten minutes together and dividing by two, an average

score for five minutes was obtained for each child. By

calculating the average of two, five-minute sessions, a mean

score of social and cognitive play behaviors was obtained

for each child in the study.

Analyses

The data from the first phase of the study were

processed using SPSS statistical software (Norusis, 1990).

Descriptive statistics were used to describe the data. Data

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from all six groups were combined together for the analysis.
The data were combined so that overall group quartiles could
be established. The theoretical scores of the entire sample
ranged from 0 to 288 whereas the actual scores ranged from
27 to 283. The mean of the entire sample was 117.33. Means
and standard deviations for individual groups are listed in
Table 1.

Children who scored above 218 were ranked one quartile
above the median and placed in the more skilled category.
Scores below 91 placed children one quartile below the
median and in the less skilled play category. Those who
scored between 91 and 218 were located in the middle two
quartiles and were excluded from the study. Children who
scored in either the upper or lower quartile were
purposefully selected for the second stage of the study (See
Appendix C) (See also Table 2).

Table 1

Mean Scores and Standard Deviations on the Play Observation

Scale for All Groups

	n	M	(SD)
Group A	16	94.74	(36.75)
Group B	17	98.82	(33.77)
Group C	17	133.25	(56.44)
Group D	17	132.12	(50.97)
Group E	16	131.55	(45.63)
Group F	17	113.18	(39.44)
Total	100	117.33	(46.39)

Table 2

Range of Scores on the Play Observation Scale for Each

Quartile

Quartile	$\underline{n}$	Boundaries	
		Lower	Upper
1	26	27	90
2	31	91	154
3	19	155	218
4	24	219	283
Total	100		

Phase Two

Sample

Subject selection. The population for the second phase was composed of children who participated in the first phase of the study and whose scores fell in either the upper or lower quartiles on the continuum. Those who scored in the upper or lower quartiles were randomly assigned to dyads. Children who scored in the middle quartiles were eliminated from the study (See Phase One).

Parents of children who were eligible were notified of their child's selection for Phase 2 in a manner specified by center directors (See subject selection). Calls were made to inform parents and guardians of the qualifications of the principle investigator, purpose of the study, and the child's role in the study. Questions and concerns were also answered at that time. Parents and guardians who agreed to allow their child to participate in the study were given convenient appointments for play sessions. Participating parents were also given a choice of leaving the lab school or observing the child through a one way mirror. The day before each play session, parents were called to remind them that the play session would occur the next day.

The sample was composed of forty-eight children (24 females) selected from six groups. Using a group continuum constructed in Phase One, children were selected from each

group based on same gender, play level, and unfamiliarity.
Even though a counterbalanced design was used to ensure
equal distribution, the number of participants in each group
was not equivalent (See Table 1), that is, the number of
children selected from each group varied. For example, four
children, two girls and two boys, were eligible for
participation from Groups B and D. This situation did not
exist in Groups A, C, E, and F. Two factors contributed to
this situation. First, the number of children who were
eligible, that is, whose scores fell within the parameters
of the specifications of the study, were greater in some
groups than others (See Table 2). Second, parental
involvement varied across the groups. For example, in some
groups, all parents who were invited to attend agreed to
participate. In other groups, several parents who had
initially agreed to participate in the second part of the
study refused. Reasons for non-participation ranged from
prior commitments to lack of parental custody during the
time of the study. The major reason presented for non-
participation was lack of time. (This may also be an issue
that warrants further study.) In the final distribution,
four eligible children from groups B and D agreed to
participate in the study. The situation was different in
Groups A, C, E, and F; one position in each group was
affected. There were two additional individuals in Groups A

and C who were qualified, but there were only seven

individuals qualified in Groups E and F. By pairing the

additional children in Groups A and C with the unpaired

children in Groups E and F, the criteria of unfamiliarity

was met. The selection distribution can be seen in Table 3

and is described in detail in Appendix C. Even though there

were some variations in the number of children selected from

each group, the integrity of the study was not compromised.

Subject characteristics. The mean age of the children

selected for the second part of the study was four years and

eight months. See above for a discussion of the

characteristics of this age group.

The sample (48 children) was composed of equal numbers

of males (24) and females. Studies have confirmed that

gender affects natural selection of block play in the

classroom, that is, girls tend not to select block play

(Rogers, 1985). When given the opportunity, however, girls

display equal levels of competence (Rogers, 1985). Variance

due to gender was controlled by forming dyads of the same

gender. Familiarity with playmates also affects play

complexity (Doyle, Connolly, & Rivest, 1980). Children tend

to display play behaviors that reflect a higher social and

cognitive level when engaged with familiar peers (Doyle, et

al, 1980). This effect was controlled by pairing children

with unfamiliar peers.

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Table 3

Number of Boys and Girls Selected From Each Group

	Boys	Girls	Total
Group A	5	4	9
Group B	4	4	8
Group C	4	5	9
Group D	4	4	8
Group E	4	3	7
Group F	3	4	7
Total	24	24	48

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Instruments

Peer collaboration. The level of peer collaboration
was measured by examining dyadic interactions during play
using the POS (Rubin, 1989) (See Appendix D). See Phase One
for a complete description of the POS. Though other
instruments have been developed (Howes, 1980; Howes, Unger,
& Matheson, 1992), there are two reasons why the POS was
selected for this study. First, the POS (Rubin, Maioni, &
Hornung, 1976) subsumes Parten's scale for measuring social
participation and provides a reliable measure of social
interaction. The rationale for this decision was based on
several factors which were discussed in Phase One. In
addition, since the coders had used the scale in Phase 1,
the interrater reliability was high (See reliability).

A score on the POS was obtained by observing the video
recordings of each child's play for a period of fifteen
minutes. Details of the coding process are located in the
measurement section.

Block play complexity. Block play complexity was
operationalized by examining the spatial relationships and
symbolism in block structures (Reifel & Greenfield, 1982).
Spatial relationships were measured on a scale designed by
Reifel and Greenfield (1982)(See Appendix G). The scale
created by Reifel and Greenfield (1982) was an adaptation of
studies and scales created by Greenfield (1978), Johnson

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(1933/1984), Hirsch (1984), Reifel and Greenfield (1982) and

Vereecken (1961). Symbolism was measured on an

experimenter-designed scale based on the work of Vygotsky

(1930/1978)(See also Appendix G).

Spatial relationships were operationally defined as the

hierarchical integration (five levels) and dimensionality

(four levels) of block constructions (Reifel & Greenfield,

1982). Levels of dimensionality were based on plane

geometry. In their study, Reifel and Greenfield (1982)

found that hierarchical complexity becomes more complex with

age and thus reflects changes in cognitive structures

(Greenfield, 1978). The subscales used for this study were

first used by Reifel and Greenfield (1982) and are described

in Appendix G.

The data were coded by recording the highest level of

block construction used by the child during a fifteen minute

play session. The entire fifteen minute session was

observed and the type of construction was evaluated. If a

question arose about the level of construction, the

videotapes were reviewed and polaroid pictures were examined

to confirm the evaluation. Specific details of the coding

process are located in the measurement section. Symbolism,

theoretically defined by Vygotsky (1930/1978) as occurring

when a child "acts independently of what he [she] sees" (p.

96), was operationalized by a measure of the child's action

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action during constructive play as described on a scale with
ratings from 0 to 2 (See Appendix F for subscale). This
measure was derived from an examination of the transcripts
of the play script (Garvey, 1977) and the child's
description of his/her creation when looking at a picture of
their creation. Asking the child to discuss his/her use of
blocks is consistent with the findings of Nicolopoulou
(1991a). She maintains that the only way to really
understand the child's play is to talk with the child. She
found that constructions viewed as stacks of blocks to
adults sometimes represented specific structures to young
children.

There have been no known previous attempts to quantify
Vygotsky's view of symbolic play. This study presents a
first attempt to quantify this concept by using a
multi-modal technique, that is, pictures, audio, and video.

Communication. The level of interactive communication
that occurred between peers during constructive play was
operationalized in seven levels by Farver (1992) (See
Appendix F). Communication during play has been
distinguished as play with noises and sounds, play with the
linguistic system, and play communication (Farver, 1992;
Garvey, 1977; Garvey & Kramer, 1989; Quay & Blaney, 1988).

Communication was examined by watching a tape recording
of fifteen minutes of dyadic play. The entire fifteen

minute session was observed and the frequency of

communication evaluated. When questions arose concerning

communication, the videotapes, pictures, and transcripts

were reviewed. A score for each child was calculated,

coded, and combined with the play partner to form a mean

score for each dyad. Specific details of the coding process

are located in the measurement section.

