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# The Influence of Peer Models on the Play Scripts of Children With Specific Language Impairment

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This investigation included two phases of inquiry that examined the effects of peer modeling upon the play scripts of children with specific language impairment (SLI). The first study employed a pretest-posttest control group design involving two groups of children with SLI (10 who participated in the experimental treatment and 10 controls) and a group of peer models (10 children with normal language development). The treatment involved dyadic play sessions in which children with SLI were paired with a normal language peer model. Significant differences were found between the play script reports of the experimental (SLI-E) and control groups (SLI-C) of children with specific language impairment. The second study, utilizing single-case methodology, involved 6 children with SLI who participated in the control group of Study 1, plus 2 peer models. Play dyads consisted of either two children with SLI or one child with SLI and a normal language peer. Results of this study provided support for the contention that play interactions with normal language peers facilitates increases in the play-script reports of children with SLI.

**KEY WORDS:** specific language impairment, peer models, scripts, social context, sociodramatic play

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**H**ow language is learned and used in social contexts has increasingly become an area of investigation in recent years. Acknowledgment of the critical role of the social, interactive component of language acquisition has fostered an interest in investigations examining the impact of specific language impairment (SLI) upon the social development and behavior of preschool children (Weiss & Nakamura, 1992; Hadley & Rice, 1991; Rice, 1993). Theoretical frameworks focusing on the social aspects of language acquisition (Bruner, 1983; Vygotsky, 1978) have sought to account for the fact that children participate in various interactive contexts throughout the time they are learning language. Consequently, in order for children to be successful communicators, their knowledge of language must extend beyond discrete skills in vocabulary or syntax, to the understanding of communication as an interactive phenomenon affected by persons, places, situations, and events (Cole, 1995; Hymes, 1972).

Sociodramatic play (i.e., pretend play involving two or more individuals) is a particularly effective vehicle for investigating the social components of language learning. Play allows children to interact with their peers in meaningful, structured ways and provides experience in the semantic, syntactic, and functional aspects of language (DeMaio, 1990). Children's success in participating in play of this type is heavily

dependent upon their ability to understand the theme of the play and to predict the language and associated behaviors that coincide with the action of the play sequence. For most children, this information is provided by an underlying, cognitive framework that represents the cumulative body of knowledge the child has acquired for a particular play event, or any other event. This representational framework has been referred to by Schank & Abelson (1977) as a script.

Each time a child experiences a particular event, the script for that event becomes richer and more complete, with slots for actors, props, and alternate sequences that allow for possible variations in the routine (Creaghead, 1991). Shatz (1983) views a script as a means of stretching cognitive resources, thus enabling a child to participate in play without worrying about how to behave or what to say. Similarly, Nelson (1986) suggests that a child who has developed a strong, stable script for a play theme is able to put the routine into the background and concentrate on other aspects of the situation, such as gaining new knowledge, solving problems, and completing a goal.

The ability to construct and retrieve scripts efficiently provides an essential foundation for furthering development in the social, cognitive, and linguistic domains (Creaghead & Tattershall, 1985; Fivush & Slackman, 1986; Lund & Duchan, 1988; Nelson & Gruendel, 1986). Unfortunately, children with SLI are at risk for the development of impoverished or idiosyncratic scripts for many reasons. Deficits in organizing information, extracting patterns, and abstracting rules that contribute to deficits in linguistic abilities may also affect a child's ability to construct scripts (Creaghead, 1991). Without adequate knowledge of "what happens, what to do, and what to say in play" (Nelson, 1986), these children must reconstruct a script each time the play event is experienced. This may result in an inability to fully participate in the interactive component of the play and a loss of natural language learning opportunities. Gertner, Rice, and Hadley (1994) found that children with language limitations were least likely to be chosen as playmates by their typically developing peers, especially for activities involving dramatic play. A lack of script knowledge of play events in preschoolers who exhibit language impairment may be a contributing factor to findings such as these.

Scripts are thought to be socially derived in that they develop as a result of participation in shared social experiences (cf. Schank & Ableson, 1977). Within the past three decades, language facilitation models have moved away from paradigms that feature isolated training on specific skills to those that build on the social, interactive nature of language learning (Cole, 1995). This trend has prompted increased investigative efforts in

this area. The use of typically developing peers as intervention agents for the development of appropriate social and linguistic skills has generated a substantial amount of interest in the past few years (cf. Odom & McEnvoy, 1988). Jenkins, Odom, and Speltz (1989) employed peers to promote social integration of severely withdrawn children in a preschool classroom. Similarly, Kohler, Strain, Maretsky, and DeCesare (1990) found that "socially competent peers" could be effective intervention agents for preschool children with poor social skills. Although there has been some attention to the effects of the presence of peer models in preschool classrooms upon the subsequent development of children with handicaps, previous research has not focused specifically on children with SLI.

The purpose of this study was to examine the effects of peer modeling during dyadic sociodramatic play upon the script reports of children with SLI. The dyad as the unit of study, as opposed to a more global investigation of integrated classrooms, was deliberately selected for this investigation. Previous research has suggested that typically developing children tend to seek out peers with similar abilities during play and other unstructured activities (Ipsa, 1981; Rogers-Warren, Ruggles, Peterson, & Cooper, 1981). The impact of the peer upon the child with SLI was anticipated to be more readily apparent in dyadic play settings in which players must interact in order for sociodramatic play to move forward.

This investigation involved an integration of group and single-case design methodology (Ellis Weismer, 1994) to programmatically address interrelated research questions concerning the impact of peer models on play-script reports of children with SLI. The specific research question addressed by Study 1 was whether significant increases are observed in the number of words, number of different words, number of play-theme-related acts, and use of linguistic markers in the play-script reports provided by children with SLI following dyadic play with typically developing peers compared to those who did not participate in this type of dyadic play. Study 2 was intended to provide a partial replication of the group phase, with more extensive assessment of the impact of the experimental treatment on individual child performance. In addition, we were interested in disambiguating whether the improvement in script reports of children with SLI could be attributed to the input provided by the peer models during play interactions or if the effects were primarily due to exposure to the script context during any play interaction. Thus, the question addressed by Study 2 was whether interaction with an SLI peer, with similarly limited script knowledge and language skills, would result in improved play-script reports.

