

SOUND EFFECTS: THE EFFECTS OF SOUND-PRODUCING TOYS ON THE LEVEL OF
SOCIAL AND COGNITIVE PLAY IN 3, 4, AND 5-YEAR-OLDS

by

JENETTE KATHERINE TURPIN

B.S., Kansas State University, 2005

A THESIS

submitted in partial fulfillment of the requirements for the degree

MASTER OF SCIENCE

School of Family Studies and Human Services
College of Human Ecology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2008

Approved by:

Major Professor
Ann Murray

Abstract

This study investigated the effects of sound-producing toys on the social and cognitive levels of play in young children. Thirty-four pairs of children were observed (N=68), ages 3, 4, and 5 years, during 15-minute play sessions. The play conditions were: 1) farm set with sound, 2) farm set with no sound, 3) doctor set with sound, and 4) doctor set with no sound. Independent variables included age, gender, and the presence or absence of sound. Dependent variables included the percentages of time that children engaged in levels of social play (solitary, parallel, and group), levels of cognitive play (functional, constructive, and dramatic), and non-play. Overall, sound was marginally associated with more time spent in play. For group play there was a marginally significant sound by gender interaction, suggesting that sound doubled female group play. There was a significant sound by age interaction suggesting that 5-year olds engaged in group play more with sound than with no sound. A significant sound by gender interaction indicated that the presence of sound increased dramatic play in both males and females, but more so in females. A sound by age interaction indicated that 5-year-olds engaged in more dramatic play with sound than without. Three-year-olds also engaged in more dramatic play when sound was present. There was a significant sound by gender interaction indicating males engaged in more functional play than girls when sound was present. There was a significant sound by age interaction, indicating that 5-year-olds engaged in less constructive play when sound was present. In conclusion, young children were more likely to engage in play when sound was present. Sound enhanced the play of 5-year-olds who engaged in more group and dramatic play, but less constructive play, with sound-producing toys. Sound also enhanced the play quality of 3-year-olds, who engaged in more dramatic play when sound was present. Furthermore, sound enhanced the play of girls who engaged in more group and dramatic play with sound, and boys, who engaged in more dramatic play with sound. Limitations of the study along with implications for future research are discussed.

Table of Contents

Table of Contents	iii
List of Figures	iv
List of Tables	v
Acknowledgements	vi
Dedication	vii
CHAPTER 1 - Introduction	1
Importance of Play	2
Age Differences in Play	2
Gender Issues in Play	3
High- vs. Low-Structure Toys	3
Interactions of Gender and Age with Toy Structure	4
CHAPTER 2 - Method	6
Participants	6
Materials	6
Procedure	7
CHAPTER 3 - Results	10
CHAPTER 4 - Discussion	16
Comparison to Literature	16
Discussion of Sound as Structure	18
Limitations	19
Conclusion	20
Implications for further research	21
References	22
Appendix A - Consent Form	25
Appendix B - Demographic Sheet	27
Appendix C - Script	28
Appendix D - Addendum to Rubin's Play Scale (2001)	30
Appendix E - Recording Form	34

List of Figures

Figure 1. Group Play: Sound x Gender Interaction.....	12
Figure 2. Group Play: Sound x Age Interaction.....	12
Figure 3. Functional Play: Sound x Gender Interaction.....	13
Figure 4. Constructive Play: Sound x Age Interaction.....	14
Figure 5. Dramatic Play: Sound x Gender Interaction.....	14
Figure 6. Dramatic Play: Sound x Age Interaction.....	15

List of Tables

Table 1. Sample Means and Standard Errors.....	10
Table 2. p-Values for Non-Play and Social Play.....	11
Table 3. p-Values for Cognitive Play.....	13

Acknowledgements

I would like to thank Dr. Ann Murray, my major professor, for her continual support, encouragement, and guidance through this process. I have learned so much through this process thanks to you. I appreciate the way you let me figure things out for myself, but are always there when I need you. I will miss working with you! Thank you for everything!

I would also like to thank the other members of my committee, Dr. Bronwyn Fees and Dr. Linda Crowe, for volunteering their time, and for their input and guidance during this experience. It has been a pleasure working with you both!

I would also like to thank Molly Murphy who spent countless hours watching video and coding it 10 seconds at a time. You made this research possible!

Thanks to Dr. Mary DeLuccie and Hoeflin Stone House for donating the toy sets for this research.

Thanks to the administrators and teachers at Hoeflin Stone House Child Care Center, Manhattan Day Care and Learning Center, KSU Child Development Center, Seven Dolors Child Care, and Oak Grove for allowing us to conduct research in your centers. Your cooperation and help made this research possible.

Thank you to the founders of the Steward Family Scholarship and the Family Studies and Human Services scholarship committee.

Thanks to Radina's Coffeehouse for allowing me to use your space and electricity for hours at a time!

Finally, I would especially like to thank Shannon Dick for the many hours he spent teaching me about research design and statistics, and for the hours he spent with me, and on his own, problem solving about this study; and Chris Turpin for the time he spent helping me think through this study and for his many revisions of my work. You guys rock!

Dedication

This is dedicated to my family Chris, Gary, Rhonda, Shannon, Michelle, and Nicole. Thanks for encouraging me in my education and in my ambitions. Thanks for supporting me in my decisions. Thanks for listening to my problems, and then listening to me tell you why no solution will work, and then still wanting to help me afterwards! Thanks for your suggestions, your input, your revisions, your ideas, your solutions, your help, your presence, your hugs, your sympathy, your patience, and your unending support. I love you guys! Best Family Ever!

CHAPTER 1 - Introduction

Sound as a feature of toys is becoming prevalent in the toy manufacturing industry. In a recent study, Light, Drager, and Nemser (2004) surveyed 60 toys for children ages 2 to 5 years old which were named as “popular” or “award winning” and represented various categories (fine motor, gross motor, games or puzzles, pretend play, and plush toys or dolls). They found that 12% of the toys included an element of light, 50% involved movement or action, and 43% contained an element of sound (voices, sound effects, or music). Research has shown that toys have a wide range of impact on the social and cognitive level of play; therefore, it seems prudent to understand the effects of electronic components of toys on the play of young children.

A review of the current literature yielded little information about how sound-producing toys affect play in typically developing preschool children. Schneider, Moch, Sandfort, Auerswald, and Walther-Weckman (1983) explored the effects of a novel object (which included a sound element) in the progression of exploration, manipulation, and then play. They found that boys manipulated the object more than girls and children played with the new object more as a function of age. The literature search also yielded little research on sound-producing toys affecting the play of the special needs population. In one study, 20 children with a mean age of 14 years who were classified as profoundly handicapped made more contact with, and played less stereotypically with the toys with extra stimuli (light, vibration, and sound), but when the stimuli were analyzed separately, sound was not significant (Murphy, Carr, & Callias, 1986). In the survey mentioned previously, Light and her colleagues, (2004) compared the traits of augmentative and alternative communication (AAC) systems with popular award winning toys designed for children ages 2-5. They found that although 43% of the toys studied included sound (voices, songs, sound-effects), very few of the AAC systems had sound effects. They concluded that children may interact more with the AAC system if it exhibited some of the same features of the more popular toys. No study was included to verify that hypothesis.

Importance of Play

The role of play in child development has been studied for many years. While it is clear from the research of Smilansky (1968), Parten (1932), and Piaget (1962) that cognitive and social play typically progresses as a child develops, research also shows that young children typically play at all levels, and there are benefits to children being engaged in the more advanced levels of cognitive and social play. Dramatic play has an important role in the development of children. Vygotsky (1967 [1933]) described pretend play as the "leading source of development in the preschool years" (p.6). According to Vygotsky, pretend play creates a zone of proximal development for the child where the child is forced to act with self-control and delayed gratification. Pretend play also develops imagination, reasoning, abstract thought, and symbolic thought which aids in language and literacy (Vygotsky, 1967 [1933]). More recently, Karen, Feldman, Namdari-Weinbaum, Spitzer, & Tyano (2005) found that children's intelligence can predict the frequency of symbolic play. The effects of play on a variety of life skills was examined by Nowak-Fabrykowski (1994), who found seven main areas in which dramatic play prepares children for the future: cognitive, expressive, creative, substitutive, stimulative, socializing, and ordering.

Group play and dramatic play are often paired together in studies, so it is difficult to distinguish which benefits come from playing dramatically and which come from playing in a group. However, some research (Garvey, 1974) claims that there are a number of skills involved in and developed through group play. These include the ability to distinguish and communicate the difference between reality and play, to make rules abstract, and to identify a theme and develop it. Rubin, Maioni, & Hornung (1976) also found that group play is associated with the ability to role-play. Solitary play of preschoolers, on the other hand, has been found to have negative effects. Preschoolers who play solitarily (and especially those who engage in more solitary-functional play) engage in fewer peer conversations, have a lower mental age (as measured by receptive vocabulary), are less able to take another's perspective, are less able to problem-solve, and have fewer positive interactions with peers (Rubin, 1982).