Setting

The setting for Phase two was a classroom in the

university child development laboratory. Though the room

was usually occupied, the room was available because

semester classes had not resumed after mid-semester break.

The classroom in the child development laboratory was

selected because it resembled a typical preschool classroom

and was equipped with ceiling video cameras. One side of

the classroom was equipped with a one way mirror through

which parents could observe their children. Headphones were

also available so parents and/or guardians could hear as

well as see their children. The equipment and materials in

the classroom were covered with brown paper which was

unappealing and designed to focus attention on the block

center. The blocks were located in one corner of the room.

Unit and variety blocks were stored in a wood cabinet which

measured four by eight feet. Hollow blocks were located on

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an open shelf that was located across one end of the room.

Prior to the entry of each dyad, four large hollow blocks,

one large triangle hollow block, four small hollow blocks

and four planks were placed around the edge of the block

area. These materials served a twofold purpose. First, the

display of blocks was designed to entice the children to

enter the play area. Second, the blocks served as a

boundary for play.

The setting provided one limitation of the study.

Several children in the study were also enrolled in the

program and generally met in the classroom selected for the

study. Precautions were taken to minimize this effect by

covering all other surfaces in the room with brown paper.

In addition, when children usually enter the school, many

familiar people are available. The children came into an

environment that was vastly different, that is, the room was

completely different since only blocks were available, staff

members typically available were not visible, and friends

usually accessible were absent. Considering these factors,

the setting was considered sufficiently different so as to

negate any effects of familiarity.

<u>Materials</u>

Wood blocks similar to those used in typical preschool

classrooms, hollow and unit blocks, were used in the second

part of the study. The use of hollow and unit wood blocks

in research dates back to early studies conducted by

Guanella (1934) and Bailey (1933). Past studies suggest

that the use of both hollow and unit blocks tend to

stimulate all levels of social interaction (Rogers, 1985).

Wood blocks used for this study were sanded smooth and

stained with a clear varnish. The dimensions of the

standard hollow block was 24" x 12" x 6". The size of the

standard unit lightweight block was 5 1/2" x 2 3/4" x 1

3/8". All together, there were 332 blocks available. The

quantity and dimensions of the individual blocks are listed

in Appendix F.

A polaroid camera was used to capture the block

creation and a tape recorder was used to record each child's

description of his/her play.

Procedure

Observations. Play sessions began as soon as both

children arrived at the lab school. When one child arrived

earlier than the other, the first child was informed that a

playmate would soon arrive. When the other member of the

dyad arrived, the children were invited to enter the

classroom. The researcher welcomed the children, invited

them to enter the room, accompanied them into the room, and

stayed in the room throughout the session.[1] The children in

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each dyad had been purposefully selected and assigned so
that both children were members of the same gender but were
not familiar with one another. Each dyad consisted of two
players both matched for more-complex play, less-complex
play, or for more- and less-complex play. After the
children had been in the room for a period of ten minutes,
video recording began and continued for a period of fifteen
minutes. The play session was recorded by an assistant
using ceiling video cameras. To ensure the sanctity of
play, the children were distracted by adults only if safety
factors warranted an interruption. When twenty-five minutes
had elapsed, the children were told, "It's almost time for
clean-up but before you put the blocks away, I would like to
take a picture of your block play. May I take a picture of
your block play? After I take a picture of your block
creation, I want to take a picture of you. May I take a
picture of you? You can take this picture with you when you
leave". After all the blocks and children were
photographed, each child was invited to look at the picture.
Since the goal was to talk with each child and yet not
alienate them from the researcher, the children were told
that each child would have the opportunity to talk and to
play while the other child talked. They were encouraged to
select the individual who would talk first and the
individual who would play first.

The recording equipment was placed in a separate part
of the room which was located away from the block center but
within the parameters of safety. Each child was asked to
talk about the picture. First, they examined the tape
recorder and held the microphone if they chose to do so.
Then each session began with the following statement, "Tell
me about this picture. Tell me about your play. What do
you see?" An audio recorder captured the ensuing
conversation. Afterwards, both children were invited to
assist in clean-up. After clean-up, the children were
escorted out of the classroom where the parents had been
instructed to meet them (See subject selection). The total
time involved in the play session ranged from fifty to
seventy minutes.

Reliability

The same graduate students who collected and coded data
in Phase One also collected and coded data in Phase Two.
For this reason, high reliability ($\underline{k}$ = 92%) was established
prior to beginning the data coding process. Accuracy was
ensured by establishing high kappa levels for block play
complexity (subscales are hierarchical integration $\underline{k}$= 90%,
dimensionality $\underline{k}$ = 90%, and symbolism $\underline{k}$ = 91%), peer
collaboration $\underline{k}$ = 92%, and communication $\underline{k}$ = 90%. Cohen's
kappa is an agreement statistic that controls for chance

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(See Cohen, 1960). Agreement was assessed at regular
intervals throughout the study to guard against observer
drift.

Measurement

 Data collection. All data were collected on video
tapes, audio tapes, and through photographs. Copies of the
video and audio tapes were made prior to coding. In
addition, complete transcriptions of the audio and
videotapes were made. Photographs of the children were
labeled and filed appropriately.

 Data coding. Coding was based on observations stored
on video and audiotapes. Photographs were also examined.
Observers coded the videotapes separately for three
different behaviors: sociocognitive play level, constructive
play, and communication. Given that block complexity was
composed of three subscales. That is, hierarchical
integration, dimensionality, and symbolism, each rater made
five separate passes. Data from audio tapes was combined
with data from photographs and video transcripts to provide
data for coding symbolism.

 Peer collaboration. The coding system used to assess
social interaction in Phase one was also used to assess peer
collaboration in Phase two (See data coding in Phase One).

 Constructive play. Coding for constructive play was

based on previously reported measures of Guanella (1934),

Johnson (1933/1984), and Reifel and Greenfield (1982).

Constructive play behaviors were coded using the scale for

block play (See Appendix E). The complexity of the block

construction was tabulated by examining the videotapes and

pictures for hierarchical integration and dimensionality.

Scores on structural complexity were combined with scores on

symbolism for a total score on block play complexity.

The theoretical range of scores for block play complexity

was 0 to 25. The actual range of scores on block play

complexity ranged from 5 to 25 with 5 considered a low score

and 25 a high score. Scores of individual children were

tabulated and combined with their partner to provide a mean

for each dyad.

Communication. Communication was coded by examining

both the video tapes and transcripts of the videotapes.

Frequency of communication was examined during the entire

fifteen minute play session. A communication score for each

child was calculated by multiplying the frequency of

communication during the fifteen minute play period by a

number reflecting the complexity of the communication.

Complexity was rated on a scale developed by Corsaro (1986)

and used by Farver (1991). See Appendix H. The seven

categories were rated hierarchically: paralinguistic cues 1,

description of action 2, repetition 3, semantic tying 4,

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calls for attention 5, directives 6, tags 7. A child who
used two paralinguistic cues (1) during a fifteen minute
period would receive a score of 2 (the frequency, 2, was
multiplied by the category, 1). The theoretical range of
the scores ranged from 0 through 31 with 1 considered a low
score and 31 considered a high score. The scores for each
child were combined with the play partner's score to form a
mean score for the dyad. Even though there was no
validation information available, interrater reliability was
90%.

Analyses

A multivariate analysis of variance was used to analyze
the data. Play group, the independent variable, was
composed of three levels. Children were matched according
to skill status: equally matched for more-complex play,
equally matched for less-complex play, and unequally matched
levels of more- and less-complex play. Each child was
assigned to a level based on their score in Phase One,
gender, and unfamiliarity with the play partner. The
dependent variables included block play complexity (BPC),
peer collaboration (PC), and communication (C).

The SPSS (Norusis, 1990) statistical system for data
analysis was used in data analyses. The main effects were
examined at an alpha level of .05. When an interaction was

found significant, simple effects were computed.

Prior to analyzing the data, the possibility of interdependence among observations was considered. Since data was collected while two children played together, independence of data collection was a major concern. Stevens (1992, p.243) stated that. "...whenever the treatment is individually administered, observations are independent. But where treatments involve interaction among persons, such as `discussion' method or group counseling, the observations may influence each other." To correct for this situation, the analysis was performed on the mean score of the dyad. Results obtained from the analyses are reported in the following chapter.

CHAPTER IV

RESULTS

Results of the statistical analyses of the data will be
reported in this chapter. A description of the data will be
reported first and will be followed by results of
statistical tests. Findings will be presented through text,
tables, and figures.