# Study 1

## Method

### Participants

Thirty preschool children participated in the study, including 20 children with SLI and 10 age-matched peer models with normal language abilities. Children in the SLI group ranged in chronological age (CA) from 3:8 (years:months) to 5:1, with a mean age of 4:2. Children participating in this study as peer models (PM) ranged in chronological age from 4:3 to 4:9, with a mean of 4:4. All children with SLI had been previously identified as having a specific language impairment and were enrolled in a language-based early childhood classroom throughout the course of the study. All children in the SLI group had standard scores of 85 or above on the Wechsler Intelligence Scale for Children–Revised (WISC–R, Wechsler, 1974). They also exhibited performance at or near two standard deviations below the mean on standardized measures of receptive and expressive language and had no concomitant motor, emotional, or physical handicaps according to multidisciplinary team reports. School records indicated that these children had no history of hearing problems, had passed hearing screenings (per ASHA guidelines, 1985),

and had normal or corrected vision. Children with SLI were randomly assigned to either the experimental (SLI-E) or the control (SLI-C) group. The SLI-E group consisted of 7 boys and 3 girls, and the SLI-C group included 6 boys and 4 girls. Children from both the SLI-E and SLI-C groups were monolingual, native speakers of Standard American English who were drawn from the same community and had similar SES backgrounds as indexed by maternal educational level. Characteristics of the groups are listed in Table 1.

Peer models were selected from a group of 4-year-old children residing in the community whose families had responded to advertisements. These children were observed in a simulated pre-school experience over 3 days to determine social interaction and play skills. Interviews were scheduled with a parent of each peer model candidate, and locally normed screening for language development, social skills, and general school readiness (e.g., number concepts, identification of letters in one's name) were administered to ensure that the children selected as peer models were following a typical developmental pattern. None of these children had any record of exceptional educational needs or a history of speech, language, or hearing problems. Children who demonstrated articulation errors that did not significantly affect their overall intelligibility were not excluded from participation in any of the groups.

**Table 1.** Summary of participant characteristics for Study 1 in terms of mean (*M*) and standard deviation (*SD*).

Variable	SLI-E Group ( <i>n</i> = 10)		SLI-C Group ( <i>n</i> = 10)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (in months)	49.8	7.8	49.6	5.4
Nonverbal cognition <sup>a</sup>	91.4	8.2	100.8	12.6
MLU <sup>b</sup>	2.5	0.6	2.1	0.8
PPVT–R <sup>c</sup>	72.6	7.9	75.9	12.7
Receptive language <sup>d</sup>	76.8	11.1	78.3	15.2
Expressive language <sup>e</sup>	72.2	13.7	75.1	9.5
Maternal years in school	14.0	8.8	15.4	7.4

<sup>a</sup>Standard scores on the nonverbal portions of the WISC-R (Wechsler, 1974).

<sup>b</sup>Mean length of utterance from a 100-utterance language sample calculated by Miller's (1981) criteria.

<sup>c</sup>Standard scores on the Peabody Picture Vocabulary Test–Revised (Dunn & Dunn, 1981).

<sup>d</sup>Standard scores on the receptive portions of the CELF–Preschool (Wiig, Secord, & Semel, 1992) or the Preschool Language Scale–3 (Zimmerman, Steiner & Pond, 1992).

<sup>e</sup>Standard scores on the expressive portions of the CELF–Preschool (Wiig, Secord, & Semel, 1992) or the Preschool Language Scale–3 (Zimmerman, Steiner & Pond, 1992).

## Procedure

### Design and Dependent Variables

Study 1 employed a pretest-posttest group design with a follow-up component (cf. Hegde, 1994) in which four dependent measures were assessed individually. The first dependent variable, number of words in the script report, was chosen as a general measure of verbal productivity (i.e., how much the children had to say in response to the prompt to provide a play script). Nelson and Gruendel (1986) argued that scripts are often reported in a generally skeletal format (i.e., not necessarily in complete sentences). Consequently, measures such as mean length of utterance (MLU) or mean length of T-units are not believed to be indices of choice for script reports.

Number of words was measured by counting all of the words produced in the script reports of the children. Repetitions of words (e.g., "I...I...I...") were counted as one word. False starts ("We went to... We ate dinner.") were not counted in the total word count nor were filler words such as *um* and *er* or single word *yes* or *no* answers to prompts. Reduplications (e.g., "bye-bye") were counted as one word. It was hypothesized that children with SLI would have more information to share following the dyadic play than before the treatment was implemented.

The second variable, number of different words, was employed to assess variability in the content of the script reports. Watkins, Kelly, Harbers, and Hollis (1995) reported that number of different words in language samples provides a sensitive and informative estimate of lexical diversity in children with SLI of this age. Participation in dyadic play with a peer model was expected not only to affect the amount of talking (as measured by number of words) but also the number of unique ideas children would be able to express.

The third variable, number of play-theme-related acts, was selected as a measure of quantity and as a measure of the commonality of children's script reports when compared to those of their peers with normal language abilities. Actions, linked by temporal or causal components, are the basic elements of scripts and differentiate them from other cognitive organizational structures (Nelson, 1986). Schank and Abelson (1977) suggested that because scripts are derived from shared social experiences, actions within scripts should exhibit little idiosyncrasy among those who participate in the experience. It has been hypothesized that children whose scripts are highly idiosyncratic may not be able to participate effectively in events guided by that particular script (Creaghead, 1991; Nelson, 1986). Sociodramatic play, such as playing house, relies heavily upon a foundation of shared knowledge regarding the play theme, the sequence of play, and the range of possible behaviors associated with the play among the participants.

