

## Sequential transition patterns of preschoolers' social interactions during child-initiated play: Is parallel-aware play a bidirectional bridge to other play states?<sup>☆</sup>

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### Abstract

Lag-sequential analysis was used to explore the simultaneous sequential transition patterns of preschoolers' social play within natural classroom settings. Subjects were 167 middle- and lower-income 4-year-olds (90 boys and 77 girls) videotaped in three child-initiated play centers. Results indicated that the proportion of social-play states did not vary during the play episodes even when accounting for type of activity center, gender, and SES. Findings also revealed that, during and within child-initiated play centers, a reciprocal relationship existed between parallel-aware and other social-play states. Specifically, knowing preschoolers who were in parallel-aware play significantly increased the likelihood of predicting their shifts into cooperative-social and onlooker play; while knowing children were in cooperative-social, onlooker, and solitary-constructive play predicted shifts into parallel-aware play. Likewise, similar to school-age children's group-entry patterns, preschoolers exhibited a three-step sequential play pattern of going from onlooker behavior into parallel-aware play then into cooperative-social play during child-initiated activities. Also supported was the notion that during child-initiated play episodes parallel-aware play is more than a static bridge into cooperative-social play; it is a dynamic bidirectional crossroad between other social-play states.

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# 1. Introduction

The important role of play in the social, emotional, and physical development of preschool-age children has been generally established in the research literature and is considered by early childhood professionals to be an integral component of a developmentally appropriate curriculum (e.g., Bredekamp & Copple, 1997; Goncu, Patt, & Kouba, 2002; Hart, 1993; Pellegrini, 2002). Play has been identified with several valuable functions in young children’s learning and is not considered to be merely a pleasurable waste of time. For example, Garvey (1990, p. 9) points out that:

Research on the growth of social competence, readiness for formal schooling, and the ability to cope with intrapersonal and interpersonal affect; on family relationships and processes; and on the problems of handicapped, disturbed, or developmentally delayed children have frequently involved studies of play activities or identified play as a positive influence in other areas of development.

In the literature, young children’s play has been studied in terms of complex social and/or cognitive maturational sequences (Bakeman & Brownlee, 1980; Howes & Matheson, 1992; Parten, 1932; Piaget, 1959; Rubin, Watson, & Jambor, 1978; Smilansky, 1968). Typically, researchers have been concerned with exploring and documenting the developmental sequences of social and cognitive play by observing individual children in their play environments. This approach has yielded much valuable information concerning how the sequence of social and cognitive play unfolds across corresponding age groups. Although understanding developmental sequences is useful, many early childhood educators in busy classroom settings are less likely focused on developmental play stages than on more current peer group behaviors that are occurring in various activity centers/areas. Correspondingly, what has received less emphasis in the literature, and may prove to be beneficial to early childhood educators, is the sequential analysis and documentation of social-play sequences of children situated within group settings (child-initiated play centers) that are typically found in preschool classrooms. Helping teachers better understand normative play patterns will assist them in facilitating natural sequences of social interaction. To accomplish this aim, the current study was designed to explore the sequential dynamics of social play as it occurs in typical preschool child-initiated play centers in natural classroom settings. All children who visited selected activity centers were simultaneously recorded. Each individual child’s social-play sequences within various activity centers were then analyzed in order to provide a more complete picture of the overall dynamics of preschool-age children’s sequential social-play states during child-initiated play.

## 1.1. Children’s individual sequential maturation of play

Historically, young children’s play has been conceptualized to be stage-like, as a function of developmental maturation. In this view, *social play* is conceptualized as proceeding in a series of immature to mature forms of social interactions (e.g., unoccupied behavior to solitary play to onlooker play to parallel play to associative play to cooperative play) over the course of early childhood (Parten, 1932). In contrast, *object play* involves children becoming increasingly able to order objects and actions in time and space, evolving from functional

play (e.g., manipulative play, repetitive motor actions with or without objects) to constructive play (Piaget, 1959; Smilansky, 1968). The latter involves developing capabilities that allow for building complex structures out of blocks, legos, and so forth or producing recognizable products using puzzles and art construction materials.

Since these earlier conceptualizations of stage-like play, the complexity of different play patterns and their developmental significance has been elaborated to include the nesting of cognitive play-categories of Smilansky within the social-play categories of Parten (1932). This has allowed for meaningful comparisons to be made across age groups in early childhood, indicating that some forms of play do not necessarily disappear when examined in fine-grained fashion (see Rubin, Fein, & Vandenberg, 1983). For example, solitary-functional behavior decreases over the preschool years, whereas solitary-constructive activity remains about the same (Rubin et al., 1978). By age four, constructive play (solitary-constructive, parallel-constructive, and associative/cooperative group-constructive) appears to be the most predominant form of behavior, accounting for about 50% of free play episodes (Johnson & Ershler, 1981; Rubin et al., 1983).

Contrary to the earlier assumptions of Parten (1932), parallel play is not discontinued over the course of development and remains a quantitatively dominant mode of social interaction for 4- to 5-year-old children (e.g., Rubin et al., 1978). In the social-play domain, children have been shown to engage in more mature forms of parallel play across these early years, moving from parallel-engaged play (conducting similar activities with little awareness of others) to more parallel-aware play where eye contact with and mutual awareness of others is displayed (Howes, 1980; Howes & Matheson, 1992). These recent studies also demonstrate how children become increasingly capable of going beyond parallel-aware play, to simple social play (e.g., talking, giving, sharing), to engaging in more complex forms of cooperative-social play that involve the enactment of organized, constructive, or sociodramatic play with complementary roles and communication (Howes & Matheson, 1992; Rubin, Bukowski, & Parker, 1998). Participating in sociodramatic play demonstrates increasingly sophisticated child abilities to share symbolic meanings through social pretense across the early childhood years (e.g., Howes, 1980; Howes & Matheson, 1992; Johnson & Ershler, 1981; Rubin et al., 1978).