Data Analyses

Data collection in Phase I involved observation of the
levels of play complexity displayed by one-hundred children
in naturalistic settings. In Phase II, four-year-olds who
scored in either the upper or lower quartiles in Phase I
were purposefully selected to play with a peer in a
laboratory setting. Children were placed in dyads on the
basis of unfamiliarity, same gender, and play level as
determined by prior observations. Dyad groupings were
composed of two girls or boys who were (a) equally more-
skilled, (b) equally less-skilled, or (c) unequally skilled
(more- and less-) as determined by ratings on the Play
Observation Scale (Rubin, 1989). Social interactions among
equal and unequal dyads during play were observed, recorded,
and tabulated.

To ensure independence of observation, scores of both
members of the dyad were averaged together to form a single

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dyad score. Twenty-four dyads ($\underline{N}$=48) were divided into
three groups. Each group was composed of dyads of two
children who displayed play that was equally more-complex,
equally less-complex, or unequally complex (more- and
less-complex) as determined by measurements of play
behaviors on the Play Observation Scale (Rubin, 1989). The
dependent variables (peer collaboration, block complexity,
and communication) were examined in terms of the independent
variable, group and the control variable, gender.

Mean scores for dyad groups were examined for
variations based on gender, dyad group, and an interaction
of the two. Means and standard deviations for the
dependent variables, peer collaboration, block complexity,
and communication, are reported in Table 4 and described in
the section that follows.

Descriptive Statistics for Peer Collaboration

Mean scores for peer collaboration by boys and girls in
Groups One (equally more-complex), Group Two (unequally
matched), and Group Three (equally less-complex) are
reported in Table 4. Means are also displayed graphically
in Figure 1. Differences between boys and girls in Group
One (equally more-complex) on peer collaboration are
minimal. That is, the mean score for girls in Group One
(equally more-complex) is 1101.75 ($\underline{SD}$ = 86.48) and the mean

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Table 4

Means and Standard Deviations of Play Behaviors for Matched (Groups One and Three) and
Unmatched Group Two Groups

	Group 1 (EM)		Group 2 (UN)		Group 3 (EL)			
	M	S	M	S	M	S	n	Range
PEER COLLABORATION								
Girls	1101.75	(86.48)	997.5	(117.84)	921.75	(97.35)	8	792-1221
Boys	1094.25	(266.28)	1202.25	(325.03)	807.75	(221.03)	8	504-1662
Boys/Girls	1098.00	(183.33)	1099.87	(251.41)	864.75	(169.45)	16	504-1662
BLOCK COMPLEXITY								
Girls	9.75	(2.22)	13.00	(2.94)	7.00	(1.83)	8	5-16
Boys	11.5	(2.08)	15.75	(2.87)	11.8	(2.38)	8	8-18
Boys/Girls	10.63	(2.2)	14.38	(3.07)	9.25	(3.11)	16	5-18
COMMUNICATION								
Girls	47.25	(13.45)	60.75	(21.39)	30	(13.69)	8	10-89
Boys	35.5	(23.79)	36.25	(25.71)	11.5	(5.57)	8	4-71
Boys/Girls	41.38	(18.96)	48.50	(25.52)	20.75	(13.83)	16	4-89

Group 1: Children are matched for equal levels of more complex play.

Group 2: Children have unequal play levels, that is, one displays more complex and one displays
less complex play.

Group 3: Children are matched for equal levels of less complex levels of play.

score for boys is 1094.25 (SD = 266.28). The close
proximity of these scores can be observed in Figure 1.

Differences in the mean scores of boys and girls in
Group Two (unequal levels) on peer collaboration are larger
than those observed in Group One (equally more-complex).
Specifically, the mean score for girls is 997.5 (SD =
117.84) and the mean score for boys is 1202.25 (SD =
325.03). Group Two was composed of four-year-olds who were
unequally matched, that is, a child who displayed
more-complex play behavior was matched with a child who
displayed less-complex play behaviors thus creating dyads of
children with unequal skill levels. Boys in Group Two
displayed behaviors that resulted in peer collaboration
scores that were considerably higher than those of girls.

In contrast, the scores of boys in Group Three (equally
less-complex) were lower than the scores of girls. The mean
score for girls in Group Three (equally less-complex) was
921.75 (SD = 97.35) whereas the mean score for boys in this
group was 807.75 (SD =221.03). It is worth noting that
scores for boys and girls were close in Group 1 (equally
more-complex), far apart in Group 2 (unequally matched), and
close again, but inverted, in Group 3 (equally less-
complex). That is, boys score higher than girls in Group 2,
but lower than girls in Group 3.

Looking at the overall change among the three groups

Means for Peer Collaboration
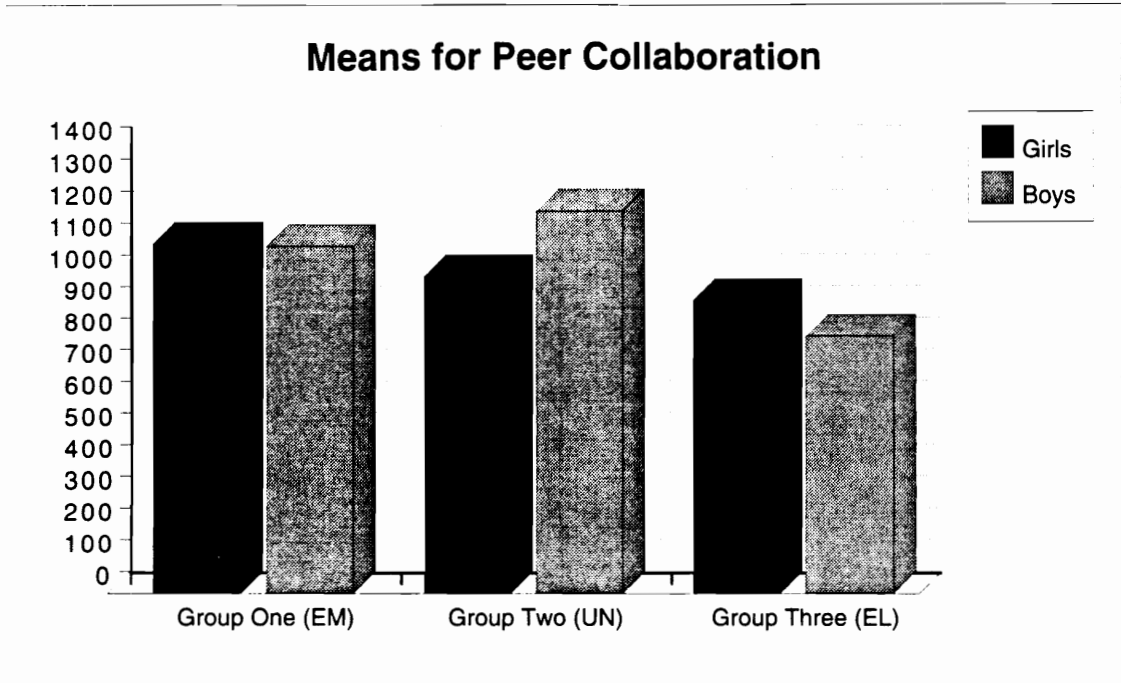
Mean Scores of Girls and Boys on the Play Observation Scale
for Groups One, Two, and Three

Figure 1

for peer collaboration, the scores of girls were higher for Group 1 (equally more-complex), lower for Group 2 (unequally matched), and even lower for Group 3 (equally less-complex). In contrast, the scores of boys in Group 2 (unequally matched) were higher than the scores of boys in either Group 1 (equally more-complex) or Group 3 (equally less-complex).

Descriptive Statistics for Block Play Complexity

Scores on block play complexity were different for boys and girls in Group One (equally more-complex). The mean score was 9.75 (SD =2.22) for girls and 11.5 (SD =2.08) for boys. This pattern was also evident in Group Two (unequally matched), the means score of girls in Group Two was 13 (SD = 2.94) and the means score for boys was 15.75 (SD =2.87). The boys in this group also scored higher than girls. A continuation of this pattern was found in Group Three (equally less-complex). The mean score for girls was 7 (SD = 1.83) and the mean score for boys was 11.5 (SD = 2.38). See also Table 4. Mean scores of boys were consistently higher than girls across all three groups. See Figure 2 for a graphic depiction of this pattern.