To obtain a set of behaviors that children at this developmental level associate with playing house, the verbal script reports for playing house elicited from the peer models who participated in the investigation were analyzed. Playing-house scripts were obtained from 20 additional kindergarten students with normal language abilities. From these script reports, seven themes emerged as representative of the range of likely behaviors that occur during "playing house" (see list in Appendix). Theme-related acts were subsequently defined as indications of action in the script reports that pertained to any of these themes. As an example, "you put it in the microstove" pertained to the cooking theme and was scored as a play-theme-related act; however, "you build a tower with blocks" did not relate to any of the identified common themes for playing house and was not scored as a play-theme-related act.

In this investigation, the following types of utterances were scored as acts: agent/action (e.g., "she cooks"), action/object (e.g., "eat food"), actor/object implying an action (e.g., "mommy dinner"), as well as single-word utterances denoting an action (e.g., "clean"). More complex utterances (e.g., agent/action/object) that contained these core constituents were also scored as acts. Less than 3% of utterances in the script reports failed to fall

into one of these categories constituting an act. Any one particular act was counted only once per script report; however, an action could be used more than once when paired with different objects or agents (e.g., "eat a banana" and "eat dinner" would be counted as two acts). Play-theme-related acts could be in reference to real actions (e.g., "You put peanut butter on it.") or based in fantasy (e.g., "You pretend to make a hot dog.>").

The fourth variable, linguistic markers, was defined as terms used in the script reports of the children that indicated temporal sequences (e.g., *first, then, later*), conditionals (e.g., *or, if*), or other conjunctions (e.g., *but, because*). Nelson (1986) and Bruner (1983) suggest that children are able to demonstrate their most sophisticated linguistic abilities within well-developed scripts. Consequently, it was hypothesized that increases in the use of linguistic markers such as these would occur as children became more familiar with the script of the play event. Terms were counted only when they were used in the manner defined above.

Scripts for playing house were elicited immediately before intervention, immediately following treatment, and again 3 weeks posttreatment. Dependent variables were measured by counting the frequency with which they occurred in the scripts provided by the participants in this study at each time interval.

## Treatment

Children with SLI were randomly assigned to either the experimental group (SLI-E) or to the control group (SLI-C). Before the formation of the SLI-C and SLI-E groups, each of the children with SLI was assigned to the house area to "play house" with one to three classmates for at least four periods of 15–20 minutes each. Verbal script reports for playing house were then elicited from all 30 children. We suspected that giving children a reason for providing a script may elicit a more elaborate script report. Therefore, for the initial script report, the adult told each child that she was trying to teach some younger children how to play house. The children were then encouraged to tell all they knew about playing house with the prompt, "What do you do when you play house?" Additional prompts, devoid of temporal or causal cues, were employed until children indicated that they were finished. These prompts were "What else happens?" "What else do you do when you play house?" and "Anything else?" During subsequent script elicitations, the adult continued to allude to the need to gather more information about playing house to help younger children, and the same prompts were employed. Children in both groups appeared to accept this explanation and were willing to continue to provide scripts throughout the investigation. Scripts were audiotaped using a voice-activated tape recorder and

were subsequently transcribed for analysis.

Following elicitation of verbal scripts for playing house, children in the SLI-E group participated in four dyadic, 15-minute play sessions with peer models. These play sessions took place over a period of 3 weeks and occurred in a specially designed play environment containing props to support the play themes previously identified in peer model script reports. The children with SLI were paired with different peer models during each play session to control for the effects of variations in the interactive behaviors of the peer models (that is, in case some peer models were better “players” than others). All play sessions were videotaped, and no adult directives were given regarding the content of the play interactions, although children were told that an adult would be nearby if needed. Children in the SLI-C group continued to participate in their self-contained classroom with opportunities for play in a house area containing the same play props provided to the SLI-E group. Classroom staff monitored the time each child spent in the house area throughout the course of this study. Children in the SLI-C group who did not spontaneously play in the classroom house area for at least 60 minutes over the course of the study were then assigned to this area as necessary to ensure equal exposure to the play props. When children in the SLI-E group had completed all four play sessions, scripts for playing house were again elicited from all 30 children following the same procedure as the initial elicitation. A follow-up script report was elicited from all of the children with SLI 3 weeks after the final play session.

### Data Analysis and Reliability

Four dependent variables, as defined previously, were investigated in this study. These variables were selected to represent both the content and the linguistic complexity of the children’s verbal scripts. Script reports elicited from the children in the SLI-E and SLI-C groups were transcribed and scored via a frequency count for each variable at each of the three time intervals. Although script reports were collected from the 10 peer models, their performance was not the focus of this investigation, and those data are not included in this report. Ten percent of the total number of scripts for the SLI-E and SLI-C groups (2/20 for each time interval) were randomly selected and independently scored in the same manner by an experienced, ASHA-certified speech-language pathologist who was given oral and written descriptions of each variable. In addition, 5% of the total number of recorded scripts (1 from each time interval) were re-transcribed by an independent listener. The percentage of interrater scoring agreement was determined by computing the number of agreements divided by the total number of judgments, then multiplying by

100. Interrater agreement for the number of words in script reports was 99% (740/741) and 97% (453/468) for the number of different words. Agreement between raters for the number of theme-related acts was 98% (75/76) and 100% (21/21) for the number of linguistic markers in script reports. Interrater agreement for word-by-word transcription of the transcripts, determined in the same manner, was 96% (439/442).

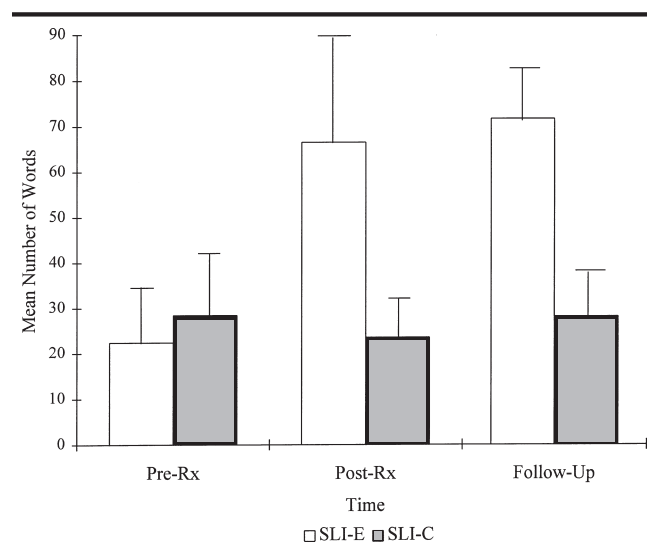
## Results

A mixed-model analysis of variance (ANOVA) with repeated measures was used to analyze the data from Study 1. Group (SLI-E, SLI-C) was the between-subjects variable and Time Comparison (pretest to posttest, pretest to follow-up) was the within-subjects variable. Separate ANOVAs were computed for the four dependent variables, using gain scores (i.e., posttest score minus pretest score, follow-up score minus pretest score).

