

Relationship Between Types of Toys and Young Children's Social Behavior

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The relationship between types of toys and children's social behavior with peers in group settings is the focus of this practice-based research synthesis. The practice characteristics involve the features of different toys that set the occasion for children's social play. The synthesis results indicate that toys and play materials most associated with young children's social play are ones with the following characteristics: (1) they involve turn taking or physical play, (2) they represent functional household objects in children's daily lives, (3) they can be used as props for pretend play, or (4) they can be used easily by two or more children. Results indicate that early childhood practitioners can use toys and play materials having these characteristics to promote social play among peers in early childhood settings.

Purpose

The purpose of this practice-based research synthesis is to ascertain the relationship between different types of toys and play materials and young children's social play. This synthesis examines the characteristics of different types of toys and materials that set the occasion for children's social play with peers in group settings.

The conduct of the synthesis is guided by a framework that focuses on examining the characteristics of practices that are related to differences in their outcomes or consequences (Dunst, Trivette, & Cutspec, 2002). Specifically, this practice-based research synthesis examines the characteristics of different types of toys that are related to variations in children's social behavior with peers. This type of research synthesis differs from more traditional meta-analyses in that it focuses on an understanding of the conditions under which a practice exerts an observable effect and not solely on a statistical relationship among variables.

Background

The extent to which different types of toys and play materials influence the social behavior of young children has been the subject of research since the 1930s (Hulson, 1930; Parten, 1932, 1933; Updegraff & Herbst, 1933; Van Alstyne, 1976). Research conducted during that time in early childhood classroom settings, such as university laboratory nursery schools and public kindergartens, reflected a general interest among educators, psychologists, and sociologists in the role of play in children's development and the influence of environmental variables on the play behavior of individuals and groups.

During the ensuing decades, interest in the influence of play materials on child behavior fluctuated with shifts in researchers' emphasis on person and/or environmental variables (Sainato & Carta, 1992). By the 1980s, interest in the influence of play materials on children's social behavior coincided with trends to include young children with disabilities in classroom settings along with children without disabilities. Social interaction occurring in settings that include children with and without disabilities was considered one indicator of the success of these programs (e.g., Guralnick, 1978, 1990, 2001), and the influence of classroom settings on children's social behavior became a focus of interest (Ichinose & Clark, 1990; Odom & Strain, 1984; Sainato & Carta, 1992). Play materials available in the environment were considered a *setting event* for the occurrence of social behavior. Setting events are environmental influences that set the stage or occurrence for certain types of behavior (Brown, Bryson-Brockmann, & Fox, 1986; Kantor, 1959; Rogers-Warren, 1984). Setting events serve to influence or facilitate behavior; that is, setting events increase the likelihood that certain behaviors will occur.

As setting events, toys and play materials seem to have different effects on children's play depending on the

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characteristics of the types of toys available to the children. This research synthesis examined the characteristics of different types of toys and play materials that set the occasion for children's social and isolate play.

Description of the Practice

In indoor group settings for young children, different types of toys appear to influence the level of children's social play, the number of children playing with a child using a toy, and the particular social interactions that occur in the presence of the toys (Kim et al., 2003; Rettig, 1998; Sainato & Carta, 1992). Social toys are ones that influence children playing together, whereas isolate toys are ones that influence children playing alone or near other children without interacting with the children. Social toys typically include blocks, toy cars and trucks, balls, wagons, housekeeping materials (e.g., dishes, dolls), dress-up clothes, puppets, and table games. Isolate toys generally include crayons/markers, clay/play dough, scissors, paints, puzzles, books, Tinkertoys, LEGOs, and peg boards.

Close inspection of the different types of toys suggests that both social and isolate toys have certain characteristics that influence whether the toys are likely to be used in social or nonsocial play. The characteristics of *social toys* are that (a) they can be used readily by two or more children or they require more than one child in order to use the toy, (b) they involve physical activity or turn taking, (c) they may be used in a way that mirrors the functional use of everyday household objects, or (d) they may be used as props for pretend play about real or imaginary situations. Characteristics of *isolate toys* are that (a) they easily can be used by just a single child or (b) they involve manipulative or creative activity.

The study of the influence of different types of toys on children's social behavior has been conducted under different conditions. Studies have been conducted in nursery and preschool settings as well as in experimental play areas. In these group settings, the contexts for studying the influences of play materials on young children's social behavior have been free-play periods characterized by child-directed play, where children may select and play with toys, materials, and other children as they wish and where adults provide minimal direction regarding children's selection and use of toys and play materials.