Despite research documenting developmental sequences in the social maturity of play states in which children engage, little is known about dynamic ways that different forms of play work together to foster socially competent interactions with peers. This is especially true for what is happening during typical preschool child-initiated activities. Studies exploring transitional-play states suggest that different types of play may be supportive of one another in sequential group processes. The work of Howes and Matheson (1992) suggest that Parten's social-play states may also represent sequential steps into specific play episodes as young children move from less to more involved social play. This notion seems supported by the earlier work of Smith (1978) who found that 3- and 4-year-old children were more likely to move from solitary play directly into group play than into other play types. Additionally, Smith observed that the shift between parallel and group play was the predominant transition among 2- and 3- year-olds.

Bakeman and Brownlee (1980) examined the role of parallel play in the sequence of 3-year-old children's social development and asserted that parallel play may often arise less from forces of development than from momentary social needs. For example, a child may

play near a group in a dramatic play center by putting on an apron and dressing a doll while observing the on-going play scenario. While doing so the child may select a role she/he might assume that would complement the play of the group. In this scenario, parallel play may serve as a situational bridge into cooperative-social play and have little, if any, relationship to the child's ability or inability to interact socially with peers.

Although not directly addressing social-play theory, a body of literature addressing processes of children's successful group-entry strategies has highlighted significant aspects of parallel-aware play behaviors in children's social interactions (e.g., Dodge, Schlundt, Schocken, & Delugach, 1983; Putallaz, 1983; Putallaz & Wasserman, 1989). For example, Dodge et al. (1983) examined school-age children's successful group-entry strategies in their conceptualization of social involvement and social cognition. Dodge et al. found that socially competent children are three times more likely to employ predictable sequential strategies leading to successful entry into a host peer group than children who display social challenges (neglected, rejected). These strategies include a three-step sequence of low-risk (waiting and hovering) to higher-risk (imitating group play behavior) to highest-risk tactics (making group-relevant statements and requests) culminating in successful social group interactions. The work of Dodge et al. implies that social-play state behaviors such as onlooker behavior (watching the play of others) and parallel-aware play (matching behaviors to on-going interaction) serve as bridges into cooperative-social play.

Consistent with the [Dodges' et al. \(1983\)](#) group-entry strategies with school-age children and incorporating findings from [Bakeman and Brownlee \(1980\)](#) and [Howes and Matheson \(1992\)](#) with younger children, [Rubin et al. \(1998\)](#) hypothesized that for early childhood social interactions:

... competent entry into ongoing peer activity appears to involve the ability to observe what the play participants are doing (onlooking activity), to approach and play beside potential play partners (parallel play), and, finally, to engage the players in conversation about the ongoing activity. As such, a simple consideration of the frequency of particular forms of social participation mask the functional significance of the behavior (p. 635).

To our knowledge this three-step sequential social-play hypothesis has not been empirically verified in the literature with preschoolers, either individually or in child-initiated play centers. Therefore, one purpose of this study was to explore the likelihood of a three-step social-play strategy among groups of preschool children across multiple play settings.

### *1.2. Impact of gender and ecological/contextual factors in child-initiated play centers*

In addition to documenting the maturational sequences of social play for young children, many studies have identified children's gender and several ecological/contextual factors found in typical preschool classrooms that influence types of social play (see [Howe, Moller, Chambers, 1994](#); [Howe, Moller, Chambers, & Petrakos, 1993](#); [Neppl & Murray, 1997](#); [Petrakos & Howe, 1996](#)). For example, concerning children's gender, [Neppl and Murray \(1997\)](#) found that the amount of dramatic play for same-gender dyads was directly related to same-sex stereotypes of play materials. Likewise, preferences for thematic play centers were associated with gender (girls preferred traditional dramatic play props and boys preferred nontraditional or

novel props; Howe et al., 1993). Concerning ecological/contextual factors, housekeeping, sand, manipulative, and vehicle centers have been found to facilitate social interaction in young children (Quay, Weaver, & Neel, 1986; Rubin, 1977; Shure, 1963). Similarity, Droege and Howes (1991) found that highly structured areas, such as housekeeping centers, facilitated imitative types of dramatic play while lower structured areas like block centers facilitated more creative pretend play. Since the purpose of the present study is to examine the simultaneous sequential social-play patterns of children occurring within preschool child-initiated play centers, three typical activity centers were chosen to account for potential ecological/contextual effects on children's play behavior. These centers included manipulative, block, and housekeeping areas.

### *1.3. Methodological issues of assessing group child-initiated play*

Many early studies of preschool children's social-play sequences have typically assessed play behavior by means of proportional scores for various play states. While much has been learned from proportional analysis of time-sampling data of children's social-play states, the overall utility of proportional analyses is somewhat limited. For example, the dynamic interplay and sequences of transitions in play episodes are commonly masked when global measures of proportions are employed. A more precise assessment of children's social interactions has often included sequential analyses of children's interactional behaviors as they appear in play episodes. However, even among the limited number of studies that used sequential analysis of play transitions (e.g., Bakeman & Brownlee, 1980; Howes & Matheson, 1992), most employed linear time-sampling procedures that focused upon children's individual behaviors. For example, a typical strategy has been to isolate a video camera/observer on one child for a set period of time then to shift attention to another child and so on. By using this type of linear time-sampling methodology it is possible to capture an individual child's engagement in multiple intervals of social play. However, linear time-sampling data often has the drawback of overlooking the behavior of the social group or play partners during this same sequence of observed behaviors. Given the dynamic nature of play states, it is likely that once attention is shifted to another target child, subtle or even dramatic changes in play behaviors may have occurred that then lead to under-representation of a child's play behavior.