Age Differences in Play

Age, or more precisely, developmental stage, has an influence on the way children play. Again, the research of Smilansky (1968), Parten (1932), and Piaget (1962) shows that as children

grow older, their ability to play and the variety of play changes. For example, Rubin, Watson, and Jambor (1978) found that preschoolers typically engage more frequently in lower cognitive and social levels of play than kindergarteners. Play increases in complexity and elaborateness as children get older (Jeffree & McConkey, 1975). The ability of children to use fewer physical objects and more imagination increases with age. Crum, Thornburg, Benninga, & Bridge (1983) found that 30- to 36-month-olds were far less capable of dramatic play using no objects than children 44- to 50-months-old. Another study found that younger preschoolers play more dramatically with more supporting props, but older preschoolers do not require props to play dramatically (Olszewski & Fuson, 1982).

Gender Issues in Play

Gender is also a source of variation in play for young children. The choice of toy or play theme is a major contributing factor to play behavior. Spencer-Pulaski (1970) found that 5-year-old girls were more likely to play with, and react positively toward, stereotypically opposite-sex toys than boys. Boy play exhibited less variety in theme than girls. In contrast, McLoyd Warren, & Thomas (1984) found that girls played in domestic roles almost exclusively, adopting few peripheral (i.e. someone who only plays a function, not a character: a “driver” for a taxi or a ticket-taker at the movies) and occupational roles, and no fantasy (e.g. princess, superhero) roles. Boys, however, engaged in a variety of themes, and played in slightly more occupational roles than domestic or fantasy. Both genders exhibited more dramatic play with their same-gender stereotyped toy than with the opposite gender toy (Neppel & Murray, 1997). One study found that, in general, boys’ pretend play exhibited more aggressive themes, while girls’ play contained more nurturing themes (Karen et al., 2005). As children get older, boys spend less time than girls in the house keeping center (Dodge & Forst, 1986). In general, Bornstein, Haynes, Pascual, Painter, & Galperin (1999) found that boys explore more than girls, and that girls play dramatically more than boys. Neppel and Murray (1997) found that girl-girl dyads exhibited more cooperative play than girl-boy dyads. Compared to the opposite sex, girls were also found to engage in more constructive play, and boys were found to engage in more functional play.

High- vs. Low-Structure Toys

One major area of study regarding toys’ impact on play is the effects of low-structure (LS) toys vs. high-structure (HS) toys. The definitions of these terms (and the terms themselves)

vary greatly among studies, but in general, HS toys have more detail and generally directly represent some specific “real” item (e.g.: a Superman costume, a plastic donut with sprinkles, a detailed baby doll). LS toys lack detail and do not specifically represent a “real” item or do, but could represent many items easily (e.g.: a piece of fabric, sticks, blocks). This structure variation can be between toy types or within toy types. For example, Robinson and Jackson (1987) studied structure between toy types by looking at blocks (LS) compared to a doctor kit (HS) and within toys by looking at interactions with a faceless doll (LS) and a Barbie (HS).

In some older studies, the claim was often made that low-detailed toys have more “holding power” with older children. Spencer-Pulaski found that LS toys increased the variety of play theme (1970). However, Robinson & Jackson (1987) found that HS toys extend the time in which children pretend over LS toys. He also found no evidence that play themes are more versatile with LS toys but that more time is spent in non-prototypical play with LS toys. Still other studies have found that elaborateness in pretend play stayed relatively the same between the high and low-structure toys (Jeffrey & McConkey, 1975).

Interactions of Gender and Age with Toy Structure

Among research on the effect of structure of toys on play, there is also a gender effect among preschool aged children. McLoyd (1983) examined gender differences in various types of dramatic play with LS and HS toys. She found that girls played more cooperatively and dramatically using HS toys. Boys exhibited less variety in theme than girls, and engaged in less cooperative play than girls in both LS and HS conditions. McLoyd et al. (1984) found that when HS toys were present, across all ages of boys, there was more domestic and occupational role play. However, boys engaged in far more fantasy play when LS toys were present.

Many studies analyze data on low versus high structure as an interaction with age. Multiple studies have shown that as children get older (from 2 to 5), they are increasingly able to pretend with progressively fewer physical cues from the toy, until they are able to pretend with no toy at all or toys that are completely unrepresentative of the item being symbolized (Elder & Pederson, 1978; Fein, 1975; Crum, Thornberg, Benninga, & Bridge, 1983). Fein (1975) stated that children are able to make more mental “transformations” as they get older. For example, in her study Fein had children pretend to feed a horse with a cup. Younger children could easily feed a horse-like toy with a cup-like cup, but had a more difficult time feeding a non-horse-like

horse or using a non-cup-like cup to feed a horse. Further, it was less likely that they were able to use both the non-representative toys at the same time. This finding was consistent with Crum et al. (1983) who found that younger children are less able to pretend using imaginary objects than older children.

The purpose of this study is to examine the effects of sound on the frequency of various levels of play. The researchers speculated that sound may add structure to toys, and therefore may act as a scaffold with which to advance pretend play. This would mean that dramatic play would increase for younger children when sound is present, but stay the same for older children who do not need the increased structure in toys to aid in pretend play. Alternatively, younger children might be distracted by the auditory element in the toy, detracting from dramatic play, while older children may be able to overlook the sound distraction due to their generally more advanced dramatic play skills. In this case, younger children would engage in more functional play and less dramatic play when sound is present. The researchers felt that, due to the lack of research on this topic and the exploratory nature of this study, no specific hypotheses could be advanced at this time. Instead, two-tailed testing was conducted so that either direction of the effect could be determined, despite the loss of statistical power.

CHAPTER 2 - Method

Participants

The participants in this study were recruited from six different community child care programs in a Midwestern city. The participating classrooms served children between the ages of 3 through 5 years. Consent forms (Appendix A) and demographic summary sheets (Appendix B) were distributed to each family in the class by the teacher. The teachers were asked to direct any questions about the study to the researchers. When the researcher received the consent forms, she paired children within centers based on age, sex, and whether or not they were on an Individualized Education Program (IEP). Approximately 259 families were approached and 129 consent forms were received. Overall, 74 children (42 males and 32 females) between the ages of 3 and 5 were able to be paired and, therefore, coded for the analysis. Originally, children with IEPs were to be studied in a separate analysis, but there were not enough participants, and so those students' data was dropped from the study. Sixty-eight children--including 20 three-year-olds (8 male, 12 female), 40 four-year-olds (24 male, 16 female), and 8 five-year olds (4 males, 4 females)--are included in the current analysis. Of these participants, 4 children were reported as Asian, 2 Black, 47 Caucasian, 3 Hispanic, and 12 as being a mix of the previous categories.

Materials

The toys chosen for this study were selected based on three criteria: 1) their ability to produce noise and have the noise turned off by a switch or by removing the battery; 2) their relative gender neutrality; and 3) their relatively common presence in child care centers. Two toys were selected. One toy was to represent micro-symbolic play (e.g. little people, Barbie, doll house) and macro-symbolic play (e.g. playing doctor, cooking food on a pretend oven, playing dress-up) (Wolfgang & Phelps, 1983).

The first toy set was a farm themed set. It included the "Little People Animal Sounds Farm" by Fisher-Price which produced "oink," "moo," "neigh," "cock-a-doodle-doo" sounds, and the tune of "Old McDonald." The "Animal Sounds Farm" included a barn and silo, four people figurines, and four animal figurines. The farm was supplemented with "Little People

tractor -Sonya,” “Lil Farmers Market,” “Little People Farm Animals-Sonya,” and “Little People Farm Animals-Eddie.” These additional supplement packs added four people, six animals, two vehicles, three pieces of fencing, and three accessory pieces.

The second toy set was a doctor themed set. It contained a doctor kit by Learning Resources with a cell phone that produced beeps and telephone ring sounds and “Mary had a little Lamb” tune, a pager that produced various beeps and telephone ringing sounds, stethoscope that produced heart beat and coughing sounds, blood pressure pump, glasses, tweezers, thermometer, scalpel, scissor tweezers, scissors, syringe, knee reflex hammer, band aid (two), mirror, otoscope, name badge, and tray. Additionally, two “Baby Talk Newborn” by Kidconnection baby dolls were added as a supplement to encourage pretend play. The dolls produced sounds including “mama,” “I love you,” and a laugh.

Procedure

Children were paired within gender to control for the variability found in play in mixed sex groupings (Dodge & Frost, 1986; Neppel & Murray, 1997), and within age to control for the variability of play and increased levels of dramatic play found in mixed group pairings (Roopnarine, Ahmeduzzaman, Donnelly, Gill, Mennis, Arky, Kristen, McLaughlin, & Talukder, 1992). After the children were grouped by center, age, gender, and IEP, each was assigned a random number. The pairs were then ordered based on their random number, and the first two were paired, followed by the second two, and so on. Then, each pair was randomly assigned to one of 4 conditions: 1) Farm with sound (FS) for the first 15 minutes then doctor set with no sound (DN) for the second 15 minutes, 2) Farm with no sound (FN)/Doctor set with sound (DS), 3) DS/FN, and 4) DN/FS. So that a balance could be maintained in each condition, there were four “slots” in each age by gender category for the four conditions. Each pair, within the age and gender group, would be randomly assigned to condition one through four. Once a condition was randomly assigned, it could not be assigned again until all four “slots” were filled. The researcher then established days and times when the children would be in a period of free play or group time when the children could be taken to another location in the center. The researcher randomized the order in which the pairs of children would be recorded each day. If a child was absent on their assigned day, the researcher moved to the next pair on the list and then re-randomized the list before the next day’s visit to include the pair that was skipped.