Search Strategy

Search Terms

The search terms used to identify relevant studies were toys, play materials, play objects, classroom environment, classroom ecology, activity centers, social behavior, and peer relationships. The search was delimited by adding infants, toddlers, or preschool children, and early childhood classroom as Boolean conditions.

Sources

The databases used for conducting the search were Psychological Abstracts (PsycINFO), Educational Resources Information Center (ERIC) database, Dissertation Abstracts, Books in Print, Social Sciences Citation Index (SSCI), and National Technical Information Service (NTIS). Archival and hand searches of relevant journals were used to augment the computer-assisted search for literature on the relationship between toys and children's social behavior. The reference lists from studies obtained in the computer-assisted and hand searches were reviewed to identify previously unidentified studies.

Selection Criteria

Studies were included in the synthesis if they (a) investigated the influences of different types of children's toys or play materials, (b) included child social behavior or level of social play as an outcome, (c) involved children under 8 years of age, and (d) were conducted in early childhood classrooms or other group settings.

To focus the synthesis on studies describing similar practices and outcomes, several types of studies related to toys were excluded. Investigations comparing the presence and absence of toys, the availability of war toys and children's aggressive behavior, and/or gender-stereotyped toys were not included in the synthesis. Similarly, investigations of other features of toy availability, such as the number or physical arrangement of toys or of the role of adults in facilitating or impeding the use of toys, were excluded. Studies that included adult prompting or reinforcement of children's use of toys or social behavior as planned interventions also were excluded.

Search Results

Sixteen (16) studies met the selection criteria and were included in this synthesis. Table 1 shows selected characteristics of the study participants, and Table 2 presents information regarding the research designs used in the studies, characteristics of research settings, and types of toys or play materials used in the studies.

Participants

The 16 studies included 529 children, 424 (80%) of whom were children without disabilities or delays and 105 (20%) of whom were children with disabilities or delays (see Table 1). The latter group of children included those with speech/language, cognitive, or motor delays; visual or hearing disabilities; Down's syndrome; autism; and Williams syndrome. The number of study participants was not reported in one investigation (Quilitch & Risley, 1973 [Study 2]). Nine of the 16 studies (56%) included only children who were typically developing, five studies (31%) included both children with and without disabilities, and two studies (13%) included only children with disabilities.

The children in the studies were between 2 and 7 years of age, with the majority of participants being 3 to 5 years of age. Children's gender was reported in 10 of the 16 studies, with 128 (55%) boys and 106 (45%) girls reported as participants.

Information about the children's racial or ethnic backgrounds was provided in five studies. These studies included children from both Caucasian and African-American backgrounds (Cowden & Torrey, 1990; Quilitch & Risley, 1973; Stoneman, Cantrell, & Hoover-Dempsey, 1983; Van Alstyne, 1976); however, the specific number of children in each group generally was not reported.

Research Designs

The sixteen studies included in this synthesis used naturalistic observation (N = 8), quasi-experimental designs (N = 7), and experimental designs (N = 1) to conduct the research (see Table 2).

Naturalistic observation. Observations were conducted during naturally occurring free-play periods in the children's preschool settings in eight studies. In 2 of the 8 (25%) naturalistic observation studies, there were between-group comparisons of children with disabilities and children without disabilities (Johnson & Ershler, 1985; Stoneman et al., 1983). A third study included comparisons between children of different age levels (Van Alstyne, 1976). One study (Hendrickson, Strain, Tremblay, & Shores, 1981) provided no information regarding the play periods observed.

Quasi-experimental and experimental designs. Three of the 8 quasi-experimental and experimental studies (38%) included within-group comparisons of the influences of social- vs. isolate-toy conditions on child behavior (Ivory & McCollum, 1999; Quilitch & Risley, 1973). One study included a within-group comparison of children's social behavior associated with the use of social and isolate toys provided in a mixed-toy condition (Cowden & Torrey, 1990). Four of the 8 studies (50%) included both within- and between-group contrasts. Two of these studies compared children in integrated groups with children in non-integrated groups (Beckman & Kohl, 1984; Martin, Brady, & Williams, 1991), one study compared children with disabilities and children without disabilities (Rettig, Kallam, & McCarthy-Salm, 1993), and another compared 2- and 3-year-olds in social- vs. isolate-toy conditions (Updegraff & Herbst, 1933).

Practice Characteristics

The toys and play materials that were investigated in the eight observational studies generally included indoor play materials normally available in the classroom settings. The play materials included blocks, sand, crayons and paper, scissors and paper, clay, dolls, dishes and other housekeeping materials, puzzles, balls, beads, books, and small cars and trucks.