Descriptive Statistics for Communication

On communication measures, the scores of girls were higher than the scores of boys in Group One (equally

Means for Block Play Complexity
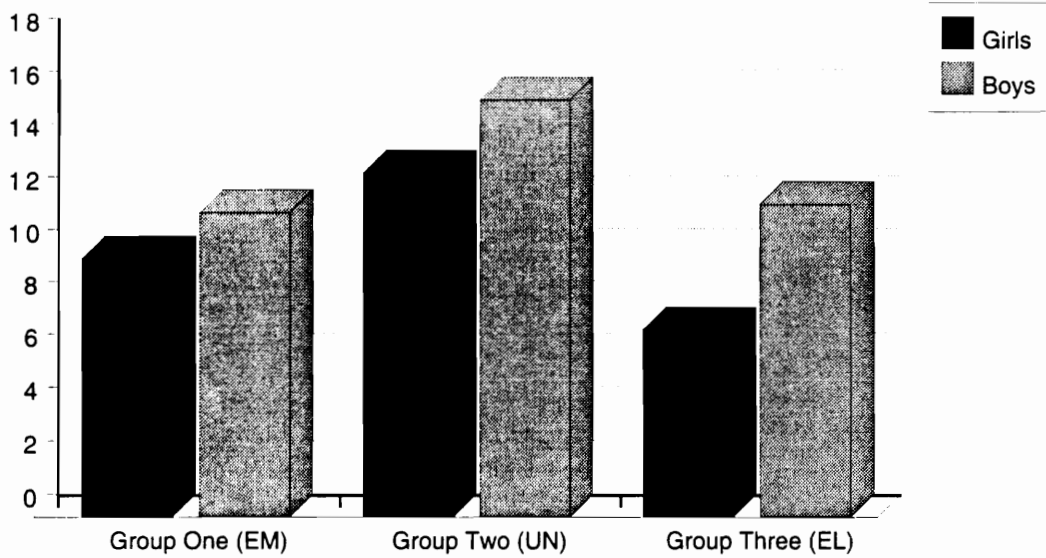
Mean Scores of Girls and Boys on Block Play Complexity for

Groups One, Two, and Three

Figure 2

Means for Communication
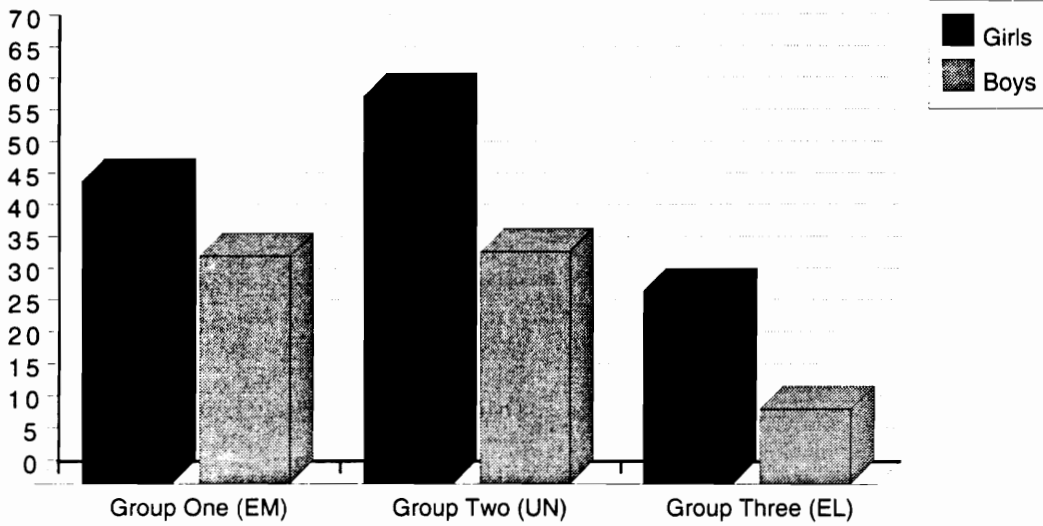
Mean Scores of Girls and Boys on Communication for Groups

One, Two, and Three

Figure Three

more-complex). The mean score for girls in Group One was
47.25 (SD = 13.45) whereas the mean score for boys was 35.5
(SD = 23.79). In Group Two (unequally matched), the scores
of girls were twice as high as the scores of boys. The mean
score for girls was 60.75 (SD =21.39) and the mean score for
boys was 36.25 (SD =25.71). Differences can be viewed in
Figure 3. The same pattern can also be observed in Group 3
(equally less-complex). The mean score of girls was 30 (SD
=13.69) and the mean score of boys was 11.5 (SD =5.37).
Differences among the scores for Group Three (equally
less-complex) are as great as the differences in Group Two
(unequally matched). This is illustrated in Figure 3.

Descriptive statistics suggest gender and group
differences on peer collaboration, block play, and
communication. To examine these differences for
statistically significance, hypotheses testing was
conducted. The results are reported below.

Hypotheses Testing

Both hypotheses examined the effect of contextual
factors on play behaviors. The first hypothesis that
four-year-olds who display less-complex play behaviors
attain higher levels when engaged in play with partners who
display more-complex levels of play was examined first. To
test this hypothesis, differences between Group Three

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(equally less-complex) and Group Two (unequally matched) were examined for statistical significance. In order to control for gender differences, same sex dyads were created for all three groups (equally more-complex, unequally matched, and equally less-complex). Dependent variables, peer collaboration, block play, and communication, were examined in terms of group and gender.

The second hypothesis, that four-year-olds who display higher levels of play complexity adjust their play to meet the level of peers who display less-complex play behaviors, also involved observations of children in same gender dyads. Children were paired with equally more-capable peers (Group One) or with peers who displayed less-complex play behaviors (Group Two). Again, the dependent variables of peer collaboration, block play complexity, and communication were examined in terms of gender and group.

Overall MANOVA for Boys and Girls

Prior to conducting multivariate analysis of variance (MANOVA), the assumptions of independence, normality, and homogeneity were tested and found satisfactory. All statistical tests were conducted at the .05 level using SPSS MANOVA (Norusis, 1990). Observed differences in mean scores were examined by conducting a 3 X 2 factorial multivariate analysis of variance (MANOVA) with three levels of group,

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One, (equally more-complex), Two (unequally matched), and
Three (equally less-complex) and two levels of gender, boys
and girls. The analyses revealed significant gender
differences. Wilks' lambda was calculated to be .383. This
is equivalent to an $\underline{F}$ ratio of 8.58 with 3 and 16 degrees of
freedom. The probability of obtaining an $\underline{F}$ this large by
chance is less than .01. See Table Five for complete
results. Observed differences between the play of boys and
girls play with peers who display different levels of
ability are statistically significant, that is, chance alone
can not explain these differences.

The multivariate analysis of variance for the effect of
group was found to be statistically significant by the
Wilks' Lambda Criterion. The Wilks' Lambda value of .313
was equivalent to an $\underline{F}$ ratio of 4.20 with 6 and 32 degrees
of freedom. The probability of obtaining an $\underline{F}$ this large by
chance was less than .03. Results are reported in Table
Five. Observed differences among the groups are greater
than would be expected. Group membership affects how the
children play with peers who display different levels of
play complexity.

Using the Wilks' Lambda Criterion, the multivariate
analysis of variance for the effect of group by gender, =
.465, was found to be statistically significant, $\underline{F}(6, 32)$ =
2.49, $\underline{p} < .04$. See Table 5. The significant group by

Table 5

Multivariate Analysis of Variance for the Effects of Gender,

Group, and Gender by Group

Source	Wilk's	df	F	p
Gender	.383	3,16	8.58	.011 **
Group	.313	6,32	4.20	.003 *
Gender by Group	.465	6,32	2.49	.043 *

* $p < .05$

** $p < .01$

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gender interaction indicates that the effects of treatment
were not uniform for boys and girls in all three groups.
Additional follow-up was necessary.

MANOVA for girls. To understand the effect of
treatment on gender, MANOVA was conducted on females using
group membership (One, Two, Three) as an independent
variable and peer collaboration, block complexity, and
communication as dependent variables. The Wilk's Lambda,
.067, for group membership for girls was found to be
statistically significant, F (6,14) = 6.67, p < .002. The
results are reported in Table 6. The analysis revealed
that when differences among girls in all three groups are
examined in terms of peer collaboration, block complexity,
and communication simultaneously, there is a difference that
is greater than would be expected to occur by chance.

An ANOVA was conducted on each of the dependent
variables (peer collaboration, block play complexity, and
communication). Differences in the ways girls in all three
groups play with blocks were found to be statistically
significant, F (1, 2) = 6.40, p < .018. Differences among
groups were not significant for either peer collaboration, F
(1, 2) = 3.18, p < .090 or communication F (1, 2) = 3.45, p
< .077. See Table 6. Variations among the three groups of
girls were the result of differences in how they played with
blocks not in how they interacted with each other or

Table 6

<u>Multivariate and Univariate Analysis of Variance for the</u>

<u>Effects of Group on Peer Collaboration, Block Play</u>

<u>Complexity, and Communication for Girls</u>

Source	Wilk's	<u>df</u>	$\underline{F}$	$\underline{p}$
MANOVA				
Group	.067	6,14	6.67	.002 **
ANOVA				
Peer coll.	65341.5	1,2	3.18	.090
Blocks	72.166	1,2	6.40	.018 **
Comm.	1900.5	1,2	3.45	.077

* $\underline{p}$ < .05

** $\underline{p}$ <.01

communicated.