The researcher spent at least 45 minutes in each room 1 to 2 days before recording began to allow the children to become comfortable with her (Crum et al., 1983). On the day recording began, the researcher asked the teacher to call the first pair, and the teacher would tell the children that it was “their turn” to go play with some new toys. When the children agreed to go, the researcher took them out of the room (or waited until the other children left the room). The researcher began to recite from a script to explain what was expected of the children (Appendix C). In four of the centers, the recording took place in an unoccupied classroom in the center. In one center, the classroom was used while the rest of the children were playing outside. In the final center, a separate section of the room was able to be completely closed off and used. The children were brought into the area where the appropriate condition was set up.

Recording began when the experimenter entered the room. The children were presented with one of the four conditions mentioned previously. For example, if the pair was assigned to condition 1, they were first presented with the farm toy with sound for 15 minutes, then, for the second 15 minutes, they were given the doctor set with no sound. The length of play time was based on a study by Schneider, Moch, Sandfort, Auerswald, & Walther-Weckman (1983) involving a “novel toy” which produced light and sound and used 15 minute play sessions during observations of play behavior. In the present study, the children were given a “demonstration” of the toy, either showing the parts that made noise, or mimicking the same movements with the soundless condition. The experimenter told the children that they would be recorded and timed and that she would be busy doing “teacher work.” On the cue of “have fun,” the researcher started a timer for 15 minutes and then limited communication with the children to brief answers to direct questions and to offer immediate “help” that the child required (going to the bathroom, tying shoes, getting a hand unstuck). On two occasions a child needed to use the restroom and taping was stopped until the child returned. At the end of 15 minutes, the researcher recited the script and introduced the second toy set in the condition to which the children were assigned. When the session was over, the researcher asked the children to help clean up, thanked the children for helping with her project, and escorted them back to the room (or to the playground).

The videos were coded by the researcher and another coder, who was blind to the study, using “The Play Observation Scale” (Rubin, 2001). Several exclusions, clarifications, and additions were written in an addendum to the scale (see Appendix D). Coders watched videos four times each--once for each child in each 15-minute treatment. They recorded the level of

social (Solitary, Parallel, or Group) and cognitive play (Functional, Constructive, and Dramatic), the type of non-play (Onlooker, Unoccupied, Exploration, Transition, Active Conversation, and Aggression), and whether or not sound was produced (see Appendix E). If the children were out of view of the camera for more than four seconds of the ten-second period, “X” was recorded for uncodeable. For experimental error, N/A was recorded. The overall play was converted into percentages so that the total for analysis would be 100% rather than a variable number of total counts when data was excluded due to uncodable periods of time or experimental error.

To establish inter-rater reliability the coders jointly coded four sessions from mismatched pairs that could not be included in the analysis (1 “session” = one child in one 15-minute treatment). They discussed how each 10 second interval should be coded. Problems were discussed and the addendum was revised. They then coded 10 sessions until they reached 80% reliability and .7 Kappa score. Overall, 30 sessions out of 148 total sessions were double-coded. The reliability for double-coded sessions was checked after each full pair was coded (4 sessions). When agreement was below 80%, the coders re-coded the session together, discussed the discrepancies, and reached an agreement which was then used in the analysis. The original agreement scores were recorded for the overall agreement score. The coders obtained 83.96% overall agreement and a .72 Kappa score in the social observations, and 83.68% overall agreement and a .74 Kappa score in the cognitive observations.

CHAPTER 3 - Results

A two-tailed analysis was conducted using Generalized Linear Models, type III sum of squares to obtain an ANOVA table. After consulting with a statistician, it was determined that due to the experimental set up in which the condition applied to “time 1” was randomized, but the condition of “time 2” was dependent on the conditions of “time 1,” “time 2” could no longer be considered independent, and so could not easily be included in the analysis. Therefore, only “time 1” was included in the analysis for a total of 68 trials. Fisher’s Least Significant Difference method was used to determine the difference of means where significant interactions were present.

Table 1. Sample Means and Standard Errors

	Social Play (mean %/SE)			Cognitive Play (mean%/SE)			
	Non-Play	Solitary	Parallel	Group	Functional	Constructive	Dramatic
Condition:							
Sound n=38	34% .0493	0.6% .0123	30% .0672	35% .0542	6% .0306	2% .0382	58% .0574
No Sound n=30	51% .0429	0.5% .0095	32% .0514	17% .0415	8% .0234	16% .0292	26% .0439
Gender:							
Female n=32	44% .0456	0% .0088	22% .0476	34% .0384	3% .0216	9% .0270	44% .0407
Male n=36	41% .0413	1% .0079	40% .0431	18% .0348	11% .0196	9% .0245	40% .0369
Age:							
3’s n=20	51% .0743	0.2% .0143	35% .0775	15% .0625	13% .0352	7% .0440	29% .0663
4’s n=40	40% .0335	2% .0064	40% .0349	18% .0882	10% .0159	14% .0198	37% .0299
5’s n=8	36% .0910	0% .0175	19% .0950	45% .0766	0% .0432	6% .0539	60% .0812

The independent variables were sound, age, and gender. The dependent variables were Non-Play, three types of Social Play (Solitary, Parallel, and Group) and three types of Cognitive Play (Functional, Constructive, and Group) (Rubin et al., 1976). The variables of toy and classroom were used as blocking factors. The sample means and standard errors for each main effect are reported in Table 1. The ANOVA results are shown in Tables 2 and 3. Fisher’s Least Significant Difference method was used to determine the difference of means where there were significant interactions.

The ANOVA results for social levels of play are presented in Table 2. For the main effect of Non-Play, sound was found to be “marginally significant” ($p=.0518$), meaning between $p=.05$ and $p=.1$. When sound was present, there was less non-play than when sound was not present (34% vs. 51%).

Table 2. p-Values for Non-Play and Social Play

	df	Non-Play		Social					
		Non-Play		Solitary		Parallel		Group	
		F-Value	p-Value	F-Value	p-Value	F-Value	p-Value	F-Value	p-Value
Overall Significance	67	1.95	.0280**	1.71	.0632*	1.67	.0711*	4.86	<.0001***
Sound	1	4.00	0.0518*	0.16	0.6913	0	0.993	5.27	.0265**
Gender	1	0.14	0.7064	0.38	0.5397	9.04	.0044***	11.68	.0014***
Sound*Gender	1	1.56	0.2181	0.11	0.7388	0.03	0.8687	3.13	.0839*
Age	2	0.70	0.4996	0.98	0.3827	2.56	0.0887*	5.61	.0068***
Sound*Age	2	1.57	0.2189	0.44	0.6484	0.76	0.4734	5.59	.0359**
Gender*Age	2	0.07	0.9282	0.21	0.8127	0.28	0.7554	1.08	0.3496
Sound*Gender*Age	2	1.16	0.2878	0.24	0.1417	0	0.9614	0.77	0.3853

* $p<.1$

** $p<.05$

*** $p<.01$

n=68

For Parallel play, the overall significance was marginal ($p=.0711$), and gender was significant ($p=.0044$). Males engaged in more Parallel Play than females (40% vs. 22%) and Age was marginally significant ($p=.0887$). Four-year-olds engaged in significantly more Parallel Play than 3’s, and four-year-olds engaged in Parallel Play more than 5-year olds, but the level of Parallel Play was not significantly different for 3- and 5-year olds.

For Group Play, gender was significant ($p=.0014$) with females participating in Group Play 34% of the time and males, 18% of the time. There is a marginally significant Sound x Gender effect ($p=.0839$) (see Figure 1). Females engaged in significantly more Group Play (48%) than males (23%) when sound was present. Females engaged in more group play with sound than without sound (48% vs. 20%). There was also a significant difference between male Group Play without sound compared to female Group Play with sound (13% vs.48%). There was a Sound x Age effect for Group Play (see Figure 2) indicating that the percentage of time in Group Play increased with sound among 5-year olds compared with all other ages.