Others (e.g., Doyle, Doehring, Tessier, de Lorimier, & Shapiro, 1992; Rubin, 1989) have attempted to overcome this limitation by videotaping the play behavior of small groups of children, typically in dyads or quartets, and then coding individually the behaviors of each child as they occur simultaneously. However, such strategies have been criticized for their limited ecological validity, in that unlike most preschools, these play groups are typically comprised of small groups of unfamiliar peers in unfamiliar settings with subjects often engaging in contrived social tasks. Such settings unfortunately do not allow for the observation of social-play behaviors as they occur simultaneously among familiar peers in naturally occurring contexts where children have the opportunity to select not only play centers but also play partners and/or groups. Under both conditions (linear time-sampling techniques and contrived play situations) a more complete picture of natural social-play sequencing within normally occurring group activities appears to be lost by either overlooking simultaneous social-play behaviors within the broader group, or by forcing unacquainted peers into unnatural social-play settings.

Because of these limitations, a more precise procedure to capture natural occurrences and transitions between children's social-play states may involve the use of sequential interval recording over extended time samples. While more labor intensive, this procedure enables researchers to examine the simultaneous behaviors of all children occurring over a more extensive period of time (30 minutes) while independently coding the behaviors of each child within 10-second intervals over the course of the time sample. This provides the researcher with a more complete representation of all social-play behaviors as they occur within natural settings and across time. Thus, each child's sequential social-play behaviors are coded within the context of the other children's behaviors. The methodological limitations of typical time sampling and proportional analysis techniques may be the reason why many studies have failed to make clear the types of dynamic social-play transitions within child-initiated play centers/areas. Thus, a sequential examination of the simultaneous social transitions of play states may illuminate whether preschoolers' social interactions, during sustained child-initiated play, are dynamic/transitional events or whether they are more static with a particular play state maintained for extended periods of time.

In summary, the implied somewhat rigid stage-like developmental sequential patterns of young children's social play historically proposed by [Parten's \(1932\)](#) has been modified and elaborated upon by many play theorists in the literature. For example, distinct qualitative shifts from one play-state behavior to the next have not been documented and shifts between social-play states appear to be more continuous than abrupt. Further elaboration is needed as to why persistent high levels of parallel-aware play remain in preschool-age children who exhibit the skills of the more mature social play. Likewise, little is known about the dynamic ways that different forms of social play work together to foster socially competent interactions. It is feasible that the dynamic interplay between solitary-constructive, onlooker behavior, parallel-aware, and cooperative-social play may be more fully understood within typical preschool child-initiated play episodes than merely comparing sequential proportional levels of each social-play state of individual children. Finally, several play theorists have proposed the likelihood of parallel-aware play serving as a bridge to more mature social-play states. A sequential analysis within preschool child-initiated play centers using interval recording focusing upon the interplay of play states during natural classroom activities holds promise in attempting to address these issues raised in the literature.

#### *1.4. Research hypotheses*

Several research hypotheses were addressed in the present study. The first hypothesis concerns possible confounding factors, specifically, whether the proportions of social play-states, in typical preschool child-initiated play environments, are the same across children's gender, and SES, while accounting for ecological/contextual differences among different child-initiated play centers. From the literature we hypothesized that there would be differences in social play-state proportions in preschool-age children due to gender and ecological/contextual factors.

The second hypothesis focuses on the prominent role and possible reciprocal relationship between parallel-aware play and the other social-play states within typical preschool child-initiated play centers. Specifically, when assessing young children in groups simultaneously,



is parallel-aware play a somewhat static state related to social maturation and suggesting a unidirectional bridge to higher social-play states or is parallel-aware play a dynamic bidirectional crossroad between the other play states within child-initiated play episodes. In other words, once preschool-age children engage in a more mature form of social interaction in child-initiated play episodes do they stay in that form because they find it more satisfying or do they revert to less mature forms because they are not capable of sustaining the social interactions? We hypothesized that parallel-aware play would have a prominent role in preschool children's play and serve a reciprocal bidirectional function between other social-play states. To our knowledge, the latter part of this hypothesis has not been thoroughly addressed in the literature. Previous research of [Rubin, Maioni, and Hornung \(1976\)](#) and [Dodge et al. \(1983\)](#) and the hypotheses of [Rubin et al. \(1998\)](#) have implied more of a unidirectional bridging function of parallel-aware play in the social-interaction hierarchy, culminating in cooperative-social interaction.

This study's third hypothesis specifically addresses the [Rubin et al.'s \(1998\)](#) hypothesized three-step group-entry pattern (e.g., onlooker play to parallel-aware play followed by social group interaction). We hypothesized that the unidirectional bridging process observed in social group interaction among school-age children's group-entry strategies ([Dodge et al., 1983](#)) would be similarly observed among preschool-age children by examining the dynamic *social-play patterns* during child-initiated play episodes.

This study was designed to simultaneously record all children's social interactions within child-initiated play activities and to examine all possible shifts into and out of differing social-play states (e.g., including shifts from cooperative-social play to other play states). It was anticipated that in addressing these three research hypotheses a clearer understanding of the role of social-play states within child-initiated play centers in the interactions of preschool-age children would emerge, particularly the unique role of parallel-aware play.

## 2. Method

### 2.1. Subjects

The sample consisted of 167 children (90 boys and 77 girls;  $M = 56$  months,  $SD = 4.32$ ) attending one of two preschool programs on a large university campus. One half of the sample, or 84 children (41 boys and 43 girls;  $M = 55$  months,  $SD = 4.21$ ), attended a university preschool program. These children were predominantly white (76 Caucasian, 8 Hispanic) from middle income (annual income range = \$36,000–\$60,000), two-parent families. The other half of the sample, or 83 children (49 boys and 34 girls;  $M = 58$  months,  $SD = 3.79$ ), attended a Head Start program located on the same university campus. These participants were of mixed ethnicity (45 Caucasian, 39 Hispanic) from lower income ( $M = \$10,000$ –\$15,000) families.