Hypothesis One for Girls

To test the first hypothesis for girls, differences in
how girls play with peers who display different levels of
play complexity were examined by conducting separate
pairwise group comparisons. Multivariate ANOVA was
conducted on girls in Groups One (equally more-complex) and
Two (unequally matched) using peer collaboration, block play
complexity, and communication as dependent variables.
Differences between these two groups on overall
multivariance for all three dependent variables were
statistically significant at an .05 level of significance
(See Table 7). The value of Wilk's lambda, .105, was equal
to an F ratio of 11.28 with three and four degrees of
freedom and this was significant at a .020. level of
probability. That is, there are differences in the way
girls who display complex play behaviors play with peers of
equal ability (Group 1) when overall variance on all three
dependent variables of peer collaboration, block play, and
communication are considered.

Differences between Group One and Group Two (described
above) were observed for the dependent variables of peer
collaboration, block play complexity, and communication
when examined simultaneously for overall multivariance.

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When considered individually, however, none of the variables
were significant.   Peer collaboration, $F(1, 6)= 2.03$,
$p < .204$, was not significant.   The sociocognitive play
level of the child did not contribute significantly to the
difference between the groups.   Neither was block play
significant, $F(1, 6) = 3.11$, $p < .128$.   The contribution of
block play complexity to the differences between the groups
was not statistically significant.   In the same way,
communication was not significant, $F(1, 6) = 1.14$, $p < .326$.
Even though none of the dependent variables, peer
collaboration, block play complexity, and communication,
were responsible for the differences between Groups One and
Two, they were significant when considered simultaneously.
These results support the rationale for the use of overall
MANOVA in this study.

Overall differences between Groups One and Two in the
areas of peer collaboration, block play complexity, and
communication may, in fact, be the result of scaffolding by
a more-skilled peer.   Group One was composed of two children
who displayed more-complex play behaviors.   Whereas Group
Two was composed of children who displayed a mixture of
more- and less-complex play behaviors.   In mixed groups, the
more-skilled peer frequently directed the play.   For
example, in one play script, the more-skilled peer developed
a pretense story about the block "cabin" she had built.   She

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Table 7

Pairwise Multivariate and Univariate Analysis of Variance of
Groups One and Two for Peer Collaboration, Block Play
Complexity, and Communication for Girls

Source	Wilk's	df	F	p
MANOVA				
Groups 1,2	.105	3,4	11.28	.020 *
ANOVA				
Peer Col	21736.125	1,6	2.03	.204
Blocks	21.125	1,6	3.11	.128
Comm.	364.5	1,6	1.14	.326

* $p < .05$

** $p < .01$

Group One: Matched equally for more-complex play behavior

Group Two: Unequally matched (more- and less-complex play)

then preceded to tell the less-skilled child to go hunting.
At first, the less-skilled child responded by ignoring the
director of the pretense, the more-skilled child continued
to prompt and encourage the less-skilled child until she
also began to engage in the play script. Although the less-
skilled child could not initially follow the play script,
she was able to enter the play script with the assistance of
the more capable play partner. Even though the differences
between the two groups were not great for the individual
variables of peer collaboration, block play, and
communication; there was significant overall multivariance.

Hypothesis Two for Girls

To test the second hypothesis for girls, a pairwise
multivariate analysis of variance was conducted for girls in
Group Two (unequally matched) and Three (equally less-
complex). Differences between groups two and three on
overall multivariance for all three dependent variables
(peer collaboration, block play complexity, and
communication) were significant at an .05 level of
significance. The Wilk's Lambda value of .131 was
equivalent to an F ratio of 8.88 with three and four degrees
of freedom. The probability of obtaining an F ratio this
large by chance is less than .031. Results are reported in
Table 8. There are differences in the ways four-year-old

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girls play with peers who display more-complex play behavior
or with peers who display equally less-complex play
behaviors.

In an attempt to understand the source of the variance
between the groups, the dependent variables of peer
collaboration, block play complexity, and communication were
examined as separate entities. See Table 8. Peer
collaboration was examined first. The univariate F value of
.98 with one and six degrees of freedom (p < .359) was not
significant. Peer collaboration was not responsible for
variations among the groups. See Table 8.

Block play complexity was also examined. Variations
among girls in Group Two and Three on block play complexity
were statistically significant, $F(1, 6)$ = 12., p < .013.
Differences exist in the way four-year-old girls
play with blocks when paired with a peer who displays
more-complex or equally less-complex play behaviors.

Communication was also found to be statistically
significant, $F(1, 6)$ = 5.86, p < .052. The level of play
complexity displayed by peers affects how four-year-old
girls communicate.

These findings provide support for the contention that
four-year-old girls display play behaviors that are
significantly different when they play with a peer who
displays equally less-complex play or when they play with a

Table 8

Pairwise Multivariate and Univariate Analysis of Variance of

Groups Two and Three for Peer Collaboration, Block Play

Complexity, and Communication for Girls

	Wilk's	df	F	p
MANOVA				
Groups 2,3	.131	3,4	8.88	.031 *
ANOVA				
Peer C.	11476.13	1,6	.98	.359
Blocks	72.	1,6	12.	.013 *
Comm.	1891.13	1,6	5.86	.051 *

* p < .05

** p < .01

Group Two: Unequally matched (more- and less-complex play).

Group Three: Matched equally for less-complex play.

Peer C. = Peer collaboration

Blocks = Block play complexity

Comm. = Communication

peer who displays more-complex play behavior. In addition,
these differences stem from the simultaneous interaction of
peer collaboration, block play complexity, and
communication. In groups two and three, mean scores for
peer collaboration did not vary significantly although there
were differencee in block play complexity and communication.

Explanations for these results may be found in the
initial interactions between girls when they entered the
room. For example, when they came in, they would
frequently look at each other and after a period of two or
three minutes, they would begin to play. It seemed as
though the child with more-complex play behavior would
frequently assume a leading role in the unequally matched
dyads. However, there did not appear to be an obvious
leader in the equally matched dyads.

To examine differences among girls paired with
equally-complex peers, Groups One (equally more-complex) and
Three (equally less-complex) were examined using pairwise
MANOVA to examine peer collaboration, block play complexity,
and communication simultaneously. Differences between these
two groups on overall multivariance were not statistically
significant at an alpha level of .05, $F(3, 4) = 2.24$,
$p < .226$. (See Table 9). Peers who were paired with equally
capable peers displayed the same play behaviors regardless
of the skill level of the pair. Since overall tests were

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Table 9

Pairwise Multivariate Analysis of Variance of Groups One and

Three for Peer Collaboration, Block Play Complexity, and

Communication for Girls

Source	Wilk's	df	F	p
Groups 1,3	.373	3,4	2.24	.226

* $p < .05$

** $p < .01$

Group One: Matched equally for more-complex play behavior

Group Three: Matched equally for less-complex play behavior

not significant, additional tests were not necessary.

The lack of statistical significance is a result of the way the girls played in different yet similar ways. For instance, two girls matched for equally more-complex play behaviors played with blocks on the tables and chairs but never once placed them on the floor even though there were blocks on the floor. They moved in synchrony as though they had a common goal of not creating clutter. When they talked to each other, they were very purposeful and used soft voices. Nonetheless, their neat creations were not very complex ($\underline{M}$ = 47.25, $\underline{SD}$ = 13.45) In contrast, two girls who were equally matched for less-complex play entered the room and instantly began to take ALL the blocks from the shelves as quickly as they could. They seemed to be using a signal system of communication that they both understood. But, since their goal was to remove all the blocks from the shelf, they engaged in very little block play and this was reflected in low means on block play complexity ($\underline{M}$ = 30, $\underline{SD}$ = 13.69). The block play that each dyad engaged in was different but the outcomes were similar. To examine variations requires a look at the process, not just the product.

Hypotheses One and Two for Boys

Hypotheses One and Two were tested on boys by

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conducting an overall MANOVA on boys using group membership
(One, Two, and Three) as an independent variable and peer
collaboration, block complexity, and communication as
dependent variables. The Wilks' Lambda value of .3056 was
equivalent to an F ratio of 1.89 with 6 and 14 degrees of
freedom. The probability of obtaining an F value this large
by chance was less than .154. Results are reported in Table
10. Observed differences were not greater than would be
expected to occur by chance. The results indicate that
there are no significant differences in the way boys in
different groups perform when the dependent variables, peer
collaboration, block play, and communication are examined
simultaneously. This fails to confirm either Hypothesis One
or Two since the differences among the groups are not
statistically significant.