Figure 1. Group Play: Sound x Gender Interaction

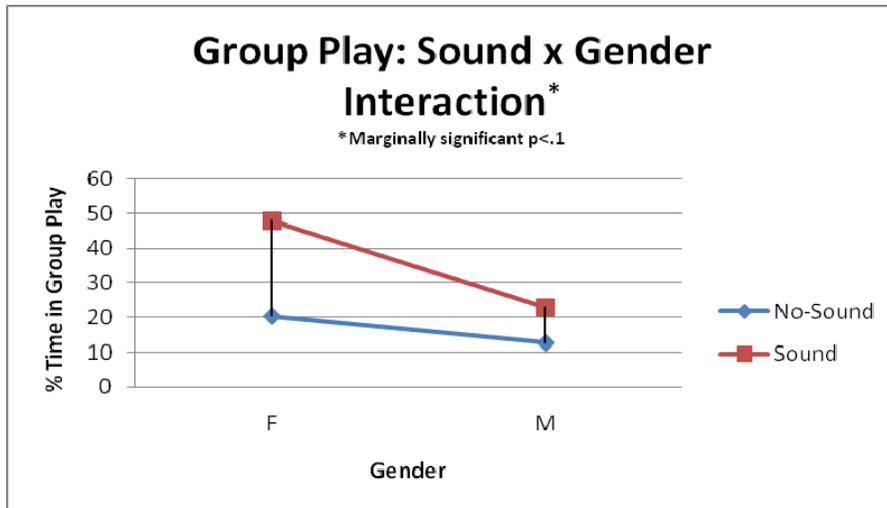
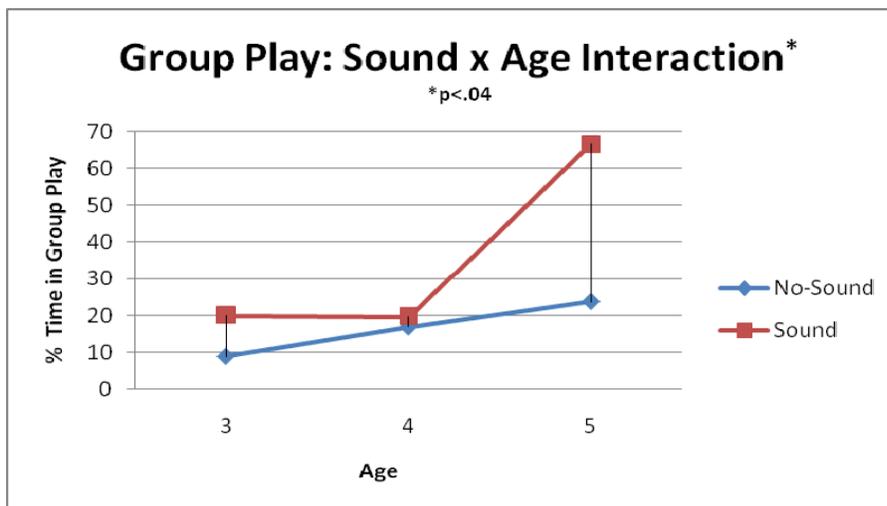


Figure 2. Group Play: Sound x Age Interaction



The ANOVA results for cognitive levels of play are presented in Table 3. For Functional Play, there was a significant Sound x Gender effect ($p=.0141$) (see Figure 3) indicating that sound was associated with more Functional Play among boys (14%) than girls (0%) when sound was present. There was also a marginally significant Age effect ($p=.0564$) indicating that Functional Play decreased as age increased (see Table 1).

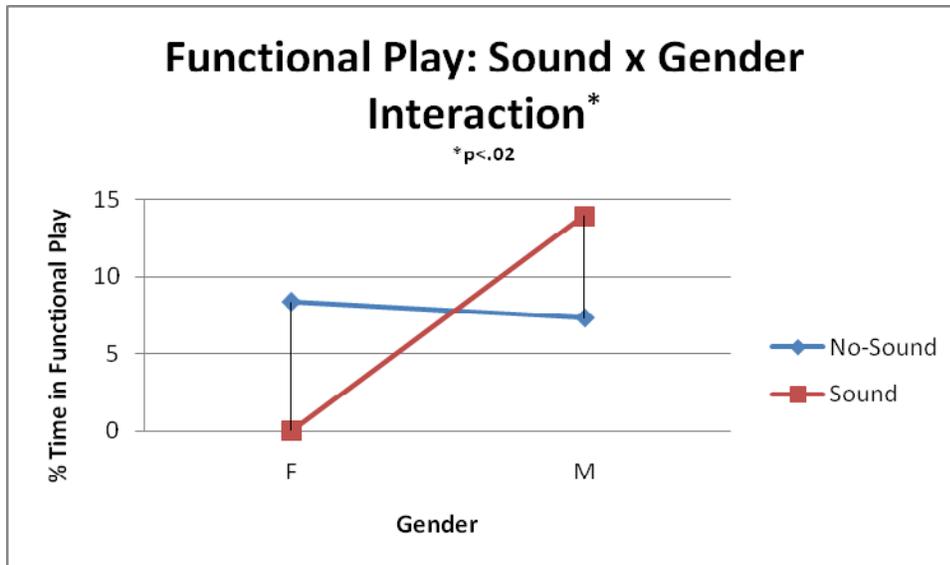
Table 3. p-Values for Cognitive Play

	df	Cognitive					
		Functional		Constructive		Dramatic	
		F-Value	p-Value	F-Value	p-Value	F-Value	p-Value
Overall Significance	67	2.77	.0018***	4.81	<.0001***	6.38	<.0001***
Sound	1	0	0.9943	3.26	.0776*	11.82	.0013**
Gender	1	5.98	0.0185**	1.29	0.2627	0.01	0.9039
Sound*Gender	1	6.54	.0141**	0.33	0.569	5.66	.0217**
Age	2	3.07	.0564*	0.77	0.467	2.09	0.1361
Sound*Age	2	0.79	0.4592	3.74	.0316**	8.16	.0010***
Gender*Age	2	0.26	0.7703	1.62	0.2094	1.41	0.2556
Sound*Gender*Age	2	0.39	0.5379	2.74	0.1049	0.05	0.8246

* $p<.1$
** $p<.05$
*** $p<.01$

n=68

Figure 3. Functional Play: Sound x Gender Interaction



For Constructive Play, a Sound x Age interaction was found to be significant ($p=.0316$) (see Figure 4) indicating that percent of time in Constructive Play decreased in the presence of

sound among 5-year-olds. Further, when sound was present, 5-year-olds engaged in less Constructive Play than both 3- and 4-year-olds. When sound was not present, 5-year-olds played more constructively than 3-year-olds and 4-year-olds.

Figure 4. Constructive Play: Sound x Age Interaction

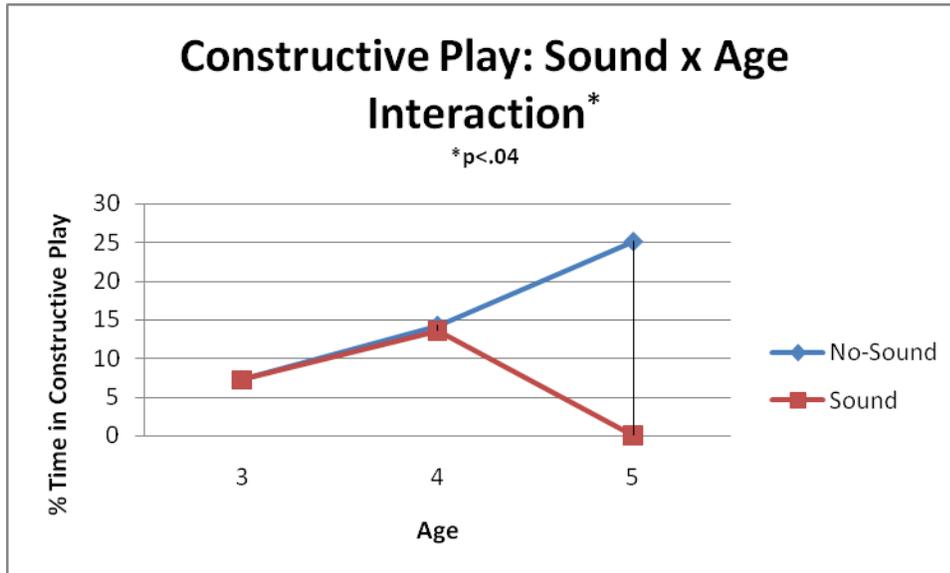
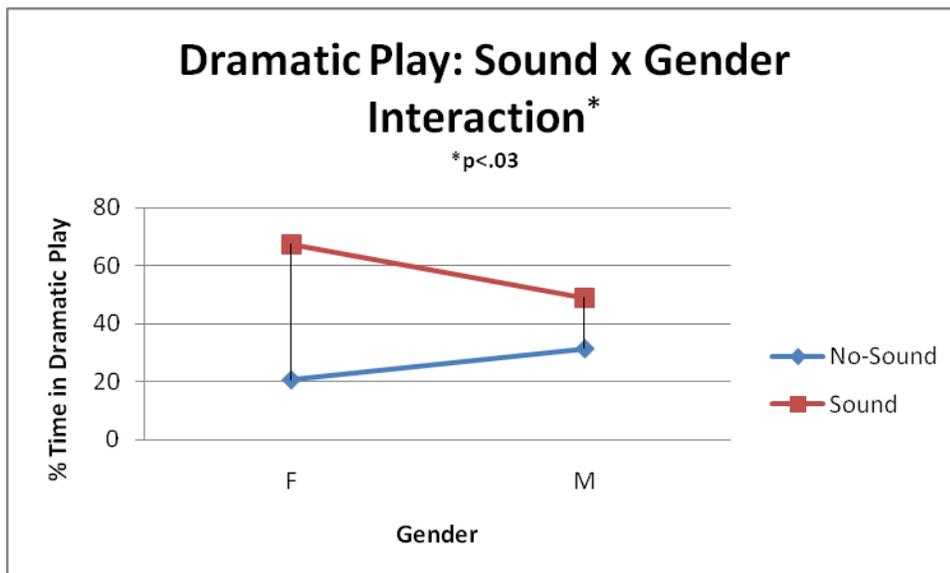