### 2.2. Settings

Since the intent of the present study was to examine sequential social-play interactions during child-initiated play episodes in natural preschool environments, the normal routines of

the classrooms were not altered. Both the university laboratory and Head Start settings run programs in which the children attend two and a half hours, either morning or afternoon. In both settings children were allowed to choose between several activity centers (e.g., house-keeping, block, manipulative, writing, creative arts, computer) as they began their preschool day. Consistent with a child-initiated play philosophy, centers in both settings were designed to encourage child-initiated versus teacher-directed activities. Likewise, the number of children allowed to visit each center at any given time was not restricted by teachers nor was the flow of children between centers controlled. For this study, three specific child-initiated play centers were selected for videotaped observation (manipulative, block, and housekeeping) to account for possible ecological/contextual confounding of the amount of social-play interactions. These centers were chosen because they are present in most early childhood settings, were considered to elicit a range of children's social interaction, and have been included in other studies (Howe et al., 1993; Johnson & Ershler, 1981; Parten, 1933). The arrangement and content of the three child-initiated play centers were designed to be as similar as possible between the preschool programs. The block centers consisted of designated floor areas in each classroom surrounded by open shelving with natural maple unit blocks in which various block-play props can be introduced (toy cars/trucks, farm/zoo animals, etc.). The manipulative centers consisted of several child-size tables/chairs with various types of materials such as puzzles, pattern shapes, Legos, sorting materials, and so forth. The housekeeping centers in each classroom consisted of a small table/chairs surrounded by small kitchen play furniture (stove, sink, refrigerator, etc.), domestic props (dolls, play food, play dishes and pans, etc.), and a variety of adult-role dress-up clothing.

### 2.3. Procedures

#### 2.3.1. Videotaping

The intent of this study was to focus upon the dynamic sequential patterns of preschool children's transitions into several social-play states (e.g., solitary-constructive, onlooker, parallel-aware, cooperative-social play) when, in selected preschool child-initiated play activity centers (housekeeping, block, manipulative). In recording the sequential patterns/transitions of social-play states within these centers, each targeted child-initiated play center in each classroom was videotaped using a concealed camera.

Each of the three targeted child-initiated play centers in each classroom were videotaped 30 minutes a day on four separate occasions, rotating the day of the week. A running clock (see Hart & Sheehan, 1986) was overlaid on the videotapes of the three centers to facilitate coding the social-play states. For *each child* present in the center, the coders identified the predominant social-play state in each 10-second segment of the videotape. This allowed the data to be entered in a time sequence (see, Altman, 1974).

#### 2.3.2. Coding

Coding sheets used by the coders described social play-state definitions and divided each play-state category into at least two or three sub-categories with another two or three specific behaviors defining those sub-categories. Table 1 presents the play-state descriptors and examples of the play states used for the study. For example, the *Cooperative-Social Play* category has



Table 1

## Play state descriptors and examples

*Solitary-constructive play*

1. Plays with toys by self rather than with other children
  - Engaged in play with toys away from other children
  - Playing alone in a center
2. Does constructive activities
  - Builds with blocks or Legos, sets the table or does puzzles alone, away from others
  - Builds things by self rather than with other children
3. Reads alone, away from others
  - While alone, reads labels in the center

*Onlooker behavior*

1. Stares at other children without interacting with them
  - Looks directly at another child or group of children with no body movement
  - Waits and hovers near other children without joining their play
2. Watches others who are engaged in activity
  - Turns his/her head in direction of other children
  - Looks in vicinity of other children while walking towards them
3. Hesitant in approaching other children
  - Walks slowly toward other children
  - Stops near children playing without entering their circle of play

*Parallel-aware play*

1. Plays actively near peers maintaining some eye contact (e.g., glances), but does not interact with them while doing so
  - Builds block structure with peers without a common goal
  - Sets the table, plays with dolls or other house keeping materials near peers with no defined role
  - Without physical or verbal interaction, assembles a puzzle, bristle blocks, or pattern blocks near peers who are doing similar things
2. Talks aloud around peers maintaining some eye contact (e.g., glances) when they are doing similar things but does not interact with them
  - Language does not appear to alter the direction of the ongoing, independent actions of peers
  - Peers do not look at or otherwise acknowledge the verbal utterance of the child
3. Pretends to be something in vicinity of peers maintaining some eye contact (e.g., glances) doing similar things but does not interact with them
  - Puts on dress-up clothing near other children with no sign of jointness
  - Pushes vehicle on the floor near another child doing the same thing with no interaction with other child
  - Assumes a role (fireman, father, mother, pet) near other children
4. Animates toys in vicinity of peers doing similar things but not interacting with them
  - Acts aggressively with block structure with no verbal definition of its role as good-guy or bad-guy
  - Places animals in families (mother, father, baby) who interact with one another but not the animals being played with by nearby children
  - Pretends dolls are babies with no interaction with other children doing similar things with no sign of coordination

*Cooperative-social interaction*

1. Offers to share materials used in a task
  - Extends a toy toward another child
2. Offers to help other children who are having difficulty with a task in the classroom
  - Picks up a puzzle piece from the puzzle another child is fitting together and places it in the puzzle frame
  - Brings a block to a structure a peer is building
  - Turns upright an overturned cup
  - Picks up something from the floor another child dropped
3. Comforts a child who is crying or upset
  - Moves toward a crying child with an extended hand
  - Bends over a child who is curled on the floor away from the group
4. Plays cooperatively with peers
  - Assumes a role as father, mother, child, or pet interacting with the other children
  - Builds structure with other children having a common goal
  - Division of labor in accomplishing task together

a subcategory of *Offers to share materials used in a task* with the specific behavior—*Extends a toy towards another child*. This category, adapted from Howes and Matheson (1992), primarily comprised of organized constructive or sociodramatic play involving complementary roles and communication (e.g., assumes a role as father, mother, child, or pet interacting with other children).

Other social play-state definitions used in this study were derived from Howes and Matheson (1992), Rubin's Play Scale (1989), and the Playground Observation Scale (Hart, DeWolf, Wozniak, & Burts, 1992). The coders scored the social-play states between peers as either onlooker (watching others), solitary-constructive (playing alone with toys), parallel-aware (engaged in similar activities without interacting but with mutual awareness), or cooperative-social (interacting socially—including dramatic pretend play), using procedures from previous studies (see Coplan, Rubin, Fox, Calkins, & Stewart, 1994; Petrakos & Howe, 1996).