### Number of Words in Script Report

The ANOVA for the first dependent variable, number of words, revealed a significant Group effect [ $F(1, 18) = 70.72, p < .0001$ ]. The effect for Time was not statistically significant [ $F(1, 18) = 0.65, p = 0.431$ ], nor was the interaction effect [ $F(1, 18) = 0.00, p = 0.946$ ]. As shown in Figure 1, the SLI-E group produced significantly more words in their script reports than the SLI-C group both immediately after treatment and at follow-up. This finding indicates that the children in the SLI-E group generally had more to say about playing house—that is, a larger base of knowledge upon which to draw than children who did not interact in play episodes with the peer models.

**Figure 1.** Mean number of words in script reports of experimental (SLI-E) and control (SLI-C) groups across time.



### Number of Different Words

The results of the ANOVA for number of different words in the script reports again revealed a significant effect for Group [ $F(1, 18) = 73.79, p < .0001$ ], but no significant difference for Time comparison [ $F(1,18) = 0.09, p = 0.767$ ] or for the interaction effect [ $F(1, 18) = 0.32, p = 0.579$ ]. Findings indicate that children in the SLI-E group not only demonstrated greater verbal productivity than the SLI-C group, but that the SLI-E group also employed more lexical diversity in their script reports. As illustrated in Figure 2, differences between the two groups were significant at the immediate posttest assessment as well as at follow-up.

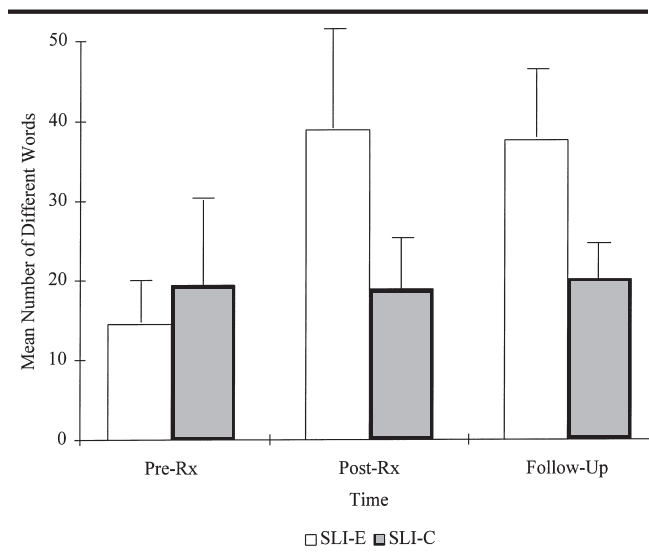
### Play-Theme-Related Acts

The ANOVA computed for the third dependent variable, number of play-theme-related acts, revealed a significant Group effect [ $F(1, 18) = 99.80, p < .0001$ ]. The main effect for Time [ $F(1, 18) = 0.01, p = 0.934$ ] was not significant, nor was the interaction effect [ $F(1, 18) = 0.18, p = 0.680$ ]. As shown in Figure 3, the number of play-theme-related acts present in the script reports of the SLI-E group was significantly higher than those for the SLI-C group immediately following treatment and at the follow-up assessment 3 weeks later. Given this outcome, it might be concluded that children who had been exposed to playing house with a peer model had a better understanding of the context of the play, such as what to do and what to say, than those who had not.

### Linguistic Markers

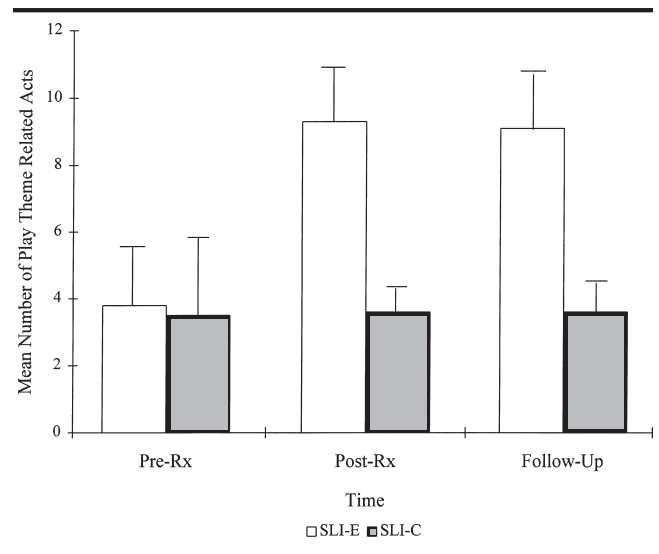
The ANOVA computed for number of linguistic markers revealed a significant main effect for Group

**Figure 2.** Mean number different words in script reports of experimental (SLI-E) and control (SLI-C) groups across time.