Figure 5. Dramatic Play: Sound x Gender Interaction

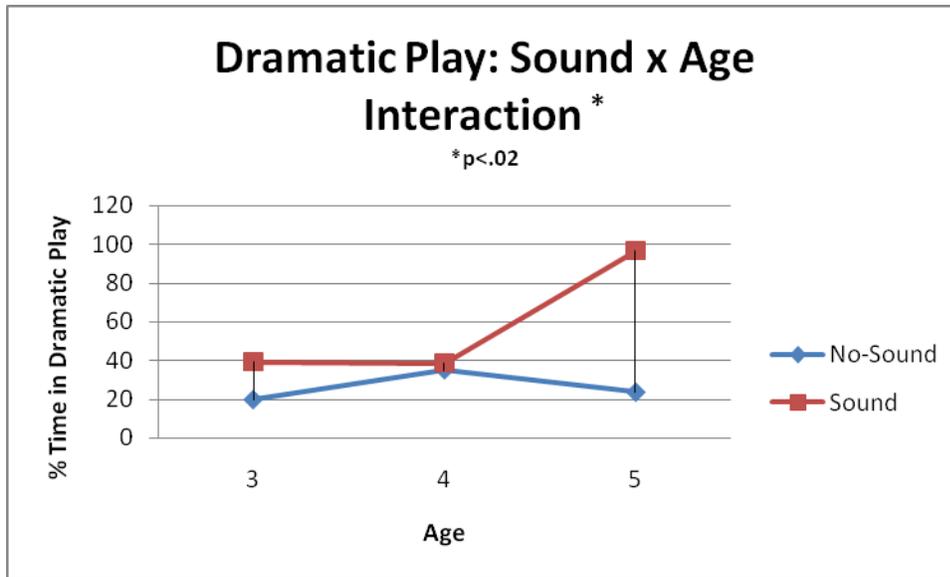


For Dramatic Play, there was a significant Sound x Gender interaction ($p=.0217$) (see Figure 5). When sound was not present, males played marginally significantly more than female (31% vs. 21%). Sound was associated with increased Dramatic Play among males and females

(67% vs. 21% for females and 49% vs. 31% for males). There was a marginally significant difference between males and females when sound was present, possibly suggesting that females engage in more Dramatic Play when sound is present than males (67% vs. 49%).

There was also a significant Sound x Age interaction for Dramatic Play ($p=.0010$) (see Figure 6) indicating more Dramatic Play among 5-year-olds when sound was present compared to play with toys without sound. Five-year-olds also engaged in more Dramatic Play when sound was present than 3- and 4-year-olds. Three-year-olds engaged in more Dramatic Play with sound without (39% vs. 20%).

Figure 6. Dramatic Play: Sound x Age Interaction



CHAPTER 4 - Discussion

The purpose of this study was to determine the effect of sound on the level of play in preschool children. The present study found sound to be marginally associated with more time spent in play as opposed to non-play. For group play, there was a marginally significant sound by gender interaction. Girls played significantly more in group play than boys when sound was present. The mean percent of girls' group play more than doubled in the presence of the sound variable. There was also a significant sound by age interaction suggesting that 5-year-olds engaged in group play more with sound than with no sound. Boys engaged in parallel play almost twice as much as girls on average. There was also a marginal age effect where 4-year-olds spent more time engaged in parallel play than 3-year-olds, and more than double the time that 5-year-olds spent in parallel play.

There was a significant sound by gender interaction indicating that the presence of sound increased dramatic play in both boys and girls, and the increase was significantly greater for girls than boys. Boys' dramatic play nearly doubled, while girls' more than tripled their dramatic play when sound was present. There was also a sound by age interaction indicating that 5-year-olds engaged in more dramatic play with sound than without. Three-year-olds also engaged in more dramatic play when sound was present. There was a significant sound by age interaction, suggesting that 5-year-olds played less constructively when sound was present. There was a significant sound by gender interaction suggesting that males played more functionally than girls when sound was present, and males and females engaged in relatively the same amount of functional play when sound was not present. However, there was no evidence that boys engaged in more functional play when sound was present. Functional play decreased with age regardless of condition.

Comparison to Literature

The present study found that, on average, boys engaged in almost twice as much parallel play as girls, but there was no indication of a difference caused by sound. Also, girls engaged in twice as much group play as boys when sound was present. Other studies have shown that girls

typically engage in more group play than boys (Neppl & Murray, 1997 & McLoyd, 1983). The analysis showed that 4-year-olds engaged in more parallel play than 3-year-olds and less than 5-year-olds. Parten (1932) concluded that children's social participation changed as a factor of age in such a way that younger children participated in more solitary play, and older children played in more organized groups. This means that 3-year-olds would typically engage in more solitary and parallel play, 4-year-olds in more parallel and some group play, and 5-year-olds in mainly group play. Rubin found that 5-year-old triads engaged in cooperative play three times more than 3 ½-year-olds (Rubin, 1982). A non-statistical review of the present study found that 3-year-olds engaged in non-play the most, followed by parallel play; 4-year-olds engaged equally in non-play and parallel play; and 5-year-olds engaged mostly in group play, followed by non-play.

The analysis of non-play in the present study yielded high percentages of non-play among all children (3's=51%, 4's=40%, and 5's=36%). Rubin et al. (1976) reported only 17% onlooker and unoccupied behavior in the middle class subjects and made no mention of other reports of differing types of non-play. The difference between these two studies may be accounted for by the difference in data collection. In Rubin's study, he observed the children for 1 minute each day for 30 days during free-play period in the children's classroom, noting the play categories in which they were engaged. This situation lends itself to a child being already engaged in play, whereas in the present study, the children were transitioned into the new room or area and presented with a new toy. This would lead to higher levels of exploration (taking in new information about an object, environment, or person--coded as non-play), which would account for at least some of the increase in percentage of reported non-play in the present study. Further, in the present study, all coded categories were treated as mutually exclusive and included more categories in non-play than simply "onlooker" and "unoccupied" as suggested by Rubin (2001) in "The Play Observation Scale."

When sound was present, boys engaged in a higher percentage of functional play than girls (14% vs. 0%). This is similar to the findings of Schneider et al. (1983) who found that boys manipulated a novel toy that included sound and light more than girls. Because Schneider's study is the only other known study involving sound in play, it is significant that the present study partially supports those findings.

Discussion of Sound as Structure

The researchers initially speculated about the possible connection between “high structured” toys and toys that produce sound (i.e. does sound itself add structure to a toy?). In the current study, both 3- and 5-year-olds engaged in dramatic (pretend) play more frequently when sound was present. Further, both girls and boys increased time engaged in dramatic play when sound was present. Crum, Thornberg, Benninga, & Bridge, (1983) found that preschoolers across age and gender are able to pretend more with toys that have more structure (physical and functional attributes). This supports the idea that sound adds “structure” to toys, since the toys with only the addition of sound produced more pretend play in 3- and 5-year-olds. Interestingly, this was not the case in 4-year-olds, who engaged in dramatic play statistically the same amount with and without sound.

McLoyd (1983) found that 3 ½-year-olds engaged in less “interactive play” when the toys were high-structure. This was not observed in the present study as 3-year-olds showed no statistical difference in the amount of group play between the sound and no sound conditions. However, it is possible that due to the small sample size of 5-year-olds (n=8) and due to their high variance, other, more subtle differences such as these were not found to be significant that would have otherwise been found to be significant. McLoyd also found that 5-year-olds played cooperatively nearly 3 times more than younger children, but this type of play was not associated with the structure level of the toys. The present study, however, did find a large difference between sound and no sound in group play, with 5-year-olds engaging in well over twice as much group play with sound than without, and more than 3 times as much group play as 3-year-olds and 4-year-olds when sound was present. McLoyd found that boys engaged in less cooperative play overall, in both high and low structure conditions. This was also seen in the present study, where boys engaged in less group play than girls in the sound condition.

Speculations have been made about the “holding power” of high structure toys (Smilansky, 1968 & McLoyd, 1983), suggesting that high structure toys can only be played with in one way, and that realistic toys dampen creativity. In the present study, the children were given only 15 minutes to play, so it is impossible to speculate on the holding power beyond those 15 minutes. However, the difference between the amount of play in which children engaged (as a measure of non-play) indicates that children play more when sound is present. If sound adds structure, then structure may encourage play, as opposed to non-play in children by acting as a

scaffold (non-play in this study consisted of unoccupied, exploration, transition, active conversation, and aggression). Onlooker and unoccupied play have been correlated with a number of undesirable characteristics. Rubin (1982) reported that unoccupied behavior was positively correlated to ratings of social maladjustment. It was also negatively correlated with peer conversations. Onlooker behavior was negatively correlated with mental age which includes chronological age, peer conversations, complexity of constructions, and teacher rating of social maladjustments.