Seven of the 8 studies (88%) using quasi-experimental or experimental designs included an *a priori* assignment of toys to either social or isolate conditions. One study included both social and isolate toys in a mixed-toy condition (Cowden & Torrey, 1990). The toy assignments in the different studies were based on reports from previous research (Cowden & Torrey, 1990; Ivory & McCollum, 1999; Martin et al., 1991; Rettig et al., 1993; Updegraff & Herbst, 1933), classifications made by a group of judges (Beckman & Kohl, 1984), or pilot studies conducted by the investigators (Quilitch & Risley, 1973). The toys and play materials included in the *isolate* conditions were clay or play dough (8 studies), paper and crayons (7 studies), puzzles (7 studies), books (6 studies), LEGOs/Tinkertoys (3 studies), paints (2 studies), scissors (1 study), peg board (1 study), parquetry (1 study), and pull toy (1 study). The toys and play materials included in the *social* conditions primarily included blocks (5 studies), cars and trucks (4 studies), puppets (3 studies), dolls (3 studies), dollhouse (3 studies), dress-up clothes (3 studies), housekeeping materials (3 studies), balls (2 studies), and wagon/riding toys (2 studies). In the one study of 7-year-old children, the play materials included in the social condition were a variety of table games.

Fifteen of the 16 studies (94%) were conducted during naturally occurring or simulated free-play sessions, lasting from 20 minutes to 1 hour. One study did not report the specific play context in which children were involved. In the majority of studies (69%), teachers or other adults were described as having minimal interactions with the children during the free-play sessions. In 5 of the 16 studies (31%), the role of adults in the settings was not described. Four of the 16 studies (25%) included measures of teacher presence or teacher-child interaction during the free-play periods.

Outcomes

The outcomes examined in the studies included children's social behavior, toy use, and cognitive level of play. Direct observation of children's play, either *in vivo* (94%) or by video (6%) was used to assess the outcomes. Direct observation was accomplished using interval (69%) or momentary (31%) time-sampling techniques.

Social outcomes. The primary child outcome relevant to this synthesis was children's social behavior (see Table 3). In 6 of the 16 studies (38%), children's social behavior was measured using Parten's (1932) Scale of Social Participation or an adaptation of this scale. This scale includes categories of unoccupied, onlooker, solitary, parallel, associative, and cooperative play (see Table 3). Seven studies (44%) included investigator-developed measures of children's solitary and social play, and one study (6%) used measures of the social value of toys, defined as the number of children playing with a child using a given toy.

The percentage of children interacting with other children was used as a measure of social behavior in two studies.

Toy use and cognitive play. Seven of the 16 studies (44%) measured the frequency or duration of children's use of the toys. Two studies (13%) measured the cognitive level of play, including functional, constructive, and symbolic play, and games with rules (Johnson & Ershler, 1985; Rubin, 1977).

Synthesis Findings

Table 3 shows the major findings of the studies regarding child social behavior and different types of toys. Other major findings regarding child behavior outcomes also are included in the table.

Results

Social outcomes. Findings from the eight naturalistic observation studies indicated that although most toys were used in both social and isolate play, some types of toys were more likely to be associated with children's social play and other types of toys were more likely to be associated with children's nonsocial play. Toys associated with social play included blocks, housekeeping and other dramatic-play materials (e.g., dishes, dress-up clothes), toy vehicles, and wagons. Toys associated with nonsocial play included books, clay/play dough, puzzles, crayons and markers, paints, etc.

These findings were corroborated by findings from 6 of the 8 (75%) experimental or quasi-experimental studies. In these studies, social play occurred more often in the social-toy conditions compared to play in the isolate-toy conditions. One of the two remaining studies reported primarily solitary play with both social and isolate toys (Cowden & Torrey, 1990). In the remaining study, which compared the play of dyads in clay (isolate) and block (social) conditions, the findings were equivocal (Updegraff & Herbst, 1933). A number of different types of social interactions occurred in both conditions. With the exception of these two studies, findings regarding the influence of social toys on children's social behavior were consistent, whether the groups of children were comprised of children without disabilities, children with disabilities, or both children with and without disabilities.

The toys and play materials associated with children's playing together had certain discernable characteristics. In 12 studies (75%), toys and play materials associated with social play were ones representing functional objects in children's lives (e.g., dishes, housekeeping materials) and/or used as props in pretend play (e.g., dolls, dress-up clothes, puppets). Toys that easily could be used by two or more children in mutual activity (e.g., blocks, cars and trucks) were associated with children's social play in 10 of the 16 studies (63%). Six of the 16 studies (38%) included toys that involved physical activity (e.g.,

balls, wagons, riding toys, climbing apparatus). In 2 of the 16 studies (13%), play materials associated with social play involved turn taking and required two or more children in order to use the material (e.g., table games).