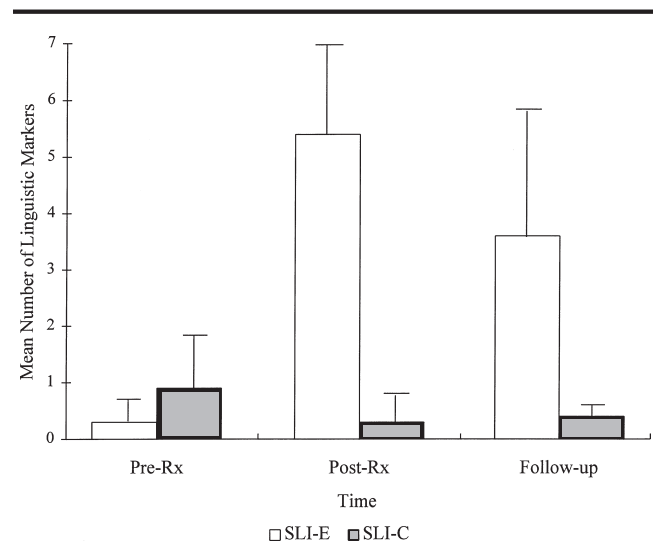


[ $F(1, 18) = 73.51, p < .0001$ ], with no statistically significant findings either for Time [ $F(1, 18) = 2.35, p = 0.142$ ] or for interaction [ $F(1, 18) = 2.94, p = 0.104$ ]. Figure 4 illustrates that children in the SLI-E group demonstrated significantly greater gains in the use of linguistic markers than the SLI-C group immediately following treatment and at follow-up. Although there appears to be a more noticeable drop in the number of linguistic markers used by the experimental group at follow-up than was noted for the other three variables, there remains a significant difference in the increase in the number of linguistic markers used by this group at follow-up compared to the control group.

**Figure 3.** Mean number of play-theme-related acts in script reports of experimental (SLI-E) and control (SLI-C) groups across time.



**Figure 4.** Mean number of linguistic markers in script reports of experimental (SLI-E) and control (SLI-C) groups across time.



These results should be interpreted with a degree of caution because of the relatively low incidence of these types of linguistic constructions in the script reports.

## Summary

Overall, children in the SLI-E group produced play scripts that were significantly improved in terms of the four variables of interest in this study both immediately following treatment and at follow-up when compared with children in the control group. This evidence suggests that the presence of peer models as interactants in play may be instrumental in bringing about increases in the script reports of children with SLI. Study 2 of this investigation provides a partial replication of these results, as well as further exploration of the role of the normal-language peer models in producing the changes noted in the scripts of the SLI-E group in Study 1.

## Study 2

### Method

#### Participants

Six children (4 boys and 2 girls) who were originally assigned to the SLI-C (control) group in the first study participated in this experiment. Two peer models (both girls) were randomly selected from the group of children who had performed in this capacity in the first experiment. Characteristics of the children with SLI are listed in Table 2.

## Procedure

### Design and Dependent Variables

In Study 2, the second phase of the investigation, a multiple baseline across subjects design was dovetailed onto the group design. The initial baseline points in Study 2 were derived from three script reports elicited in Study 1 for a subset of the children who had participated in the first phase. Only those children who had not previously interacted with peer models (i.e., those in the SLI-C group) were included in Study 2. After baseline measurements were established, multiple measures of the dependent variables were obtained during the treatment phase. These dependent variables consisted of the same four measures as in Study 1—namely, number of words in the script report, number of different words, number of play-theme-related acts, and number of linguistic markers.

### Treatment

Four randomly assigned dyads were formed, two SLI x SLI pairs (C-1, C-2 and C-3, C-4) and two SLI x PM pairs (E-1 and E-2). The composition of the dyads remained the same throughout this portion of the investigation. That is, new play partners were not assigned for each play session. From the results of Study 1, it can be inferred that familiarity of the play partner did not contribute to the language gains attained by the SLI-E group because increases in each dependent variable were observed even though the PM play partner changed across sessions. Study 2 focused on the influence of the particular play partner (SLI or PM) at the individual subject level, using a single-case design. Within this design, the familiarity factor remained constant across the relevant comparison of interest (i.e., children in both

**Table 2.** Summary of participant characteristics for Study 2.

Subject	Sex	CA (in months)	Nonverbal <sup>a</sup> IQ	MLU <sup>b</sup>	PPVT-R <sup>c</sup>	Receptive <sup>d</sup> language	Expressive <sup>e</sup> language
C-1	F	58	89	3.8	71	70	66
C-2	M	55	98	2.9	82	80	70
C-3	F	48	106	3.1	79	79	71
C-4	M	52	108	3.2	83	78	74
E-1	M	52	95	3.3	81	79	73
E-2	F	57	107	2.8	75	81	72

<sup>a</sup>Standard scores on the nonverbal portions of the WISC-R (Wechsler, 1974).

<sup>b</sup>Mean length of utterance from a 100-utterance language sample calculated by Miller's (1981) criteria.

<sup>c</sup>Standard scores on the Peabody Picture Vocabulary Test-Revised (Dunn & Dunn, 1981).

<sup>d</sup>Standard scores on the receptive portions of the CELF-Preschool (Wiig, Secord, & Semel, 1992) or the Preschool Language Scale-3 (Zimmerman, Steiner & Pond, 1992).

<sup>e</sup>Standard scores on the expressive portions of the CELF-Preschool (Wiig, Secord, & Semel, 1992) or the Preschool Language Scale-3 (Zimmerman, Steiner & Pond, 1992).

types of dyads interacted with the same partner over the course of the study).

Single-case, multiple baseline designs involve the collection of baseline data points before the initiation of treatment. The nature of this type of design dictates that additional baseline points are collected for subsequent subjects in order to stagger the onset of treatment, providing control for maturational effects (cf. Barlow & Hersen, 1984; Hegde, 1994). In this study, the original three scripts elicited in Study 1 were utilized as baseline data points for children with SLI in the C-1, C-2 and E-1 pairs. Two additional baseline scripts were elicited from the children with SLI in the C-3, C-4 and E-2 pairs before beginning the intervention phase.

As in the first experiment, each dyad participated in four 15-minute play sessions in the same specialized environment described and used in the initial phase of the investigation. The four play sessions occurred within a 3-week period, with script reports being elicited following each play session as in Study 1.