When considering the frequency of constructive play, 5-year-olds played more constructively than 3- and 4-year-olds without sound, a reasonable progression considering the progression by age in the “maturity” of play. Interestingly, however, when sound was present, 5-year-old constructive play dropped from 25% to 0%. This is not a phenomenon that has been mirrored in any studies of play. This may have been due solely to the fact that the percentages that are reported for different cognitive levels of play are mutually exclusive; dramatic play increased so greatly that the percentages of the other kinds of play had to decrease.

Limitations

As previously mentioned, the small sample size ($n=8$) and high variability of the 5-year-olds in the study may have caused problems in the analysis rendering smaller effects to appear as non-significant. This may mean that there are effects, especially between 3- and 4-year-olds, that were not found in the analysis.

It was noted that the results of group and dramatic play overlapped in some ways. In both dramatic play and group play categories, the following effects were observed: 1) when sound was present, play increased among females; 2) females played more with sound than males; 3) 5-year-olds played more when sound was present than when it was not; and 4) 5-year-olds played more than other ages when sound was present. It is possible that due to dramatic play's social nature, these two categories and their effects are linked.

Very little solitary play was observed within this study (0.6% with sound and 0.5% without sound). This may be due to the way solitary play is defined by Rubin (2001) to include playing with different toys, which was impossible in the present study due to the single set of toys presented to the pairs of children. Rubin's definition also included being further than 3 feet apart, which is more difficult than in a normal play setting since the observations were conducted

in locations as small as approximately 11ft. x 11ft. Rubin's definition of solitary play was modified in this study to include children facing more than 90 degrees away from the child or intentionally moving away from the child with no other signs of parallel play. The need for solitary play to involve the use of different toys was deemphasized. Even with these modifications, solitary play was far less present than in other studies of play in both the sound and no-sound categories (Rubin et al., 1976 & Rubin et al. 1978). The absence of solitary play among this age of children does not reflect typical play behavior of children (Parten, 1932). The experimental situation (putting two children in an empty room with one toy set) may have artificially decreased the amount of solitary play.

Since the nature of the research question required the manipulation of the sound variable, the observations were not done in a naturalistic setting. The children were generally not familiar with the environment that they were in (except in the two centers where the observations took place in the classroom). Also, the children did not choose their play partner naturally as they would have in a classroom setting. Additionally, children were presented with only one set of toys, instead of having a choice of what toy to play with, and they were not familiar with the toy. Therefore, care must be taken when drawing implications from the study to apply to a classroom setting.

It should be noted that the sound in the toys in the present study "matched" the structure of the rest of the toy. That is to say, the sound had a logical connection to the action. For example, on the farm set, when the child opened the barn door with the cow picture on it, the toy "moored." There are many toys that do not match the sound to the toy (e.g. a talking grill that sings). It is expected that toys lacking this kind of logic regarding the sound they produce would not result in the same kind of play.

Conclusion

Further research is needed to determine whether the impact of sound on play is the same phenomenon as structure in toys. Parts of the present study support the idea, but due to the uniqueness of the study and its limitations, more research is needed to draw firm conclusions.

The objects that are available to children for play affect the way in which they play, and in turn, what they may learn from that play. The results of the research indicate that contrary to popular speculation, sound increases the amount of play in children overall. Further, it appears

that sound increases higher levels of play in children including dramatic play in 3- and 5-year-olds and among all males and females. Group play among females is more than doubled on average when sound is present. Further, 5-year-olds engaged in nearly twice as much group play when sound was present. This suggests that there are few, if any, negative effects of this kind of sound-producing toy on preschoolers' play. It would seem that sound may serve as a scaffold, encouraging a more complicated form of play which children may engage in on their own. This study suggests that the general "lack of quality play" that is popularly cited in regards to toys with "bells and whistles" may simply be a reflection of an attitude toward the technology and not a genuine reflection of the child's interaction with the toy. This does not mean that parents and educators should fill their room with sound-producing toys, but rather that they should not automatically dismiss a toy because it produces sound. As is generally recommended, parents and educators should provide their children with a wide range of toys, both high- and low-structure, that facilitate a variety of themes and levels of play.

Implications for further research

Because this is the first study of its kind, replication of the experiment is recommended, especially with a larger population of 5-year-olds. Research on structure of toys indicates the importance of more structure in toys to encourage older 1-year-olds and especially 2-year-olds in pretending (e.g. Fein, 1975). Their interactions with toys in general, social ability, ability to pretend, and needs for facilitating dramatic play are very different from older children. It is recommended that the study of sound in general and of sound as an element of structure in toys be investigated at the 2-year-old level.

References

- Bornstein, M.H., Haynes, O.M., Pascual, L., Painter, K.M., & Glerin, C. (1999). Play in two societies: pervasiveness of process, specificity of structure. *Child Development, 70*(2), 317-331.
- Crum, R.A., Thornburg, K., Benninga, J., & Bridge, C. (1983). Preschool children's object substitutions during symbolic play. *Perceptual and Motor Skills, 56*, 947-955.
- Dodge, M.K. & Frost, J.L. (1986). Children's dramatic play: influence of thematic and nonthematic settings. *Childhood Education, 71*, 166-170.
- Elder, J. L. & Pederson, D.R. (1978). Preschool children's use of objects in symbolic play. *Child Development, 49*, 500-504.
- Elder, J.L. & Pederson, D.R. (1978). Preschool children's use of objects in symbolic play. *Child Development, 49*, 500-504.
- Fein, G.G. (1975). A transformational analysis of pretending. *Developmental Psychology, 11*(3), 291-196.
- Garvey, C. (1974). Some properties of social play. *Merrill-Palmer Quarterly, 20*(3), 163-180.
- Karen, M., Feldman, R., Namdari-Weinbaum, I., Spitzer, S., & Tyano, S., (2005). Relations between parents' interactive style in dyadic and triadic play and toddlers' symbolic capacity. *American Psychological Association, 75*(4), 599-607.
- Jeffrey, D.M. and McConkey, R. (1975). An observation scheme for recording children's imaginative doll play. *Child Psychology and Psychiatry, 17*, 189-197.
- Light, J.C., Drager, K.D.P., & Nemser, J.G. (2004). Enhancing the appeal of AAC technologies for young children: lessons from the toy manufacturers. *Augmentative and Alternative Communication, 20*(3), 137-149.
- McLoyd, V.C. (1983). The effects of the structure of play objects on the pretend play of low-income preschool children. *Child Development, 54*, 626-635.
- McLoyd, V.C., Warren, D., & Thomas E.A.C. (1984). Anticipatory and fantastic role enactment in preschool triads. *Developmental Psychology, 20*(5), 807-814
- Murphy, G., Carr, J., & Callias, M., (1986). Increasing simple play in profoundly mentally

- handicapped children: II. Designing special toys. *Journal of Autism and Developmental Disorders*, 1986, 16(1), 1986.
- Neppl, T.K, & Murray, A.D. (1997). Social dominance and play patterns among preschoolers: gender comparisons. *Sex Roles*, 36(5/6), 381-393.
- Nowak-Fabrykowski, K. (1994). Can symbolic play prepare children for their future? *Early Child Development and Care*, 102, 63-69.
- Olszewski, P. & Fuson, K.C. (1982). Verbally expressed fantasy play of preschoolers as a function of toy structure. *Developmental Psychology*, 18(1), 57-61.
- Parten, M.B. (1932). Social participation among school children. *Journal of Abnormal and Social Psychology*, 27, 243-269.
- Piaget, J. (1962). The stages of the intellectual development of the child. *Bulletin of the Menninger Clinic*, 26(3), 120-128.
- Robinson, C.C. & Jackson, R. (1987). The effects of varying toy detail within a prototypical play object on the solitary pretend play of preschool children. *Journal of Applied Developmental Psychology*, 8, 209-220.
- Roopnarine, J.L., Ahmeduzzaman, M., Donnely, S., Gill, P., Mennis, A., Arky, L., Kristen, D., McLaughlin, M., & Talukder, E. (1992). Social-cognitive play behaviors and playmate preferences in same-age and mixed-age classrooms over a 6-month-period. *American Educational Research Journal*, 29(4), 757-776.
- Rubin, K.H, Maioni, T.L., Hornung, M. (1976). Free play behaviors in middle- and lower-class preschoolers: Parten and Piaget revisited. *Child Development*, 47, 414-419.
- Rubin, K.H, Watson, K.S., & Jambor, T.W. (1978). Free-play behaviors in preschool and kindergarten children. *Child Development*, 49, 534-536.
- Rubin, K.H. (1982). Nonsocial play in preschoolers: necessary evil?. *Child Development*, 53, 651-657.
- Rubin, K. (2001). The Play Observation Scale (POS). College Park, MD: University of Maryland.
- Schneider, K., Moch, M., Sandfort, R., Auerswald, M., & Walther-Weckman, K. (1983). Exploring a novel object by preschool children: a sequential analysis of perceptual, manipulating, and verbal exploration. *International Journal of Behavioral Development*, 6, 477-496.