Other findings. Of the seven studies reporting toy use findings, six studies (88%) reported that social toys (e.g., blocks, cars and trucks, and housekeeping materials) were among the most popular toys in terms of frequency of times chosen or amount of time used. Investigators of studies reporting cognitive level of play consistently reported that children displayed higher levels of cognitive play (symbolic play) with housekeeping and other dramatic-play materials.

Rival Explanations

Several threats to internal and external validity and rival explanations for the findings are present in a number of the studies. In 5 of the 16 studies (31%), history cannot be ruled out as a threat because data collection occurred over an extended period of time (4 to 9 months) during which other events influencing children's social behavior with toys may have occurred. Instrumentation is a threat in five studies (31%) because interobserver reliability on the social outcome measures either were not determined or were determined on a very small percentage of the total number of observations (Hendrickson et al., 1981; Hulson, 1930; Rubin, 1977; Updegraff & Herbst, 1933; Van Alstyne, 1976). Attrition is a threat in one study (Van Alstyne, 1976), where at least 23% of the original sample was not included in the data analyses because of children's irregular attendance and missing data. In one study that reported differences in children's social play in social- and isolate-toy conditions, no tests for differences were conducted (Beckman & Kohl, 1984).

In several of the studies, adults could have influenced children's behavior in the play settings. Whereas in 11 of the studies (69%), adults were either not present in the play settings or were described as interacting minimally with the children during free-play periods, five of the studies (31%) included no description of the adults' roles in the play settings (Beckman & Kohl, 1984; Hendrickson et al., 1981; Johnson & Ershler, 1985; Rubin, 1977; Shure, 1963) nor did they report data indicating that adult presence was a factor influencing play behavior. Although it is assumed that during the free-play periods, children were free to use toys without direction, in four of these studies, it is not known whether adults may have been present in the play areas and differentially influenced children's play with the different toys.

Finally, in all of the studies using quasi-experimental designs, multiple treatment interference cannot be ruled out because children in all the playgroups participated in both social- and isolate-toy conditions or a mixed-toy condition. However, with the exception of one study, children's

participation in these studies led to similar outcomes regarding the influence of types of toys on their behavior.

Conclusion

Although there are weaknesses in a number of the studies, similar findings across the group of studies, which included different settings and children of different ages and developmental levels, indicate that several conclusions may be made about the findings. In the studies included in this synthesis, the different types of toys available in the environment influenced children's social behavior. Social toys set the occasion for children to play together with toys and interact with one another around shared activities or goals. In contrast, isolate toys set the stage for children to play alone or near other children with similar toys, but without interacting with the children.

Social toys were among the most preferred toys in the free-play settings. Because the majority of children in the studies were 3 to 5 years of age, these conclusions may be most relevant for children developmentally in this age range. Although children with disabilities appeared to exhibit less social behavior in the presence of both social and isolate toys than did children without disabilities, they nevertheless were influenced by the different types of toys, exhibiting more social behavior in the presence of social toys than with isolate toys.

Implications for Practice

The findings from this research synthesis have a number of implications for practice. The research evidence warrants the use of particular types of toys to set the occasion for social play among peers (2-7 years old) in early childhood settings. Providing particular types of toys for children's play increases the likelihood that interactions among children will occur.

The types of toys and play materials that encourage children playing together (i.e., social toys) are ones that involve turn taking (e.g., table games) or physical play (e.g., wagons, riding toys), can be used in ways that reflect the practical use of everyday household objects (e.g., dishes, housekeeping materials), can be used as props for pretend play (e.g., puppets, dress-up clothes), or can be used readily by two or more children (e.g., blocks, cars and trucks). Other types of toys, on the other hand, make it more likely that children will play alone or near one another (i.e., isolate toys). These types of toys can be used easily by just one child, or they involve manipulative (e.g., peg board, LEGOs) or creative (e.g., crayons, paints, play dough) play.

The implication of these findings is that children's everyday classroom experiences with toys and play materials provide numerous opportunities for increasing peer interactions. Classrooms that make available toys and play materials that easily can be used by two or more children

(e.g., blocks, cars and trucks) are likely to increase children's social play because the toys can bring children together in similar play using shared materials. In other cases, the availability of toys and play materials that serve as props for pretend play (e.g., dress-up clothes, puppets) would promote social interaction when children engage in actions about real or imaginary situations that involve two or more characters. Similarly, the availability of toys that represent functional objects in children's lives (e.g., dishes, housekeeping materials) could promote social interaction by setting the stage for children to interact with one another while engaged in behavior that reflects the functional use of the objects. Providing toys and play materials that encourage children to take turns with one another (e.g., table games) or engage in physical play (e.g., riding toys) also would promote the likelihood of social interaction. Practitioners who want to organize environments encouraging young children's social play should bear in mind that the type of toys provided is one environmental feature influencing social play among children and should consider the characteristics of the toys and play materials made available to children in those environments.