### Data Analysis and Reliability

The variables described in Experiment 1 were examined for each of the scripts elicited from the six children with SLI in this experiment. As before, 10% of the total number of scripts for the two SLI groups (5/48 scripts) were randomly selected and independently scored by an experienced ASHA-certified speech-language pathologist who was given oral and written descriptions of each variable. Transcription scoring agreement was determined by re-transcribing 5% of the total number of scripts in this phase of the investigation. Interrater scoring agreement was 99% (571/573) for the total number of words present in the script reports and 97% (305/314) for the number of different words. Agreement between raters for the number of play-theme-related acts and number of linguistic markers present in these scripts was 97% (35/35) and 100% (12/12), respectively. Agreement between raters on word-by-word transcription was 95% (225/250).

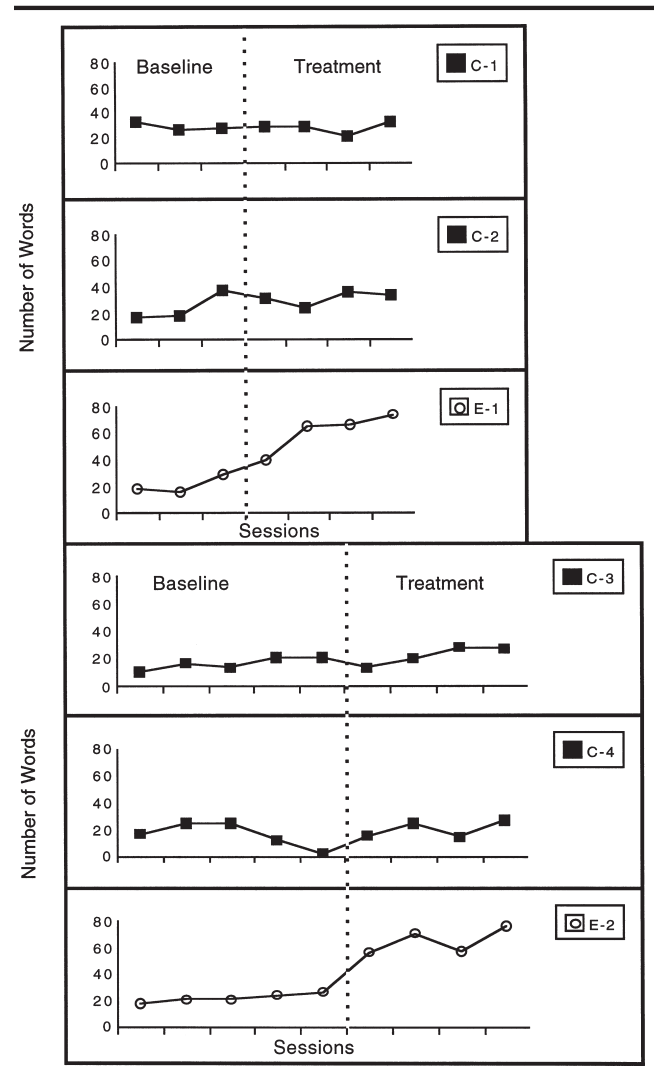
## Results

Data obtained from the second study have been plotted across time (i.e., the four play sessions spanning a 3-week period) for each of the six participants with SLI for each of the four dependent variables.

### Number of Words in Script Report

Figure 5 represents a plot of the number of words present in the script reports of all children with SLI during the baseline and treatment phases of this study. Note that C-1 and C-2 were co-participants in the same

**Figure 5.** Number of words in the script reports of all participants in baseline and treatment phases.



dyad, whereas E-1 participated in play with a peer model. (The script reports of peer models are not plotted.) The same relationship is present between C-3 and C-4, who made up a third dyad, and E-2 whose partner was a peer model. Visual inspection of the frequency data suggests that both E-1 and E-2 demonstrated a substantial gain in the number of words used in their script reports compared to C-1, C-2, C-3, and C-4, whose performance on this variable remained relatively unchanged. One method of quantifying this data is to compare the highest level achieved by each participant in each treatment condition. The highest levels achieved by C-1 in the baseline and treatment phases were identical (33 words in each condition). C-2 demonstrated a net decrease of 2 words from baseline to treatment (38,36), C-3 an increase of 7 words (21,28). C-4 exhibited the same number of words in each condition (25,25). Conversely, E-1 demonstrated a net increase of 45 words

between baseline and treatment conditions (29,74), whereas E-2 showed a gain of 50 words (27,77). Comparison of these data across participants presents evidence of a substantial increase in the number of words produced in the script reports of E-1 and E-2 compared to no appreciable change in the length of the script reports for any of the control participants. Even the increase of 7 words demonstrated by C-3 appears to be minimal when compared to net increases of 45 and 50, demonstrated by E-1 and E-2, respectively.

One might question the stability of the baseline of E-1 because of the slight increase in the last data point before the treatment phase was initiated. There is a possibility that this child may have demonstrated a continuation of this upward trend even without the introduction of the treatment in the form of peer model play. However, it is difficult to ignore the magnitude of the change from the highest point of the baseline phases to the highest point of the treatment phases, especially when compared to the relatively small change noted in the control dyads. In fact, one might make the same claim for C-2, who evidenced a similar profile during the baseline phase; however, in this case, the upward trend did not continue in the treatment phase. Further, E-2 demonstrated a very stable baseline phase, followed by a substantial increase in the number of words in the script reports during the treatment phases.