Smilansky, S. (1968). *The Effects of Sociodramatic Play on Disadvantaged Preschool Children*.
New York: Wiley.

Spencer Pulaski, M.A. (1970). Play as a function of toy structure and fantasy predisposition.
Child Development, 41, 531-537.

Vygotsky, L.S. (1967 [1933]). Play and its role in the mental development of the child. *Soviet
Psychology*, 5(3), 6-18.

Wolfgang, C.H. & Phelps, P. (1983). Preschool play materials preference inventory. *Early Child
Development and Care*, 12, 127-141.

Appendix A - Consent Form

Parental Consent Letter for Toy Play Study

Dear Parent/Guardian,

My name is Jenette Turpin and I am a Master's student in Early Childhood Education. For my Master's thesis I am conducting research under the supervision of Ann Murray, associate professor in ECE, about how toys affect children's play. From this study we hope to learn about what toys should be used in high-quality early childhood environments to promote symbolic (make-believe) play. This research is partially funded by the Stewart Family Research Fund and by Hoeflin Stone House Child Care Center.

As part of the study, we would like to video record your child playing with another child. If you give your permission for your child to participate in this study, your child will go to a playroom with one other child. The children will be shown some toys and then, under the direct supervision of the researcher, will be allowed to play uninterrupted with the toys. They will be video recorded for 30 minutes.

There are no known risks associated with your child's participation in this study. While there are no direct benefits to your child from participating in this study, it is our hope that this research will add to our understanding of the way children play and how to help children learn more from play. We will keep all information about your child's specific performance confidential. A number will be assigned to your child. That number will be the only identification associated with any of the data we collect and will not be used in reporting the results. Your child's name will not be reported with any of the results. The results will be reported for the whole group of children tested and you will receive a summary of the results.

Participation is completely voluntary. Your choice to allow or not to allow you child to participate in this research will have no effect whatsoever on the services you are currently receiving. You or your child may choose to withdraw consent at any time. Even with parental consent, your child may choose not to participate in the research at any time during the study.

If you have any questions or concerns please contact:

Ann Murray, Associate Professor in Early Childhood Education, Principle Investigator

(785) 532-1492

admurray@ksu.edu

Rick Scheidt, Chair, Committee on Research Involving Human Subjects,

1 Fairchild Hall, Kansas State University, Manhattan, KS 66506

(785) 532-3224

Sincerely,

Ann D. Murray, Ph.D.
Associate Professor

Jenette Turpin
Master's Student

(Over)

I understand this project is research, and that my consent for my child's participation is completely voluntary. I also understand that if I decide to consent to my child's participation in this study, I may withdraw my consent at any time, and my child may stop participating at any time without explanation, penalty, or loss of benefits to which I or my child may otherwise be entitled.

I verify that my signature below indicates that I have read and understand this consent form, and willingly agree to allow my child to participate in this study under the terms described, and that my signature acknowledges that I have received a signed and dated copy of this consent form.

I give my consent for _____ to participate in the research project
Print your child's name
described above and to be video taped.

Parent/Guardian's name (Please Print) _____

Parent/Guardian's Signature _____ **Date** _____

Video Release Form

(Your child can participate in the study even if you do not sign the video release.)

I consent to allow the video of my child to be shown in future presentations about this research project for the purpose of teaching students or training professionals, or for future research. No identifying information will be used while showing the video or presenting the research.

Parent/Guardian's Signature _____ **Date** _____

Appendix B - Demographic Sheet

Information Sheet for Participation in Research Toy Play Study

Child Information:

Child's First (given) Name: _____

Child's Last (family) Name: _____

Child's Gender: Male Female

Child's birth date (MM/DD/YYYY) _____

Child's Race (Choose all that apply):

- | | |
|--|---|
| <input type="checkbox"/> American Indian and Alaska Native | <input type="checkbox"/> Asian |
| <input type="checkbox"/> Black or African American | <input type="checkbox"/> Caucasian |
| <input type="checkbox"/> Hispanic (not white) | <input type="checkbox"/> Native Hawaiian and Other Pacific Islander |
| <input type="checkbox"/> Other (please explain): _____ | |

Is your child currently on an Individualized Education Plan (IEP): Yes No

Center child attends _____ Classroom child attends _____

Parent Information:

Mother's highest level of education completed:

- | | | |
|--|---|--|
| <input type="checkbox"/> Less than high school | <input type="checkbox"/> Some high school | <input type="checkbox"/> High school diploma |
| <input type="checkbox"/> Some college | <input type="checkbox"/> Associates degree | <input type="checkbox"/> Technical Degree |
| <input type="checkbox"/> Bachelor's Degree | <input type="checkbox"/> Master's Degree | <input type="checkbox"/> Doctoral Degree |
| <input type="checkbox"/> Post-Doctoral work | <input type="checkbox"/> Other (please explain) _____ | |

Mother's occupation _____

What kind of work does she do? _____

Father's highest level of education completed:

- | | | |
|--|---|--|
| <input type="checkbox"/> Less than high school | <input type="checkbox"/> Some high school | <input type="checkbox"/> High school diploma |
| <input type="checkbox"/> Some college | <input type="checkbox"/> Associates degree | <input type="checkbox"/> Technical Degree |
| <input type="checkbox"/> Bachelor's Degree | <input type="checkbox"/> Master's Degree | <input type="checkbox"/> Doctoral Degree |
| <input type="checkbox"/> Post-Doctoral work | <input type="checkbox"/> Other (please explain) _____ | |

Father's occupation _____

What kind of work does he do? _____

Appendix C - Script

Abbreviated Script for “Sound Effects...”

Ask the teacher for the two children by name.

Note what each child is wearing.

“Hi. My name is Jenette. I am working on a project for school. I have two different toys and I want to watch how kids play with them. Let’s go to [the assessment suite], and I will show you the toys...”

Walk to room

Get the first toy

“This is the [Farm/Doctor set]. Let me show you some of the parts.” (activating sound areas in S and NS conditions)

For the **farm**, the researcher will say:

“This is where the **pig** sleeps” and move the door that activates the pig sound.

“This is where the **sheep** sleeps” and move the door that activates the sheep sound.

“This is where the **cow** sleeps” and move the door that activates the cow sound.

“This is where the **horse** sleeps” and move the door that activates the horse sound.

“And this is where the **rooster** sleeps” and activate the rooster sound (move to the right).

OR

For the **doctor set**, the researcher will say:

“This is the **pager**, it says “Emergency” on it” and push the button on the left.

“This is the **cell phone**” and push the “star” button that “rings”

“This is the **stethoscope**” and push the button twice for the heart beat and the cough.

“And this is the **baby**.” and activate it twice (for both sound-producing areas--stomach and hand).

“You’ll have 15 minutes to play with this toy. I’ll tell you when time is up, and then we’ll get out the other toy. I have to do some teacher work while you play, but I’ll be sitting right over there (indicate where the researcher will sit).”

“Try to stay in this area so that the camera can see you (*indicate*).”

“I’ll tell you when it’s time to stop. Have fun!” (start timer on “have fun”)

Go sit at the table and act “busy”.

At 15 minutes

“OK, time is up!”

“Let me get the second toy.” The researcher will get the toy.

“This is the [Farm/Doctor Set]. Let me show you some of the parts.”

For the **farm**, the researcher will say:

“This is where the **pig** sleeps” and move the door that activates the pig sound.

“This is where the **sheep** sleeps” and move the door that activates the sheep sound.

“This is where the **cow** sleeps” and move the door that activates the cow sound.

“This is where the **horse** sleeps” and move the door that activates the horse sound.

“And this is where the **rooster** sleeps” and activate the rooster sound (move to the right).

OR

For the **doctor set**, the researcher will say:

“This is the **pager**, it says “Emergency” on it” and push the button on the left.

“This is the **cell phone**” and push the “star” button that “rings”

“This is the **stethoscope**” and push the button twice for the heart beat and the cough.

“And this is the **baby**.” and activate it twice (for both sound-producing areas--stomach and hand).

“You’ll have 15 minutes to play with this toy, I’ll tell you when time is up, and then we’ll go back to the classroom. I’m going to go do more teacher work while you play, but I’ll be sitting right over there (*indicate where I will sit*).”

“Try to stay in this area so that the camera can see you (*indicate*).”

“I’ll tell you when it’s time to stop. Have fun!”

At 15 minutes

“OK time is up!”

“Did you have fun?” RESPOND

“Thanks for helping me! Let’s go back to the classroom, now.”

Lead them back,

Set up the toys again.

Go and get the next pair.

Answers to questions/Interactions

When the children try to engage you:

“I have to work on this right now. “How about you go and play with the toys”

Questions or comments **not directly necessary** to the study “Let’s talk about that when you are done playing.”

Questions about the study that have already been answered or directly relevant ANSWER AS ANSWERED PREVIOUSLY OR ANSWER CONCISELY

Any other questions and interactions will be redirected to: **“play”**

Physical danger or extended verbal fighting Quickly intervene either by redirecting the child to **“play”** or **physically intervene**.

If out-of-hand, recoding will cease, and the pair will be escorted back to the classroom.