To assist practitioners in implementing this practice, a *Bottomlines* report (Vol. 1, No. 8) that uses nontechnical, user-friendly language to describe what we know about types of toys and children's social behavior has been developed. The *Bottomlines* also includes vignettes illustrating the use of social toys in classroom settings.

The *Bridges* and *Bottomlines* reports also are being used to develop practice guides that illustrate how practitioners can use toys to set the occasion for children's social interactions in group settings. Practice guides that steer a user through the implementation of a particular practice are developed by the Research and Training Center staff when research evidence supports the use of the practice. These guides will be available in either electronic versions at our website (www.researchtopractice.info) or written versions that can be obtained by writing us at our Research and Training Center address.

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Table 1
Characteristics of Study Participants

Study	Total Participants	Age (Months)	Gender		Characteristics of Groups
			Male	Female	
Beckman & Kohl (1984)	16	37-51	2	2	4 children without disabilities in 2 integrated groups of 4 children each
		42-68	2	2	4 children with Down's syndrome or cognitive delay in 2 integrated groups of 4 children each
		42-68	4	4	8 children with Down's syndrome or cognitive delays in 2 nonintegrated groups of 4 children each
Cowden & Torrey (1990)	24	53.9 (Mean)	12	12	24 children with noncategorical (functional or developmental) delays from one classroom playing in groups of 4-6
Hendrickson et al. (1981)	115	24-72 ^a	—	—	115 children without disabilities or delays from five classrooms
Hulson (1930)	10	48-60 ^a	—	—	10 children without disabilities or delays from one classroom
Ivory & McCollum (1999)	8	45-61	3	5	8 children with disabilities (cerebral palsy [1], motor delay [1], cognitive delay [2], language delay [2], language and cognitive delay [2]) from two inclusive classrooms
Johnson & Ershler (1985)	42	36-71	10	11	21 children without disabilities
		36-71	16	5	21 children with disabilities/delays (social, cognitive, language, motor, or self-help delays)
Martin et al. (1991)	24	48-71	7	5	6 children without disabilities and 6 children with disabilities (speech [6], MR [2], OH [2], VH [3], HI [1]) in 2 integrated groups of 6 children each ^b
		49-70	9	3	12 children with disabilities (speech [8], MR [5], ED [1], autism [2], LD [1], OH [3]) in 2 nonintegrated groups of 6 children each
Parten (1933)	34	24-54	—	—	34 preschool children without disabilities
Quilitch & Risley (1973) Study 1	24	84-96 ^a	—	—	4 groups of 6 children each
Quilitch & Risley (1973) Study 2	—	84-96 ^a	—	—	Groups of 6 children (composition not held constant)
Rettig et al. (1993)	24	41-64	4	4	8 children without disabilities in 4 integrated groups of 4 children each
		42-70	2	6	8 children with disabilities (Down's syndrome [1], developmental delay [4], speech/language [2], Williams syndrome [1]) in 4 integrated groups of 4 children each
		44-66	3	5	8 children with disabilities (speech/language [2], language disorder [5], HI [1]) in 2 nonintegrated groups of 4 children each
Rubin (1977)	42	46.4 (Mean)	24	18	42 children without disabilities from two classrooms
Shure (1963)	14	48-60 ^a	7	7	14 children without disabilities from one classroom
Stoneman et al. (1983)	12	47-60	3	3	6 children without disabilities
		54-72	3	3	6 children with disabilities (Down's syndrome [1], developmental delay [3], behavior disorder and/or language delay [2])
Updegraff & Herbst (1933)	28	30-38	7	7	14 children from Classroom 1 (28 pairs)
		40-50	10	4	14 children from Classroom 2 (34 pairs)
Van Alstyne (1932/1976)	112	29-35 (N = 17) 36-47 (N = 25) 48-59 (N = 20) 60-71 (N = 50)	—	—	112 children without disabilities from seven classrooms

^a Ages in months are approximate. Studies reported ages in years.