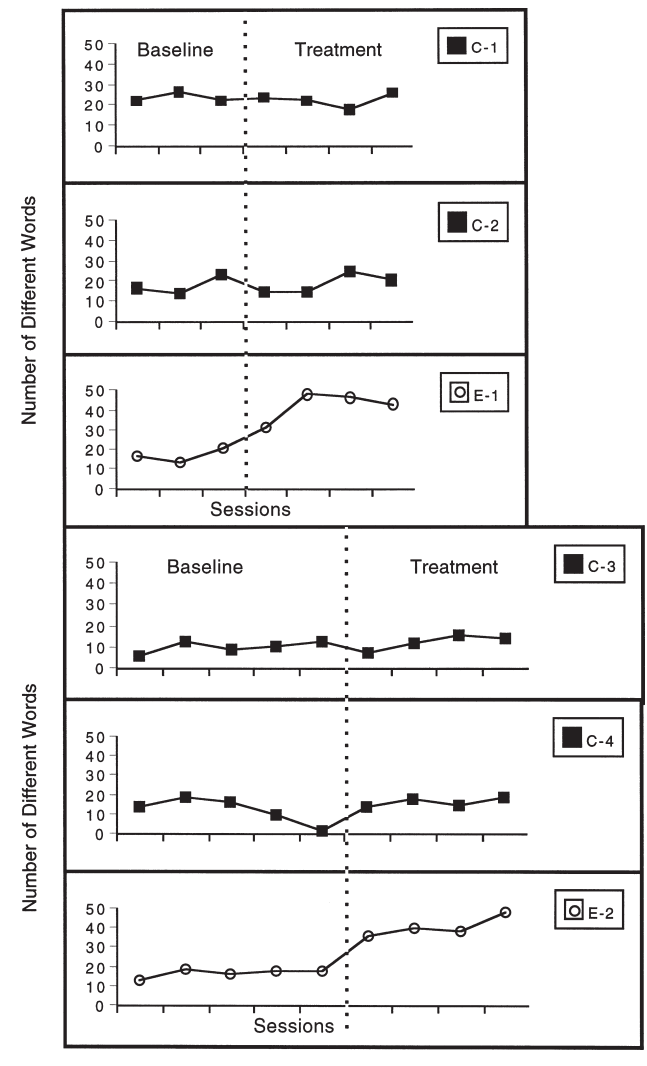
### Number of Different Words

Figure 6 illustrates the data obtained for this variable at each time interval. As noted in the results for the first variable, both E-1 and E-2 demonstrate a readily observable increase in the number of different words used in their script reports following the introduction of the peer model. Observation of the plotted data for control participants (C-1, C-2, C-3, C-4) suggests that the number of different words used in script reports at all time intervals remained generally constant. C-4 is an exception in that he demonstrated a very noticeable drop to 2 just before the beginning of treatment. Conversely, both E-1 and E-2 demonstrated gains immediately after treatment. E-1 did show a slight increase just before treatment that could be interpreted as evidence that the script report was improving without treatment. However, it is difficult to discount the size of the difference between the highest data points pre- and posttreatment. Difference scores of 27 (21,48) and 29 (19,48) for E-1 and E-2, respectively, are considerably greater than those noted in the scripts of children who participated in SLI x SLI dyads. For these children difference scores ranged from -1 to 3.

### Play-Theme-Related Acts

Visual inspection of the data plotted in Figure 7 indicates a gain in the number of play-theme-related acts

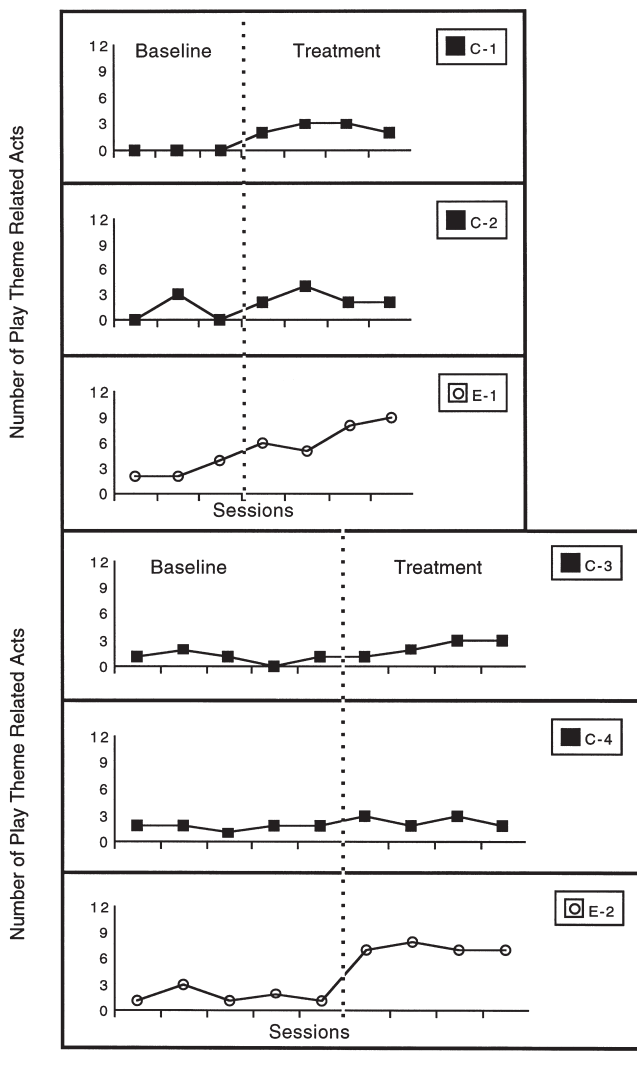
**Figure 6.** Number of different words in the script reports of all participants in the baseline and treatment phases.



reported by E-1 and E-2, with less of a noticeable difference for C-2, C-3, and C-4. A slight environmental impact, as described above, may be present in the case of C-1. Both E-1 (4,9) and E-2 (3,8) demonstrated a net increase of 5 play-theme-related acts, based on the highest data point for baseline and treatment conditions. The largest net increase for participants in SLI x SLI dyads was 3, for C-1 (0,3). C-2 had a net increase of 1 (3,4); C-3 showed a gain of 2 (1,3); and C-4 increased by 1 (2,3). It appears that the presence of a typically developing peer model is more likely to lead to an increase in the number of play-theme-related acts in script reports than interaction with another child with SLI.