Findings

A synopsis of the results of the statistical tests are
reported in Table 11. The first hypothesis (that four-year-
olds who display less-complex play behaviors attain higher
levels when engaged in play with partners who display more-
complex levels of play) was confirmed for girls, but not for
boys. Results of an overall MANOVA and a separate pairwise
multivariate test for girls in Groups Two (unequally
matched) and Three (equally less-complex) confirmed the

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Table 10

Multivariate Analysis of Variance for the Effects of Group

on Peer Collaboration, Block Play Complexity, and

Communication for Boys

Source	Wilk's	df	F	p
Group	.3056	6,14	1.89	.154

* p < .05

** p <.01

first hypothesis for girls. Results of an overall MANOVA

for boys found no significant variance among the groups.

The second hypothesis (that four-year-olds who display

higher levels of play complexity adjust their play to meet

the level of peers who display less complex play behaviors)

was also confirmed for girls, not boys. Results of an

overall MANOVA and a separate pairwise multivariate analysis

for girls in Groups One (equally more-complex) and Two

(unequally matched) confirmed the second hypothesis for

girls. Results of an overall MANOVA for boys in Group One

(equally more-complex), Two (unequally matched), and Three

(equally less-complex) found no significant variance among

the groups. The findings confirmed both hypotheses for

girls but failed to confirm either hypothesis for boys. The

findings are discussed in the chapter that follows.

Table 11

Summary Results of Overall, Pairwise, and Univariate MANOVA
Tests for Girls and Boys in Groups One, Two, and Three for
Peer Collaboration (PC), Block Play Complexity (BP), and
Communication (C)

	Hypothesis I	Hypothesis II	
	Groups 2 and 3 (unequally matched for more- and less- complex play) and (equally less- complex play)	Groups 1 and 2 (unequally matched for more- and less- complex play) and (equally more- complex)	Groups 1 and 3 (equally more- complex and equally less- complex
Girls	Overall MANOVA * $p < .031$ Dependent variables PC NS .359 BP * .013 C * .051	Overall MANOVA * $p < .020$ Dependent variables PC NS .204 BP NS .128 C NS .326	Overall MANOVA NS $p < .226$
Boys	The overall effects for all three groups were non- significant $p < .154$	The overall effects for all three groups were non- significant $p < .154$	The overall effects for all 3 groups were non- significant $p < .154$

NS = Not Significant
* = Significant at .05 level
** = Significant at .01 level

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CHAPTER V

DISCUSSION

This study was designed to address the question, Do
four-year-olds who display more-complex skills during
constructive block play provide assistance to less-skilled
partners? To answer this question, two hypotheses were
examined. The first hypothesis, that less capable four-
year-olds attain higher levels when engaged in play with
peers who display more-complex levels of play was confirmed
for girls, but not for boys. Results of the pairwise
multivariate tests between girls in Group Two (unequal play
levels) and Group Three (equally less-complex play) support
the first hypotheses for girls but not for boys.

The second hypothesis, that children who display higher
levels of play complexity adapt to the level of the play
partner was also confirmed for girls but not for boys.
Results of the pairwise multivariate tests between girls in
Groups One (equally more-complex play) and Two (unequal play
levels) support the second hypothesis for girls but not for
boys.

Support for the Vygotskian construct of play as the
actualization of the zone of proximal development was
provided for girls but not for boys. The way in which this
information contributes to and extends literature will be
examined in the following section. In addition,

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limitations, recommendations, and conclusions will be

discussed.

Contributions

This study contributes to the literature in several

ways. First, this study adds to our understanding of how

boys and girls collaborate with peers. The findings of this

study suggest that there are differences in the ways boys

and girls play with peers who display different levels of

play complexity. The behaviors displayed by girls when

interfacing with a peer who was matched equally or unequally

for play complexity level were different in a statistically

significant way. In contrast, the behaviors displayed by

boys when interfacing with a peer who was matched equally or

unequally for play complexity level was not significantly

different. Awareness of these differences is valuable for

not only for the researcher but also for the practitioner.

Second, this study adds to our understanding of play,

especially constructive play. Examining play as the zone of

proximal development provides a new way of thinking about

the relationship between play and peer mediation. Past

studies of play typically examined correlations between play

and other variables in the environment. Nicolopoulou

(1991b) suggests that play is valuable in and of itself and

should be studied as a separate entity. This was

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accomplished in this study. A different lens was used to examine play and the peer interactions that occurred during play.

In addition, this study joins other studies that have examined constructive play with blocks. Given the sparsity of studies on constructive play with blocks, this study adds to our understanding of constructive play with blocks. In the past, many factors, especially theoretical orientation, have affected the dearth of research on constructive play (Christie & Johnson, 1987). Using Vygotsky's definition of play gives value and legitimacy to the examination of constructive play with blocks.

Further, this study also provides an additional empirical test of Vygotksy's theory. Due to his illness, Vygotsky concentrated on developing new areas of study rather than testing theories. This has led some of his critics to suggest that Vygotsky's theory is not a theory but rather a set of postulates strung together (Bidel, 1988; Nicolopoulou, 1991b). His work on play is a good example. Even though he wrote only twelve pages on the topic of play, there is a tremendous amount of information contained within those pages. Empirical testing of Vygotksy's theory provides legitimacy for his views (Overton, 1984).

This study extends and enhances our knowledge of peer collaboration, constructive play, and Vygotksy's theory.

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There are, however, several limitations in this study.
These will be examined next.

Limitations

The first concern involves the setting. The classroom
used in Phase Two was familiar to several children in the
study. This concern was addressed previously in the methods
section. Prior to the play sessions, precautions were made
to limit the effects of the room. The decision to use the
room was based on the needs of the study, that is, available
videotaping equipment, easy access to parents, facilities
that allow parents to observe their children, and a
classroom that resembled other preschool classrooms.
Covering play areas in the room drastically altered the
appearance of the room so that all children were presented
with an equally different situation. Still, there may have
been some residual effects for some children and this must
be acknowledged as a limitation.

In addition, the sample was problematic in two distinct
ways. First, participation was voluntary. This eliminated
children of parents who refused to participate in the study.
Samples of volunteers always present the possibility of a
biased sample. This situation was also mentioned in the
methods section. Given the difficulty in obtaining members
for the study (See Subject Selection), a choice was made to

use the sample and acknowledge the limitation of a sample composed of volunteers.

Second, due to the stipulations of participating centers in Phase I, the sample was selected on the basis of two observations in the classroom. The limitation of time and measuring instruments may have provided an inaccurate assessment of the child's play level and this could have affected the overall results.

Age and developmental level of the sample also served as limiting factors. Since only four-year-olds were used in the study, these findings cannot be generalized to children who vary chronologically and developmentally. See methods section. Another concern exist in the gender of the members of the research team. Since the principle investigator and research assistants were female; the possibility of gender bias must be acknowledged.

In addition, the way in which parents and guardians talked to their children prior to the laboratory observation may have affected subsequent play. To thoroughly understand sociocultural influences, the context that occurred prior to play should have been investigated. Certainly, a difference in how girls and boys play with each other was found in this study. Did parents prepare girls and boys for the play differently? Past studies of gender have found conflicting results. For example, Rogers (1985) did not find gender

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differences in constructive play among boys and girls who
were paired together in a naturalistic setting. Also, a
study of play completed by Rubin, Lynch, Coplan, Rose-
Krasnor, and Booth (1994) also found results that were
similar to those found by Rogers (1985). Specifically,
Rubin et al., (1994) found that when unfamiliar girls and
boys were paired in same sex dyads, boys and girls did not
play in significantly different ways. In contrast, several
scholars have found differences in the way boys and girls
play (Fagot, 1974; Maccoby, 1990; O'Brien & Huston, 1985).
Significant differences in both pretend play and
communication used by boys and girls were reported by Jones
and Glenn (1991). Even though the current study was not
designed to examine gender differences; the current study
supports the existence of gender differences during play.

These concerns do not affect the strength of the
findings but should be considered when interpreting the
results. Based on the contributions and limitations of this
study, recommendations for future research are proposed in
the following text.