^b MR = Mentally retarded, OH = Other handicaps, HI = Health impaired, VH = Visually handicapped

Table 2
Play Settings and Types of Toys

Study	Research Design	Research Setting		Toys/Play Materials
		Location	Context	
Beckman & Kohl (1984)	Quasi-experimental	Experimental playroom in preschool achievement center	Simulated 20-minute, free-play sessions	Isolate toys: Books, paper/crayons, play dough, puzzles Social toys: Blocks, ball, cars and trucks, puppets Mixed toys: Mix of isolate and social toys
Cowden & Torrey (1990)	Quasi-experimental	Experimental play area near preschool classroom	Simulated 20-minute, free-play sessions (3)	Mixed toys: Social (blocks, dollhouse, dolls, dishes, puppets, riding vehicles); Isolate (crayons, play dough, puzzles, pull toy, toy animals)
Hendrickson et al. (1981)	Naturalistic observation	Day care and nursery centers, private kindergarten	—	Indoor play materials/equipment
Hulson (1930)	Naturalistic observation	Research center laboratory preschool	1-hour, free-play periods over 9 months	Indoor play materials/equipment. Recorded first six choices made each day by a child, including blocks, sand table, house corner, seesaw, paper/scissors, crayons/paper, doll, balls, aquarium, books, plasticene, blackboard
Ivory & McCollum (1999)	Quasi-experimental	Play centers in inclusive public-school preschool classrooms	30-minute, classroom free-play periods over 4 weeks	Isolate: Books, paper, scissors, crayons, markers, play dough, puzzles, LEGOs, paints/brushes Social: Blocks, vehicles, puppets, dolls, dress-up clothes, dollhouse, housekeeping materials
Johnson & Ershler (1985)	Naturalistic observation	University child-study center, preschool special-education program	Free-play periods over 3 months	Indoor play materials/equipment. Play materials used were categorized as dramatic-play materials, arts and crafts, manipulatives, miscellaneous toys, construction toys (scissors, glue, paper), large-muscle toys, cooking materials, no toy, games, tools, puzzles, books
Martin et al. (1991)	Experimental	Experimental play areas near public-school preschool classroom	20-minute, simulated free-play sessions over 5 days	Isolate: Books, art materials, play dough, puzzles, peg board, parquetry Social: Balls, toy vehicles, puppets, dress-up clothes, housekeeping materials, wagon
Parten (1933)	Naturalistic observation	University nursery-school program	1-hour, free-play periods over 4 months	Indoor play materials/equipment including sandbox, dramatic play (house and dolls), trains, Kiddie Kar, scissors/paper, clay, swings, blocks, books, paints
Quilitch & Risley (1973) Study 1	Quasi-experimental	Play area in community recreation center	Simulated 45-minute, free-play sessions of 15 minutes for each condition	Isolate: Talking book, crayons, play dough, puzzles, Tinkertoys, gyroscope Social: Don't Cook Your Goose, Don't Break the Ice, Don't Spill the Beans, Pick-up-Stix, checkers, playing cards
Quilitch & Risley (1973) Study 2	Quasi-experimental	Same as Study 1 above	45-minute, free-play sessions each day for 9 days	Same as Study 1 above
Rettig et al. (1993)	Quasi-experimental	Experimental play areas in early childhood special-education programs	30-minute, simulated free-play sessions over 7 weeks	Isolate: Books, crayons/pens/paper, play dough, puzzles Social: Blocks, cars and trucks, dolls and doll clothes, toy playhouse
Rubin (1977)	Naturalistic observation	University laboratory preschool	1-hour, free-play periods over 30 days	Indoor play materials
Shure (1963)	Naturalistic observation	University laboratory nursery-school program	1-hour-15-minute, free-play periods over 4 months	Materials in five indoor play areas: Art, books, dolls, games, blocks

Table 2, continued

Study	Research Design	Research Setting		Toys/Play Materials
		Location	Context	
Stoneman et al. (1983)	Naturalistic observation	Model demonstration mainstreamed preschool	40-minute, free-play periods over 6 months	Indoor play materials/equipment. Materials used were categorized as blocks and vehicles, housekeeping materials, library materials, art materials, record player, water play, fine motor materials
Updegraff & Herbst (1933)	Quasi-experimental	Experimental playroom at preschool research setting	Simulated free-play sessions	Isolate: Clay/clay boards Social: Blocks
Van Alstyn (1932/1976)	Naturalistic observation	Public-school nursery, junior-kindergarten and kindergarten classrooms	45-minute, free-play periods over 4 months	Indoor play materials/equipment. For social participation measures, 25 play materials were sampled, including blocks, hollow blocks, clay, scissors, crayons, paints, doll, doll corner, dishes, ball, colored cubes, beads, Blox that Lox, wagon, dump truck, small cars, wooden animals, puzzles, pull toys, peg board, telephone, pyramid

Table 3
Outcome Measures and Major Findings About Child Social and Other Behavior