Appendix D - Addendum to Rubin's Play Scale (2001)

Excluded categories:

- Games with rules (not relevant)
- Anxious (is a double code)
- Rough and tumble (is a double code...will be coded as functional, aggression, etc.)
- Hovering (is a more intense form of onlooker, is a double code)
- Out of room (Not possible in setting)

Marks for coding:

-The letter within the box will be marked when it occurs in play categories, or simply written in with no circle in non-play categories.

-Circling the code will indicate that sound was produced in the toy by the focal child. Sound is coded every time the focal child initiates the sound (pushes the button, etc) and is not coded if the sound is simply continuing from the previous ten seconds. For example, if at second 9 of the 10-second observation, the child pushes the button, and the song plays through that 10-second period and 3 seconds into the second 10-second period, then sound is coded for only the first 10 seconds, not the 10 seconds (unless sound is initiated again in the second 10 seconds).

General Guidelines:

Hierarchy of coding:

Unlike in Rubin's hierarchy, exploration will be coded as less dominant than any form of play, since exploration is not widely accepted as a form of play. It seems as though Rubin included it in the cognitive forms of play only because it can occur in a social context, but in our study it is only coded as a non-play category and not assigned a social category as well. Also, since we are not looking at children's overall behaviors and are interested primarily in the social and cognitive levels of play, any kind of play will be coded over any kind of non-play including conversation (this is not the case in Rubin's hierarchy (p. 10)).

Therefore, the hierarchy when two or more behaviors are observed as the same length of time, shall be:

Any group play behavior is coded over other levels of social play in the following order:

1. Group Drama > Group Constructive > Group Functional
2. Parallel play (Dramatic > Constructive > Functional)
3. Solitary Play (Dramatic > Constructive > Functional)
4. Conversation (because it requires group participation)
5. Exploration (because it may also have a social component)

6. Onlooker

7. Unoccupied

8. Transitional

9. Aggression (because it is usually double-coded, though not always, it should be superseded by any of the above and only coded if it is the only activity dominating the time).

Social

“Solitary Play: The child plays apart from other children at a distance greater than three feet (one meter). S/he is usually playing with toys that are different from those other children are using. The child is centered on his/her own activity and pays little or no attention to any children in the area. If the child is playing in a small area the three-foot rule is often not applicable. In such cases the observer must rely upon the relative attentiveness of the child to others in his/her social milieu.” (Rubin, 2001)

-The three foot rule does not strictly apply because the children are playing in a restricted space.

-The child playing with a different toy=solitary play does not generally apply because the children were forced to play with the same toy.

-If the children are turned away more than 90 degrees from one another and show no other indication of parallel play, code solitary

-If the focal child intentionally moves away from the other child, code solitary.

-Even if the child is interacting with the teacher, the child should still be coded as solitary unless in parallel or group with partner.

“Parallel Play: The child plays independently; however, the activity often, though not necessarily, brings him/her within three feet of other children. If the child is very attentive to others while playing independently, parallel play is coded regardless of the distance between the focal child and the other children. S/he is often playing with toys that are similar to those that the children around him/her are using. The child usually seems to be somewhat aware of, and attentive to, his/her playmates, and frequently engages in “parallel speech” (i.e., verbalizing his/her own thoughts for the benefit of the other children). In short, the child plays beside, or in the company of, other children but does not play **with** his/her companions.” (Rubin, 2001)

-If there is no clear indication that the child is playing solitary or group, the child will be coded as parallel.

-Parallel may be coded even if the focal child's partner is in non-play (e.g. If the partner is onlooking and the focal child is playing in close proximity and using parallel speech, then they may still be coded as being in parallel play).

-In play that began as dramatic group play, even if the story line is shared, if the two characters do two very different things or are focused on two different aspects of the story, it will be coded as parallel, not group (see example on p.11 “*Parallel vs. Group Play*”).

-In regards to “teaching” as a constructive behavior, if one child watches the lesson and then does nothing to “follow-up” on what he was taught, then it is coded as *parallel* and not group.

-If partner doesn't make an attempt to involve themselves in the activity (even if the child is trying to get them involved) than it is coded as parallel or solitary.

“Group Play: The child plays with other children and there is a common goal or purpose to their activity. They may be following one another in a functional activity, or they may be organized for making some material product, striving to attain some competitive goal, dramatizing situations of adult or group life, or playing formal games. Whatever the activity, the goals are definitely group-centered.” (Rubin, 2001)

-Both children must clearly have the same goal.

-In regards to “teaching” as a constructive behavior, if a child watches the lesson and then “follows-up” by repeating the lesson, by including the new knowledge in the play, by expanding on what was taught, or by asking new and related questions, then code *group*.

Cognitive

The focal child's cognitive and non-play behaviors will be coded independently of the child's partner.

“Functional Play: This is an activity that is done simply for the enjoyment of the physical sensation it creates. Generally speaking, the child engages in simple motor activities (e.g. repetitive motor movements with or without objects). Specific examples are climbing on gym equipment; pouring water from one container to another; jumping on and off a chair; making faces; singing or dancing for non-dramatic reasons; ringing bells and buzzers, etc. ” (Rubin, 2001)

-No modifications or clarifications used

“Constructive Play: The definition of constructive play is the manipulation of objects for the purpose of constructing or creating something. Pounding on playdough for the sensory experience of the pounding is considered to be functional play; however, pounding for the purpose of making a “pancake” is coded as constructive. Similarly, pouring water in and out of containers is a functional activity; however, pouring water into a series of containers for the purpose of filling each container to the same level is a constructive play behavior. It can be seen, therefore, that one major distinction between functional and constructive activity concerns the child’s **goal** during play. Additionally, construction may manifest itself as teaching another how to do something. This differs from exploration because the child already knows how to perform the task. For example, the target child *shows* another child how the elevator on an action figure activity set raises and lowers.”(Rubin, 2001)

-Positioning toys or people in order to set up a scene or dramatic play (as in setting up a doctors office, setting up the farm the as in putting the animals where they should live or the tractors in the garage, even if the don't then play out the story) code constructive

-If the child is assigning characters or roles, code constructive

-If the child is giving a brief history to set up play, code constructive

- “How-to” kinds of teaching are coded as constructive (e.g. “See you push this button and then you...”)
- Negotiating “Where things go”
- Taking dramatic things apart

“Dramatic Play: Any element of pretense play is coded as dramatic. The child may take on a role of someone else, or may be engaged in pretend activity (e.g., pouring pretend water into a cup and then “drinking” it). S/he may also attribute life to an inanimate object (e.g., making a doll talk).” (Rubin, 2001)

- Narrating the pretend play or telling a story is coded as dramatic.
- Using toys as if they were real is coded as dramatic.
- Dress up is coded as dramatic.

Non-Play

Exploration

- Labeling items is coded as exploration

Onlooker-No modifications/Clarifications

Unoccupied-No modifications/Clarifications

Active Conversation

- Asking what a toy, animal, etc. is is coded as conversation.
- Talking to a teacher or child, or listening to a teacher or child for information
- Negotiating, (but not to set up a dramatic scene (coded as constructive) and not within dramatic play (coded as dramatic)).
- Fighting or arguing verbally (but not in dramatic roles (coded as dramatic), and not threatening or antagonizing, which is aggression)
- “What-is” teaching/talking (as opposed to “how-to” teaching which is constructive). For example, “This is a llama”. Or “See? This stethoscope makes noise.”
- Listening is always conversation unless within play

Transition

- Looking at teacher to get attention or to start a conversation or trying to get a child's attention is coded as transition.
- Cleaning up, as in putting away or straightening up an area is coded as transition (BUT setting up a scene is coded as constructive).
- Setting something up, for example setting up toys to knock off, is coded as transitional (BUT if it is setting up a dramatic scene, than it is coded constructive).

Aggression-No modifications/Clarifications

Appendix E - Recording Form

(Only front side shown)

Coder	
Date	
Time	

Time Sampling Record Form

Sound effects: the effects of sound producing toys on the cognitive and social level of play in 3-, 4-, and 5-year-olds
 Jenette Turpin and Ann Murray

Child ID # _____ Pair # _____ Toy _____ Date of Recording _____
 Age _____ Class _____ Sound _____ Time of Recording _____
 Gender _____ Center _____ Time _____
 IEP _____ Order _____

Key for abbreviations:

Social	Cognitive	Non-play	Unusable
S-Solitary	F-Functional	U-Unoccupied	X-Uncodable
P-Parallel	C-Constructive	O-Onlooker	NA-Experimental Error
G-Group	D-Dramatic	E-Exploration	
		T-Transition	
		A-Active Conversation	
		R-Aggression	

Marks when recording:

X (x-out)-No sound Produced
 O (circle)-Sound Produced

	0-1min						1-2 min						2-3 min						3-4 min						4-5 min					
	0-10	10-20	20-30	30-40	40-50	50-60	0-10	10-20	20-30	30-40	40-50	50-60	0-10	10-20	20-30	30-40	40-50	50-60	0-10	10-20	20-30	30-40	40-50	50-60	0-10	10-20	20-30	30-40	40-50	50-60
S	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
P	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
G	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
N																														