Recommendations

Several areas need to be examined in future studies.
First, age and gender need to be considered differently in
future studies. Specifically, sample selection, which was

based on developmental and chronological level, limited the
generlizability of the study. Sample selection was based on
observations in Phase I. The sample selection process may
have influenced the play of the children who were invited to
play and may have contributed to the reported variance for
girls but not for boys. This needs to be investigated. In
addition, this study suggests that real differences exist in
the ways boys and girls play with same gender peers who
display different skill levels. There is, however, no way
of knowing if the differences displayed by girls who played
with girls would also have been evident in play with boys.
Is there a difference in how girls and boys play with
members of a different gender? Do boys and girls use
different collaborative procedures when playing with members
of the same sex? Under what circumstances and at what age
does play actualize the zone of proximal development for
boys? To answer these questions, the initial selection
process should include mixed dyads of both younger and older
boys and girls.

The second recommendation involves reexamining the
design of this study. The way in which the play level of
the peer affects play was not completely addressed in this
study. In an attempt to capture the essence of play through
multiple measures, MANOVA was conducted. One assumption of
MANOVA is that data are collected independently. To meet

this assumption, the scores of the dyads were averaged
together. The focus of the study was on the collective
interaction of the dyad rather than on individuals. Future
studies may want to focus on individual contributions as
well as the interaction.

Summary

Validating the construct of play as the zone of
proximal development is a necessary step in providing
empirical support for Vygotksy's theory and a necessary part
of theory building (Overton, 1984). Vygotsky postulated
that play leads development. Changing the view of how play
is perceived has the potential to redirect the focus of not
only the research world, but also the classroom. If peers
affect play (and girls and boys differently), then how can
practitioners alter play so that all children benefit?
Replication and continued investigation are needed.

Vygotsky's theory admonishes scientists to use a
holistic approach when studying human development. Can
scientists use empirical methods to examine sociocultural
influences? Are additional methods and instruments for
measurement needed? Additional studies of peer play through
a sociohistorical perspective will provide answers as the
dialogue initially started by Lev Semenovich Vygotskii
(Russian spelling) continues.

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Footnotes

[1]
As an experienced kindergarten teacher who has worked with children in unfamiliar situations for over a decade, it seemed logical that past expertise in interacting with children would enhance the quality of the study.

Appendix A

Letter to Center Directors/Teachers

Virginia Polytechnic Institute and State University
Date

Dear Center Director/Teacher,

We are conducting a study on block play in the preschool classroom and would like to involve the children in your center in this project. For this reason, we are requesting permission to work with teachers, parents and children in your center.

If you agree to participate in the study, we will send informed consent letters home to the parent(s) of selected children requesting permission for their inclusion in the study. Only classrooms with four-year-olds will be involved in the study.

The study will involve two parts. During the first part, the children who agree to participate in the study will be observed twice during their regular play time in the center classroom. For the second part, the children will be invited to play at the Virginia Tech Child Development Laboratory. They will be videotaped while playing with another child in the block corner.

No child will be forced to participate against their will. All children will be free to withdraw from the study at any time with no negative consequences. The collected data will be coded to ensure confidentiality. After the data is collected and analyzed, the information gained in the study will be made available to the centers, teachers, and parents.

This study has been approved by the Institutional Review Board for projects involving human subjects at Virginia Polytechnic Institute and State University.

If you have any questions or concerns about this study, please contact us. Thank you for your cooperation.

Sincerely,

Dorothy J. Sluss
(429-5469)

Dr. Andrew Stremmel
(231-4671)

Appendix B

Letter to Parents/Guardians

Virginia Polytechnic Institute & State University
Parent and Child Consent Form
Date

Dear _____,

        We are conducting a study on block play in the
preschool classroom. We are requesting your permission to
include your child in the study. In addition, we are
requesting your child's permission to participate in the
study.

        The study will involve two parts. During the first
part, the children who agree to participate in the study
will be observed twice during their regular play time in the
center classroom. For the second part, selected children
will be invited to play at the Virginia Tech Child
Development Laboratory for an hour. Not all children who
participate in part one of the study will participate in the
second stage.

        No child will be forced to participate against their
will. All children will be free to withdraw from the study
at any time with no negative consequences. The collected
data will be coded to ensure confidentiality. After the
data is collected and analyzed, the information gained in
the study will be made available to the centers, teachers,
and parents.

        This study has been approved by the Institutional
Review Board for projects involving human subjects at
Virginia Polytechnic Institute and State University.
If you agree to participate in the study, please sign the
form on the following page. We are also requesting that you
explain the study to your child so that your child may
consider whether or not they want to join the study. Please
sign on the appropriate lines to indicate that both you and
your child have agreed to participate in the study. After
you have signed the form, please retain this first page for
your records and return the consent form which is on second
page.
        If you have any questions or concerns about this study,
please contact us. Thank you for your cooperation.

                                        Sincerely,

Dorothy J. Sluss   Dr. Andrew Stremmel
(553-6319)   (231-4671)

KEEP THIS PAGE FOR YOUR FILES. THANK YOU

Consent Form

Block play and Preschoolers

#_____

I acknowledge that I have been informed of the nature of
this study and I understand that my child may withdraw from
the study at any time. It is understood that the
information will be kept confidential. I give consent for
my child to participate in this study.

Name of child: _____

Name of parent: _____

Signature of parent:
                        _____

Address: _____

                        _____

Phone: _____

I also acknowledge that I have been informed of the nature
of this study and I have explained the study to my child.
My child realizes that she/he may withdraw from the study at
any time and there will be no negative consequences. My
child has agreed to participate in this study.

Signature of parent _____

Signature of child _____
(or Parent for child)

Please return to your child's teacher by _____.

THANK YOU

Appendix C

Sample Selection Criteria

Sample Selection Criteria

Group	A		B		C		D		E		F	
	HM	HF	HM	HF	HM	HF	HM	HF	HM	HF	HM	HF
	HM	HF	HM	HF	HM	HF HF	HM	HF	HM		HM	HF
	LM LM	LF	LM	LF	LM	LF	LM	LF	LM	LF		LF
	LM	LF	LM	LF	LM	LF	LM	LF	LM	LF	LM	LF

Group distribution

> L= LOWER QUARTILE
> H= HIGHER QUARTILE
> F=FEMALE
> M=MALE

	MALE	FEMALE	TOTAL COUNT
HIGH/HIGH	4 DYADS 1HM/6HM 2HM/5HM 3HM/4HM 1HM/2HM	4 DYADS 1HF/6HF 2HF/5HF 3HF/4HF 1HF/2HF	16
LOW/LOW	4 DYADS 1LM/6LM 2LM/5LM 3LM/4LM 1LM/2LM	4 DYADS 1LF/6LF 2LF/5LF 3LF/4LF 1LF/2LF	16
HIGH/LOW	3HM/6LM 4HM/5LM 5HM/4LM 6HM/3LM	3HF/6LF 4HF/5LF 5HF/4LF 6HF/3LF	16
TOTAL COUNT	24	24	48

Dyad assignment

Numbers 1,2,3,4,5,6 refer to the group
> L= LOWER QUARTILE
> H= HIGHER QUARTILE
> F=FEMALE
> M=MALE

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Appendix D

Play·Observation Scale

**Sociocogitive subscales used in Play Observation Scale
(Rogers & Sawyer, 1988, p.20; Rubin et al., 1976, p. 414;
Rubin, 1989)**

**(Definitions used in the study are listed below. The actual
instrument, the Play Observation Scale, may be obtained by
contacting the author, K. Rubin, at the University of
Waterloo, Waterloo, Canada.)**

Non-play

   1. Unoccupied-- Children watch others at play
   but do not enter the play. Unoccupied children
   may just stand around or move about the area.

   2. Onlooker-- Children watch others play, may
   talk to them or ask questions, and seem to move
   closer to a group, rather than watching
   whatever momentarily catches their attention.

 Subscale for solitary play

   (a) **Solitary-functional**: A child plays alone
   with objects. Even if the child is within
   speaking distance of others, the child does not
   alter her of his play, or interact with the
   others. The child uses simple repetitive muscle
   movements with or without objects.

   (b) **Solitary-constructive**: A child plays alone with
   objects. Even if the child is within speaking distance
   of others, the child does not alter her of his play, or
   interact with the others. The child manipulates
   objects to construct or to "create" something;

   (c) **Solitary-dramatic**: A child plays alone with
   objects. Even if the child is within speaking
   distance of others, the child does not alter
   their play, or interact with the others. The
   child's play involves the substitution of an
   imaginary situation to satisfy the child's
   personal wishes and needs

 Subscale for parallel play

   (a) **Parallel-functional**: A child plays with
   toys like those used by nearby children. The child
   does not try to influence the other children's
   activities. "He plays **beside** rather than **with** the other
   children" (Parten, 1932, p. 250). The child uses
   simple repetitive muscle movements with or without
   objects.