Study	Outcome Measures		Findings	
	Social	Other	Social	Other
Beckman & Kohl (1984)	P ^a	Toy use	For both classrooms, and for all groups, the most social interactions occurred in social toy condition, then mixed, then isolate condition. Children in integrated groups interacted more than did children in nonintegrated groups for all toy conditions.	Toy play occurred most often in isolate condition, then mixed, and least often in social-toy condition. Children in nonintegrated groups played with toys more often than did children in integrated groups. Toy preferences were variable across groups and toy conditions.
Cowden & Torrey (1990)	P	Toy use	Children were unoccupied more than 25% of the time. All toys primarily were used during solitary play. No cooperative play occurred. Associative play occurred less than 6% of the time.	Social toys were preferred over isolate toys. Riding toys, dollhouse, and dishes were the most preferred social toys. Play dough, crayons, and pull toy were the most preferred isolate toys.
Hendrickson et al. (1981)	P		Majority of toys were used in isolate manner at some time. Majority of toys were used in more than one play context. Materials associated most with isolate play: Puzzles, templates, parquetry, peg boards, toy animals, paper/pencil, sink, car track, pull toys, Tinkertoys, LEGOs, paper cutouts Materials associated with parallel play: Climbing apparatus, musical instruments, play in loft, erasable tablets, toy trucks and cars, crayons, bottles, toy phone, paint/easel, sand/water table Materials associated with share/cooperative play: Books, balls, puppet stage, dress-up clothes, post office toy, wagon, giant pillow, clay and play dough, blocks, toy housekeeping materials, records/record player Materials associated with physical assistance: Toy sewing machine	
Hulson (1930)	I ^b	Toy use	Materials having greatest social value: Blocks, house corner, sand, seesaw Materials having lowest social value: Animals, plasticene, doll, blackboard Watching other children occurred minimally.	Interest span (time spent with a material) decreased from first to sixth choice. Blocks, sand, house corner, Kiddie Kar, ranked highest in number of times chosen and persistence in use. Most activities occurred around house corner, sand, Kiddie Kar, blocks, seesaw, and dishes.
Ivory & McCollum (1999)	P		Parallel play predominated across both toy conditions. Cooperative play occurred more with social toys than with isolate toys. Isolate play was low in both toy conditions.	
Johnson & Ershler (1985)	P	Cognitive play Toy use	Children with and without disabilities were similar in percent of time spent interacting with peers and teachers. Occurrence of conflict was rare. Children with disabilities: Most social interactive play occurred with dramatic play and large-muscle materials. Children without disabilities: Most social interactive play occurred with dramatic play, art, and miscellaneous materials, and when no toy was used.	Use of dramatic play materials was most prevalent for both groups, and they were used at every social and cognitive level of play. Children without disabilities used arts and crafts, construction toys, miscellaneous toys, tools, and cooking items more than did children with disabilities Children with disabilities had more use of large-muscle toys, books, dramatic-play materials, and games than did

Table 3, continued

Study	Outcome Measures		Findings	
	Social	Other	Social	Other
Johnson & Ershler (1985), continued				children without disabilities. Children without disabilities used a greater variety of toys at each cognitive-play behavior level.
Martin et al. (1991)	I ^c		The incidence of social behavior was greater in integrated settings than in nonintegrated settings, for each toy condition. The incidence of social behavior was greater in the social-toy condition than in the isolate-toy condition. The incidence of social behavior was greatest in the integrated social-toy condition and lowest in the nonintegrated isolate-toy condition.	
Parten (1933)	P	Toy use	Solitary play occurred most frequently with trains. Associative play occurred most frequently with trains, Kiddie Kar, paper/scissors, swings, and paints. Cooperative play occurred most frequently during playing house and dolls. Materials associated with parallel play were sand, paper, clay, swings, beads, paints. The social value of toys varied with age. Social participation score was highest for house and dolls, and Kiddie Kar; lowest for train and beads.	Majority of play groups were comprised of two children, and the majority of these were same sex. Tendency to play in larger groups increased with age. Materials with greatest frequency of use were sandbox, dolls, toy train, Kiddie Kar, paper/scissors, clay, swing, blocks Youngest children preferred sand play, 3-year-olds preferred dolls and swing.
Quilitch & Risley (1973) Study 1	I ^d		The percentage of time spent in social play was greatest in the social-toy condition.	
Quilitch & Risley (1973) Study 2	I ^d		Even when group composition was not held constant, social interaction was greatest in the social-toy condition.	
Rettig et al. (1993)	I ^c		Across all participants, the incidence of social interactions was greatest in the social-toy condition. More social interactions occurred in the social-toy condition for 5-year-olds than for any other age group. Children with disabilities showed significantly more social interactions in the social-toy condition than in the isolate-toy condition. There was no significant difference in social interactions in the different toy conditions for children without disabilities. Children without disabilities showed greater frequency of interactions in both the social- and isolate-toy condition than did children with disabilities.	
Rubin (1977)	P	Cognitive play	Most nonsocial play (solitary, parallel) occurred with paints, crayons, play dough, sand/water, and puzzles. Most social play (associative, cooperative) occurred during house play, vehicle play, reading	During play with play dough and sand/water, functional play primarily was used. Children primarily were engaged in constructive play during play with paints, crayons, and puzzles, and during reading. Dramatic play occurred most during house play and vehicle play.