Coders were trained prior to the study to identify the targeted social-play states using children of the same age playing in conditions similar to the study's child-initiated play settings. Inter-rater reliability testing of the coded play-state behaviors was calculated on 20% of each coder's responses during the study. When a coder's inter-rater agreement with the tester dropped below 0.80, the coder was given additional training to review the play-state behavior definitions. For the study the overall Cohen's *kappa* for inter-rater reliability for the coded play-state behaviors was 0.89, with a range of 0.79–0.97 for all the possible combinations of pairs.

### 2.3.3. Data analysis procedure

The statistical procedure used to assess patterns of play-state transitions in the child-initiated play centers was lag-sequential analysis. For this study, a lag represented a shift/transition into a play state made by each child during the designated 30-minute child-initiated play episodes. Since the focus was on the sequence of shifts/transitions from one play state to another, a play-state lag or shift was recorded only when it signaled the beginning of a different type of social play and not when it represented a continuance of that play state. For example, in the following hypothetical videotaped sequence [S\_P P P\_O\_P\_C C\_P] of the four coded play-state behaviors (S, Solitary-constructive; O, Onlooker; P, Parallel-aware; C, Cooperative-social), five shifts/transitions or lags (represented by underscores) into play states would be counted.

The examination of shifts/transitions from one social-play state to another in lag-sequential analysis attempts to determine the likelihood that a child, knowing the current play state he/she is engaged, will shift/transition into another particular play state. The total likelihoods of shifts/transitions from any single play state to each of the study's other four play states within the child-initiated play episodes will total 100%. Besides determining the likelihood of shifts/transitions between any particular play state, lag-sequential analysis enables researchers to designate a *starting point* and an *end point* of specific play states in order to assess the likelihood of certain nonrandom patterns of shifts/transitions. For example, if the interest is in which play state children are likely to shift into following parallel-aware play, designated as a *starting point*, one can determine the likelihoods of shifts/transitions into the other play states, designated as *end points*.

In addition to analyzing the likelihoods of single shifts/transitions from one play state to another, lag-sequential analysis allows for the examination of the likelihood of a three-step (or two-phase) shift/transition sequence. For example, the interest of this study was examining

the likelihood of a specific two-phase shift/transition sequence into cooperative-social play (i.e., onlooker play → parallel-aware play → cooperative-social play). In testing this designated two-phase sequencing into cooperative-social play, the shift/transition following the onlooker → parallel-aware sequence (phase one) could be into any of the other three play states (phase two), excluding parallel-aware play. Thus, in designating the starting pattern of onlooker play → parallel-aware play the only three remaining play-state *end points* available for subsequent shifts/transitions following parallel-aware play are: (1) into cooperative-social play, (2) into solitary-constructive play, or (3) back into onlooker play.

### 3. Results

#### 3.1. Preliminary data analyses

To ascertain if children's gender was related to the type of activity center and thus potentially confound the frequency of play states observed/videotaped, a 2 (girls, boys) × 3 (block, housekeeping, manipulative) Chi-square test was calculated. The results revealed only a modest relationship between the three activity centers and children's gender [ $\chi^2$  (2,  $N$  = 129 hours) = 6.21,  $p$  < .05]. Cell Chi-square statistics revealed that 99.8% of the overall Chi square was attributed to discrepancies between the observed and expected hours with boys playing slightly more in the block centers (5.6 hours) and girls playing slightly more in the housekeeping centers (6.0 hours). This modest gender finding was anticipated and is consistent with previous research (Parten, 1933). Given these differences, child gender was included in subsequent analyses examining the potential effects of child-initiated play centers on play states. For descriptive information, the total number of 10-second play segments coded for all children in the study was 46,471. The housekeeping center had the highest number of coded 10-second observations (16,248), followed by the manipulative center (15,171), and the block center (15,052).

#### 3.2. Research hypotheses

##### 3.2.1. Impact of children's gender, SES, and ecological/contextual factors on amount of play-state behaviors between centers

The first research hypothesis addresses whether individual and setting variables/factors (i.e. gender, SES, ecological/contextual), may confound different amounts of preschoolers' social-play interactions in different child-initiated play centers. To determine if the amount of social play-state behaviors observed/videotaped varied across SES, gender, and activity center, a series of 2 (SES) × 2 (gender) × 3 (activity center) analyses of variance (ANOVAs) were calculated with each of the study's four play-state proportions (solitary-constructive, onlooker, parallel-aware, cooperative-social play) serving as the dependent variables. Proportions were calculated by dividing the number of 10-second episodes for each play state observed by the overall total of 10-second episodes for all the social-play states. The ANOVAs resulted in no significant main effects for SES, gender, activity center or interactions. Thus, the first research hypothesis that there would be differences in social-play states due to gender and

ecological/contextual factors was not supported. Since there were no significant differences in the amount of each play-state behavior between types of activity centers, SES, and gender, we felt confident in collapsing across these individual and setting variables/factors for the subsequent analyses.

### 3.2.2. *Relationship between parallel-aware play and the other play states*

As previously discussed, research has indicated that parallel-aware play has a prominent and specific role in preschool children's social interactions. Thus, the second research hypothesis addresses both the prominence and possible reciprocal relationship between parallel-aware play and the other social-play states in typical preschool child-initiated play centers. In addressing this hypothesis, several steps or procedures were followed. The first procedure was to establish the prominence of the play-state shifts/transitions into and from parallel-aware play. Prior to doing this, however, an initial or baseline likelihood of preschoolers making shifts/transitions into any one of the four social-play states (solitary-constructive, onlooker, parallel-aware, cooperative-social play) had to be determined. These initial/baseline likelihoods were calculated by dividing the number of shifts/transitions into a particular play state by the total number of all shifts/transitions ( $n = 9.374$ ). As anticipated, lag-sequential analyses revealed that the initial/baseline likelihoods of the play-state transitions were not evenly distributed (i.e., not random behaviors) between the four social-play states. Rather, the likelihood of children shifting into parallel-aware play (P) from any other play state was 40% ( $n = 3.751$ ); the likelihood of shifting into cooperative-social play (C) from any other play state was 24% ( $n = 2.249$ ); shifting into onlooker play (O) from any other play state was 29% ( $n = 2.690$ ); and shifting into solitary-constructive play (S) from any other play state was 7% ( $n = 684$ ). These initial/baseline likelihoods ( $S = 7\%$ ,  $O = 29\%$ ,  $P = 40\%$ ,  $C = 24\%$ ) of shifts/transitions were used in  $z$ -score calculations to determine the statistical significance of the probability or likelihood of the transitions/shifts from and into each targeted play state.