(b) Parallel-constructive: A child plays with toys like
those used by nearby children. The child does not try
to influence the other children's activities. "He plays
beside rather than **with** the other children" (Parten,
1932, p. 250). The child manipulates objects to
construct or to "create" something.

(c) Parallel-dramatic: A child plays with toys like those
used by nearby children. The child does not try to
influence the other children's activities. "He plays
beside rather than **with** the other children" (Parten,
1932, p. 250). The child engages in the substitution
of an imaginary situation to satisfy their personal
wishes and needs.

   Subscale for associative play
   (a) **Associative-functional:** Common activities occur
   between children. They may exchange toys and/or follow
   one another. Although all the children in the group
   are doing similar activities, specific roles are not
   defined, and there is no organized goal (such as
   building or playing a game with rules). The child uses
   simple repetitive muscle movements with or without
   objects.

   (b) **associative-constructive:** Common activities occur
   between children. They may exchange toys and/or follow
   one another. Although all the children in the group
   are doing similar activities, specific roles are not
   defined, and there is no organized goal (such as
   building or playing a game with rules). The child
   manipulates objects to construct or to "create"
   something;

(c) **associative-dramatic:** Common activities occur between
children. They may exchange toys and/or follow one
another. Although all the children in the group are
doing similar activities, specific roles are not
defined, and there is no organized goal (such as
building or playing a game with rules). The child
substitutes an imaginary situation to satisfy his/her
personal wishes and needs.

   Subscale for cooperative play
   (a) **Cooperative-constructive:** Children cooperate with
   others to construct something, hold competitions,
   produce dramas with coordinated roles, or play games
   with formal rules. Group membership is defined,
   usually by one or two powerful leaders. The child

manipulates objects to construct or to "create"
something.

(b) **Cooperative-dramatic**: Children cooperate with
others to construct something, hold competitions,
produce dramas with coordinated roles, or play games
with formal rules. Group membership is defined,
usually by one or two powerful leaders. Substitution
of an imaginary situation to satisfy the child's
personal wishes and needs.

(c) **Cooperative-games**: Children cooperate with
others to construct something, hold competitions,
produce dramas with coordinated roles, or play games
with formal rules. Group membership is defined,
usually by one or two powerful leaders. During
cooperative games, acceptance of prearranged rules and
adjustment to these rules is observed.

Appendix E

Parten's Play Scale

**Parten's scale of social participation (Rogers & Sawyers,
1988, p. 20).**

1. Unoccupied-- Children watch others at play but do
not enter the play. Unoccupied children just stand
around or move about the area.

2. Onlooker-- Children watch others play, may talk to
them or ask questions, and seem to move close to a
group, rather than watching what ever momentarily
catches their attention.

3. Solitary independent play--A child plays alone with
objects. Even if the child is within speaking distance
of others, the child does not alter her of his play, or
interact with the others.

4. Parallel activity-- A child plays with toys like
those used by nearby children. The child does not try
to influence the other children's activities. "He plays
beside rather than **with** the other children" (Parten,
1932, p. 250)

5. Associative play--Common activities occur between
children. They may exchange toys and/or follow one
another. Although all the children in the group are
doing similar activities, specific roles are not
defined, and there is no organized goal (such as
building or playing a game with rules).

6. Cooperative or organized supplementary play–
Children cooperate with others to construct something,
hold competitions, produce dramas with coordinated
roles, or play games with formal rules. Group
membership is defined, usually by one or two powerful
leaders. (p.20)

Appendix F

Blocks used in Phase Two

Blocks

Nine large hollow blocks	24" x 12" x 6"
Twelve medium hollow blocks	12" x 12" x 6"
Six small hollow blocks	6" x 12" x 6"
Two hollow triangle blocks	24" x 12"-4" x 6"

    (Half of a large hollow block)

Sixteen cardboard cylinders	24" x 6"
Six wooden planks	24" x 4" x 1"
Two wooden planks	6' x 4" x 1"

Sixteen quadruple unit blocks
                     21" x 2 3/4" x 1 3/8"
Forty-seven double-unit blocks
                     12" x 2 3/4" x 1 3/8"
Eighty-four unit blocks
                     5 1/4" x 2 3/4" x 1 3/8"
Twenty-nine half-unit blocks
                     2 1/2" x 2 3/4" x 1 3/8"

Five triangles (1/2 of a unit)
Five triangles (1/2 of a half-unit)
Five triangles (1/2 of a block: 5 1/2 by 5 1/2)
Five large cylinders
Five small cylinders

One arch with 6" vertical archway
Six tracks
Three doors
Three windows
Two Ys
Two Xs
One small replica of person
Two archways with inserts
Two archs
Six archs

Nine wooden cylinders
Three wooden cylinders
Two wooden cylinders

Twenty-three wooden blocks	1" x 1" x 6"
Thirteen wooden blocks	1" x 1" x 3"

Appendix G

Block Complexity Scale

I. Block Complexity
    A. Hierarchical integration (Reifel & Greenfield,
                              1982, p.209)
    Level 0 No true integration
    Level 1 At least one block is used to tie together
          or span other blocks
    Level 1a. simple integrations arches or bridges on
          same plane, enclosures
    Level 1b. complexity increases arches or bridges
          may be on two nonparallel planes
    Level 2 At least two arches or bridges are joined
          together by one other block

    B. Dimensionality (Reifel & Greenfield, 1982)
    Level 0 No dimensions one block or geometric point
    Level 1 One dimension Linear patterns that are
          either vertical or horizonal
    Level 2 Two dimensions If at least three blocks
          are placed so that two lines or one
          plane exists. Bidirectional use of
          blocks.
    Level 3 Three dimensions If the blocks are placed
          together to form at least one plane plus
          one line which is actually two planes

C. Symbolic play based on Vygotsky (Vygotsky, 1932,
1978; Sluss, 1996)

    Level 0. Presymbolism   The block is used as a
    block. The child carries or stacks the blocks.
    No symbolism is observed.

    Level 1. First level symbolism Reproduction of
    reality. The child uses the blocks to
    reproduce a table in the room, a house,
    or a school bus.

    Level 2. Second level symbolism The object is
    transformed. The child builds a space
    shuttle, a pirate ship, or a candy
    machine.

Appendix H

Communication Scale

COMMUNICATION SCALE

Subscales described by Corsaro (1986) and utilized by Farver (1991, p. 58).

1. <u>Paralinguistic cues</u>: Changes in intonation and pitch to mark fantasy and the animation of objects. For example, the "vroom vroom" sounds of toy rocket.

2. <u>Descriptions of action</u>: Declarative statements accompanying ongoing activity or describing past or future action. For example, the child says, "I'm riding on a bus," as they sit on a block.

3. <u>Repetition</u>: Repeating a partner's prior utterances.

4. <u>Semantic tying</u>: Adding new semantic elements to partner's previous contribution. For example, the child says, "Its a building." and the second child says, "Its a tall building."

5. <u>Calls for attention:</u> Utterances used to gain partner's attention. These include the partner's name, "Hey!"

6. <u>Directives</u>: Declarative used to control partner's action, for example, "Do this!"

7. <u>Tags</u>: Verbal devices placed at the end of a conversational turn to elicit a response or acknowledge. These include, "We're playing pirates, aren't we?"
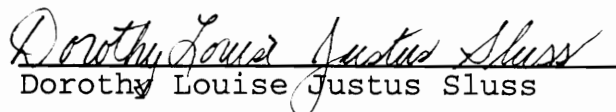
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VITA

Dorothy Justus Sluss, granddaughter of Mary Ramsey Justus and daughter of Monroe and Mildred Dotson Justus, was born in Hurley, Virginia, on August 2, 1951. Educated in the public schools of Buchanan county, she graduated from Hurley High School in 1969. Her college career began at Southwest Virginia Community College in Richlands, Virginia, and extended to Clinch Valley College at Wise, Virginia, where she obtained a Bachelor of Science degree in Elementary Education in 1978.

Professional employment began in 1978 in the public schools of Russell County and continued in Wise County until 1991. During this time, she completed a M. S. degree from the College of Education at Virginia polytechnic Institute and State University at Blacksburg, Virginia.

In 1990, she entered the doctoral program in the College of Department of Family and Child Development. In 1994, she accepted the position of Visiting Assistant Professor of Education at Emory & Henry College. The following year, she joined the faculty of East Tennessee State University as Assistant Professor of Early Childhood Education. She completed requirements for the Ph. D. degree in Child Development at Virginia Tech on December 13, 1995.

Dorothy is married to J. Roger Sluss, Sr. and they have one son, James R. Sluss II.

Dorothy Louise Justus Sluss