Table 3, continued

Study	Outcome Measures		Findings	
	Social	Other	Social	Other
Shure (1963)	P	Participation affect constructiveness	<p>Children played alone (solitary, solitary-same) most often in block and game areas.</p> <p>Awareness of other children (onlooker, parallel) was exhibited most often in art and book areas.</p> <p>Complex social interactions (associative, cooperative) were exhibited most often in doll corner and blocks.</p>	<p>Most time was spent in the block and art areas.</p> <p>All play areas elicited more relevant activity than irrelevant activity.</p> <p>Quality of child affect (primarily neutral) was similar across all areas.</p> <p>Constructive use of materials occurred in every area, and most frequently in art and book areas.</p>
Stoneman et al. (1983)	I ^e	Toy use	<p>Interactions among children with and without disabilities occurred proportionately more frequently during play with blocks and vehicles than during play with any other materials.</p> <p>Children playing with blocks and vehicles, water play, housekeeping materials, and record player were involved in proportionally more cooperative play than were children playing with library materials, fine-motor toys, or no toys.</p> <p>Children using library materials were engaged in more solitary play than were children using any other materials. Children using blocks and vehicles were engaged in less solitary play than children using any other materials.</p> <p>Children with disabilities engaged in more solitary play than did children without disabilities. Children without disabilities engaged in more cooperative play.</p> <p>Adult-child interactions occurred most frequently when children were not involved with toys.</p>	<p>Most popular materials across both groups were art and housekeeping, followed by fine-motor toys, record player, blocks and vehicles, water play, and library materials.</p>
Updegraff & Herbst (1933)	I ^f		<p>Two-year-olds: Watched partners more while playing with clay than while playing with blocks. Conversations about the use of materials was prevalent during play with both materials. There were no differences in giving/taking suggestions during play with clay and blocks.</p> <p>No differences in behavior of 3-year-olds while playing with clay and blocks.</p> <p>Three-year-olds paid more attention to partner than did 2-year-olds, made more verbal suggestions for use of materials, and held more conversations about the materials.</p> <p>More mutual activity related to the materials occurred with blocks than occurred with clay.</p> <p>More cooperative behaviors occurred with clay than occurred with blocks.</p> <p>More behaviors rated least cooperative occurred while children were playing with blocks.</p>	
Van Alstyne (1932/1976)	I ^g	Toy use	<p>Materials having most conversational value were dishes, hollow blocks, doll corner, wagon, parallel bars, telephone, blocks, colored cubes, ball, crayons, clay.</p> <p>Materials used primarily in active cooperation were parallel bars, wagon, dishes, hollow blocks, blocks, doll corner, colored cubes, dump trucks.</p> <p>Materials used most in passive cooperation were clay, crayons, scissors, painting, beads, puzzles, books, balls.</p> <p>Children's attention spans were the same for materials having the highest social value and materials having the lowest social value.</p>	<p>The greatest amount of time was spent on blocks, clay, doll corner.</p> <p>Children's attention span with materials was greatest for clay, painting, doll corner, blocks.</p>

Table 3, continued

NOTE: I = Investigator-developed measure of social behavior; P = Parten's Scale of Social Participation (Parten, 1932) or adaptation of this scale: unoccupied, onlooker, solitary, parallel, associative, cooperative play

^a Investigator-developed measure of social interaction

^b Investigator-developed measure of social value (i.e., number of children playing with a child using a given toy—and watching)

^c Investigator-developed measures of isolate (playing alone) and social (verbal, motor/gestural) behaviors

^d Investigator-developed measure of the percentage of children interacting with other children

^e Investigator-developed measure of solitary activity, conflict with peers, cooperative interaction, and adult-child interaction

^f Twenty-five behavior codes (positive and negative) including attention to others, playing near, watching, mutual activity, complying, imitating, conversations about materials, suggestions, taking materials, exchanging materials, and engaging in conflict

^g Investigator developed measure of conversation, passive cooperation, active cooperation, and interactive watching

^h Cognitive levels of play include functional, constructive, and symbolic (dramatic) games with rules.