### 3.2.3. *Transitions from and into parallel-aware play*

Having established the initial/baseline likelihoods of shifts/transitions to each social-play state from any other play state, the next procedure was to examine the anticipated dynamic reciprocal nature of parallel-aware play. The first step in examining this relationship was to control the shifts/transitions from parallel-aware play (selecting parallel-aware play as the starting point). It should be noted that when designating a starting point the likelihood of all the shifts/transitions into the other three play states will always total 100%. Lag-sequential analyses revealed that if preschoolers were engaged in parallel-aware play in the child-initiated play centers the likelihood of them making a shift/transition into cooperative-social play was 43% (a significant increase from the  $C = 24\%$  baseline;  $z = 26.5$ ,  $p < .001$ ), into onlooker play 46% (a significant increase from the  $O = 29\%$  baseline;  $z = 25.0$ ,  $p < .001$ ), and into solitary-constructive play 11% (a nonsignificant increase from the  $S = 7\%$  baseline;  $p = ns$ ). These results are depicted in Fig. 1.

The next step in addressing the second research hypothesis regarding the reciprocal dynamic relationship of parallel-aware play with the other three play states was to control for shifts/transitions to parallel-aware play (selecting parallel-aware play as the end point) from the other three play states. Lag-sequential analysis revealed that regardless of which social-play

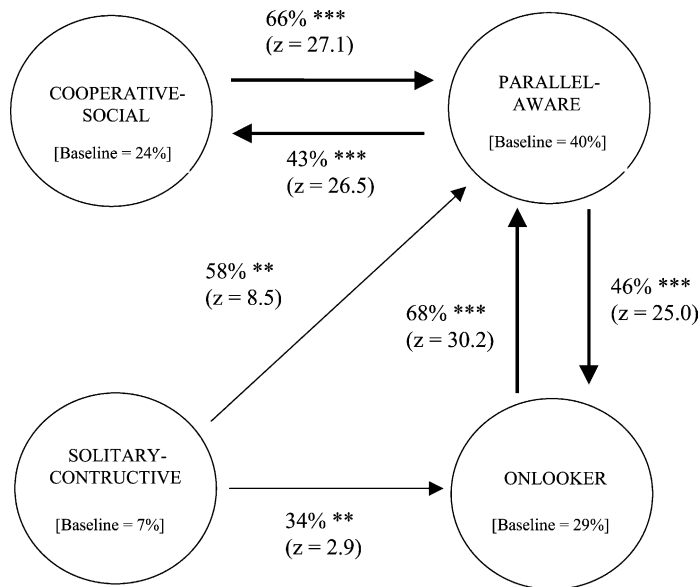


Fig. 1. Significant differences with lag-sequential analyses in likelihoods of shifts/transitions *into* and *from* play states.

*Notes.* Baseline likelihoods of shifts/transitions *into* each play state are noted in parentheses. Only significant changes in likelihoods are represented by arrows. Significant differences *from* and *into* play states were determined by z-score tests between the baseline likelihoods and the calculated likelihood of a transition *from* any given play state to another: \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

All possible shifts/transitions *from* any particular play state totals 100%. For example, the likelihood of children shifting *from* parallel-aware play are: *into* cooperative-social play, 66%; *into* onlooker play, 54%, and *into* solitary-constructive play, 9% (total 100%).

On the other hand, all possible shifts/transitions *into* a particular play state may total more than or less than 100%. For example, the total likelihood of shifts/transitions *into* parallel-aware play are: *from* cooperative-social play, 66%; *from* onlooker play, 68%; *from* solitary-constructive play, 54% (total 188%). A potential total of 300% exists if 100% of the shifts *into* parallel-aware play *from* each of the three other play states occur.

state was targeted as the starting point, the next most likely shift/transition by preschoolers was to parallel-aware play. Results, also depicted in Fig. 1, revealed that the likelihood of shifts/transitions to parallel-aware play from onlooker play was 68%. In other words, 68% of all shifts from onlooker play were next into parallel-aware play. The likelihood of this occurring represented a significant increase ( $z = 30.0$ ;  $p < .001$ ) from the baseline likelihood of all shifts/transitions into the parallel-aware play state ( $P = 40\%$ ). The likelihood of shift/transitions occurring into parallel-aware play from cooperative-social play was 66%. This represented a significant increase ( $z = 27.0$ ;  $p < .001$ ) from the parallel-aware play baseline likelihood ( $P = 40\%$ ). The likelihood of shift/transitions occurring into parallel-aware play from solitary-constructive play was 54%. Again, this represented a significant increase ( $z = 8.5$ ;  $p < .01$ ) from the parallel-aware play baseline ( $P = 40\%$ ). It should be noted that when designating an end point, the likelihoods of shifts into that play state might be greater or less than a total of 100%. In this study, the total proportion of shifts/transitions into parallel-aware play was equal to 188%. However, a potential total of 300% exists if 100%

of the shifts into parallel-aware play from each of the three other play states would have occurred.

Having established the prominence of parallel-aware play in the reciprocal relationship between each of the other three social-play states, lag-sequential analyses were also used to explore the likelihood of all shifts/transitions from and into all of the play states (designating each of the four play states one at a time). These results are also shown in Fig. 1. As depicted in Fig. 1, the only significant from and into shift/transition likelihood that did not involve parallel-aware play was the shift from solitary-constructive play into onlooker play. The likelihood of this shift was 34%. In other words, 34% of all shifts from solitary-constructive play were into onlooker play. The likelihood of this occurring was significantly different ( $z = 2.9$ ;  $p < .01$ ) from the baseline likelihood of all shifts into the onlooker play state ( $O = 29\%$ ). As anticipated, both segments of the second hypothesis were supported by the study’s findings.

3.2.4. Two-phase (three-step) group-entry pattern

The third research hypothesis addressed whether or not the two-phase (three-step) social play-state sequence hypothesized by Rubin et al. (1998) and documented by Dodge et al. (1983) for school-age children (e.g., onlooker play → parallel-aware play → cooperative-social play) could be empirically verified in the natural pattern of preschool children’s social interactions

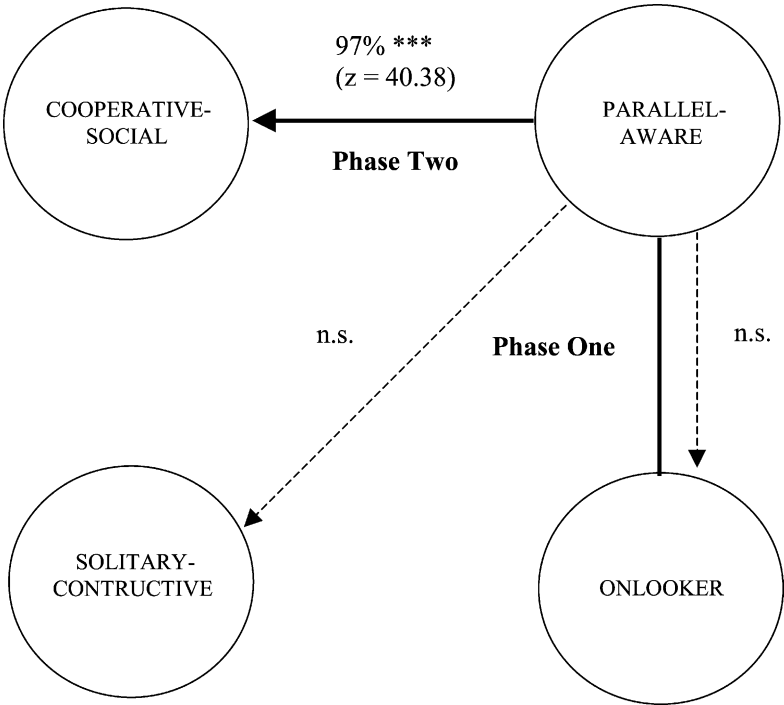


Fig. 2. Likelihoods of the three possible *second phase* shifts/transitions following the onlooker to parallel-aware *first phase*.

Note. Significant differences in the likelihoods of each of the three *second phase* shift/transition options were determined by z-score tests: \*\*\*  $p < .001$ .



within child-initiated play centers. To address this hypothesis, lag-sequential analyses were used to test three possible two-phase shifts: (1) onlooker play → parallel-aware play → cooperative-social play; (2) onlooker play → parallel-aware play → onlooker play; and (3) onlooker play → parallel-aware play → solitary-constructive play. The results of these three analyses are shown in Fig. 2 and, as anticipated, reveal that the only significant two-phase shift is the hypothesized onlooker play → parallel-aware play → cooperative-social play sequence. The likelihood of this particular two-phase shift sequence occurring into cooperative-social play was 97%, which was highly significant ( $z = 40.38$ ,  $p < .001$ ). In other words, out of these three possible two-phase shifts, 97% were found to be the onlooker play → parallel-aware play → cooperative-social play sequence. The other two sequences only accounted for 3% of the shifts. The third hypothesis was supported as predicted.

#### 4. Discussion

This study provides supportive and unique insights into both the prominent and pivotal role of parallel-aware play in the social interactions of four-year-old children within three typical child-initiated play centers. The results of this study are consistent with past research (e.g., Howes & Matheson, 1992; Roper & Hinde, 1978; Smith, 1978) in demonstrating that parallel-aware play is the most prominent play state and most frequently involved in play transitions/shifts. This was found to be the case even when accounting for children's gender and SES or type of child-initiated activity center. Thus, this study's results provide an additional explanation for the continued high levels of parallel-aware play observed in preschool-age children even after they develop skills requisite to interacting cooperatively with peers. The stability of these play sequence patterns across gender, SES, and activity centers (housekeeping, blocks, manipulatives) suggests that these social-play states are consistent across wide domains.

In addition to supporting the prominent role of parallel-aware play, a major contribution of this study is that the results yielded two prominent bidirectional bridging roles of parallel-aware play in four-year-old children; (1) parallel-aware play → cooperative-social play → parallel-aware play, and (2) onlooker play → parallel-aware play → onlooker play. These patterns reinforce previous findings (e.g., Bakeman & Brownlee, 1980) indicating that parallel-aware play occupies a pivotal role between play-state transitions and as such, should not merely be viewed as a less socially mature activity than cooperative-social play, which is expected to fade away as the skills of cooperative-social interaction emerge. Rather, parallel-aware play apparently remains prominent in the play episodes of four-year-old children in child-initiated play settings because of its important dynamic and bidirectional bridging function during numerous transitions between other play states. Thus, this study's findings suggest that when observing preschoolers' behaviors in child-initiated play centers, early childhood practitioners need not be overly concerned that the social competence of children is inadequate or less mature if parallel-aware play remains their predominant type of social interaction. At the same time parallel-aware play may be used by children as a safe haven to maneuver in and out of social-play situations allowing them to regulate more complex social interactions or planned retreats into solitary activities (cf. Dodge et al., 1983; Putallaz & Wasserman, 1989).

The lag-sequential analyses of the present study revealed that knowing children are engaged in parallel-aware activities immediately prior to initiating cooperative-social interaction is crucial information that significantly increases one's ability to predict transitions into cooperative-social play. Likewise, the present study's results uniquely document, in natural preschool child-initiated play environments, a three-step or two-phase play sequence of social interaction. In other words, knowing preschoolers are watching others (exhibiting onlooker behavior) just before playing in the parallel-aware state with other children (phase one) will typically lead to cooperative-social interaction (phase two). This finding is consistent with previous research studying school-age children (e.g., Dodge et al., 1983; Putallaz & Wasserman, 1989) and empirically supports Rubin et al.'s (1998) social-interaction hypothesis for preschool-age children. Not only may the watching (onlooker behavior) → playing near (parallel-aware play) → group interaction (cooperative-social play) sequence occur when preschool-age children make an initial entry into groups, but this transitional pattern apparently continues throughout ensuing play episodes.

The contributions of the present study's findings provide play researchers and early childhood practitioners with a reassuring way of viewing the role of parallel-aware activities in the play of young children. Looking beyond the cognitive content or social maturity of the play state, this study's sequential analyses have provided a window into the dynamic transitional functions of parallel-aware play during child-initiated play centers. Extending the results of this study, it appears that parallel-aware play is more than merely a unidirectional bridge from onlooker behavior to cooperative-social play (see, Rubin et al., 1998); parallel-aware play appears to serve as a bidirectional crossroad between other prominent social-play states within natural child-initiated play episodes of preschool-age children.

Methodologically, the present study makes several important contributions to the play literature including: extensive observation of a large sample, observations of natural play by sampling all children in each play episode, and lag-sequential analysis of the transitions between play states. With few exceptions (Howes & Matheson, 1992), previous research using time-sample recording of young children's behaviors has typically studied much smaller samples (i.e., Krasnor & Rubin, 1983; Rubin et al., 1978). Additional methodological contributions relate to coding procedures. The interval recording of data for this study, contrasted with time-sampling recording commonly used in earlier research, allowed multiple children to be observed during any specific time interval (180, 10-second intervals per 30-minute observation). Thus, the play of all the children present in the observed activity center was recorded on videotape and overlapping observations separately coded. This means that the behaviors of all the players appear simultaneously in the data set for sequential comparison. In other words, all of the children present in a play episode are sampled rather than observing children in isolated time segments. By contrast, for example, the time-sample recording of data utilized by Bakeman and Brownlee (1980) videotaped 7-minute segments of play (recorded in 28, 15-second intervals) for each child. These 7-minute segments of interaction were exclusive for each child. What is missed with this type of sampling procedure are the complementary interactions of the other players in the ebb and flow of social-play within extended child-initiated play episodes.

A limitation of this study includes its one-age-group sample that restricts an understanding of possible developmental trends in young children's play transitions during child-initiated play activities. In an effort to test the feasibility of using lag-sequential analysis to identify changing

levels of social participation by individual children within natural play, a large single-age-group sample was selected. In order to assess developmental trends, it would be beneficial if future research extended the upper age range concerning the possible bidirectional role of parallel-aware play into early-middle school years. It is plausible that parallel-aware play activities may serve important social interaction functions well beyond the preschool years.

Another limitation of the study surrounds the issue of individual differences. For example, it seems possible that children who engage in less mature forms of solitary play (e.g., solitary-functional or solitary-dramatic), including more reticent forms of behavior, may have greater difficulties shifting into parallel-aware forms of play and as a result have more difficulty achieving cooperative-social play states (Burgess, Rubin, Cheah, & Nelson, 2001; Hart et al., 2000). However, the focus of the current investigation was on the dynamics of play within child-initiated play centers, which may preclude a more representative sampling of various forms of solitary behaviors as they occur within the broader preschool setting. As a result, the design of this study does not allow for more detailed assessment of the impact of individual differences on the patterning of children's social-play dynamics. It may be important for future researcher to further delineate the differential impact of solitary forms of play on children's social interactions and play dynamics.

#### *4.1. Implications for practice*

Consistent with the results of this and other studies (e.g., Bakeman & Brownlee, 1980; Howes & Matheson, 1992), early childhood practitioners may not be served well in assuming that most four-year-old children remain continuously in one level or type of social interaction for extended periods of time as implied by purely developmental theories of play. The present study's findings reinforces the notion that merely defining play states in terms of social or cognitive maturity is not entirely adequate and can be enhanced by studying social-play with regard for the utility of each state in natural behaviors of preschool-age children. Preschool children's ability to transition between play states may be a more pertinent measure of social maturity and may potentially influence children's sociometric status. This notion is somewhat consistent with prior research (Putallaz, 1983) demonstrating that group-entry strategies are predictive of children's sociometric status, with more popular children using parallel-aware types of behaviors (e.g., using relevant comments, taking frame of reference of larger group) as they enter groups or cooperative play situations. Children who are neglected or rejected may have more difficulties engaging in effective parallel-aware behaviors and as a result may have fewer reciprocal friendships and display less social understanding or sensitivity in play situations.

The information provided by this study may allow teachers to focus on the role of parallel-aware activities in the play of young children. This information aids teachers in designing interventions that facilitate the effective use of parallel-aware strategies for children who are neglected or rejected by peers by focusing on increased modeling and facilitation/scaffolding of children's transitions between social-play states. For example, neglected children who play alone with puzzles may be benefited by teachers introducing larger puzzles (intended for groups of children) that provide more opportunities for parallel-aware and cooperative-constructive play. Likewise, in dramatic play centers, teachers could provide multiple sets of props to

further facilitate opportunities for several children (including reticent children) to engage in parallel-aware activities.

Summarizing, the information provided by this study supports a specific perspective for viewing the role of parallel-aware activities in the play of young children. Looking beyond the cognitive content or social maturity of the play state, this sequential analysis has provided a window into the transitional functions of parallel-aware play in child-initiated play centers. Subsequently, preschool children who presently enjoy watching the interaction of peers during child-initiated play activities may be viewed “in transition” and, thus, interventions could be designed to reflect positive expectations for transitions into higher levels of social interaction.

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