Although both E-1 and E-2 demonstrated an increase of 5 play-theme-related acts between the highest attained levels in each phase, the role of the play partner in this change may be somewhat difficult to

**Figure 7.** Number of play-theme-related acts in script reports of all participants in baseline and treatment phases.

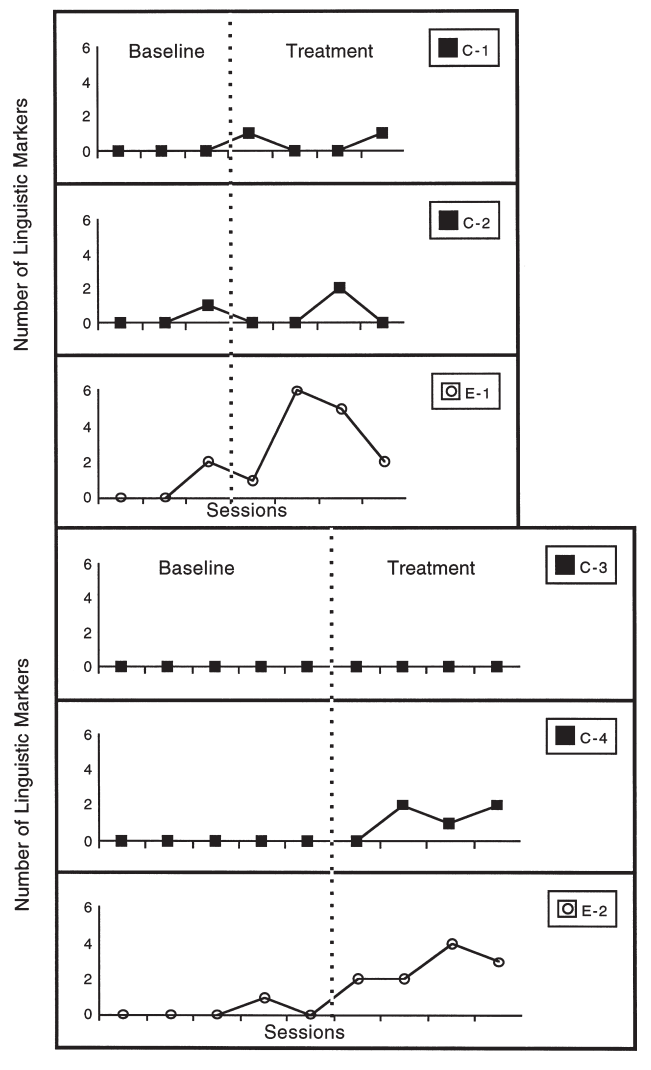


determine for E-1. As noted with the first variable, this child demonstrated a slight upward trend before the treatment phase, suggesting that increases might have occurred regardless of the interactive behaviors of the other member of the play dyad. Again, this was not the case with E-2, who demonstrated a clear change during treatment compared to the baseline phase. None of the individuals participating in the control dyads showed an increase as large as 5, the range being from 1 to 3 additional play-theme-related acts reported at the highest level during the treatment phase.

**Linguistic Markers**

Visual inspection of the frequency data for linguistic markers in play-script reports follows a pattern similar to that noted in the first three variables (Figure 8). Interpretation of this data should be viewed as tentative

**Figure 8.** Number of linguistic markers in script reports of all participants in baseline and treatment phases.



because of the relatively low frequency of linguistic markers in any of the script reports.

Although little or no observable change was noted in the control participants, both E-1 and E-2 demonstrated an increase in the use of linguistic markers at one or more data points following treatment. If dyadic play alone, regardless of the play partner, was all that was necessary to facilitate increases in a child's script reports, we might expect to see some evidence of change even in the SLI x SLI dyads. C-4 provided weak evidence for this hypothesis; however, data plotted for C-1, C-2, and C-3 did not support this claim.

The net increase of 4 linguistic markers noted for E-1 (2,6) and of 3 linguistic markers for E-2 (1,4) was larger than net increases for any of the control dyad participants. C-1 (0,1) and C-2 (1,2) both demonstrated a net gain of 1, whereas C-3 showed no gain (0,0). C-4

(0,2) showed the largest net increase for control cases with a net change of 2. Again, this data was somewhat difficult to interpret given the low frequency of these constructions in the children's script reports.

The shape of the plotted data for C-1 and C-2 shows both children returning to the baseline levels of zero several times during the treatment phase, suggesting that no durable changes occurred in the linguistic complexity levels demonstrated during script reports. C-3 remained at zero throughout the baseline and treatment phases. C-4, as mentioned earlier, demonstrated some apparent positive gains in linguistic complexity during the treatment phase. E-1 showed a slight regression immediately after the initiation of treatment (2,1), but then demonstrated a noticeable increase at the second data point of the treatment phase (1,6). The apparent instability of the use of linguistic markers may indicate that these concepts were just beginning to emerge in the child's verbal expression. However, the demonstration of two data points during treatment phase that were higher than any points during baseline, or any points demonstrated by children in the control dyads at any time, may suggest that the treatment was, in part, responsible for the increased use of these terms. E-2 presented somewhat stronger evidence for the role of the peer model interaction as a catalyst for the increased use of these markers in that she demonstrated consistently higher use of linguistic markers during the treatment phase than during baseline.

## Summary

Inspection of data representing individual subject performance across variables supports the hypothesis that play with typically developing peer models produces positive increases in the play scripts of children with SLI. Although some of the participants in the control dyads may have shown slight improvement on one variable or another, none of these children demonstrated improvement on more than one variable. Further, participants in control dyads demonstrated little or no substantial gains for any of the dependent variables. Conversely, both E-1 and E-2 showed increases on all variables measured in this study, and each of these increases was greater than any increases demonstrated by individuals from the SLI x SLI dyads.

## Discussion

Although intervention models that include both typically developing children and children with language disabilities in the therapeutic setting have become more widespread in recent years, there is relatively little empirical data to support the efficacy of this practice (cf. review by Ellis Weismer, in press).

The purpose of this investigation was to provide preliminary data for intervention models such as these that utilize a more capable peer as a catalyst for increasing social, cognitive, and language abilities that are specifically related to play scripts in children with SLI.

The use of an integrated design involving both group and single-case methodology was chosen for several reasons. First, we were able to investigate the effects of peer modeling through statistical analysis of group performance as well as through inspection of individual patterns of responses. Additionally, we were able to provide a partial replication of our first study by using children from the control group as participants in the single-case phase of the investigation (Study 2). Finally, we were able to define more clearly the role of the play interactant in producing the changes that were noted in the scripts of the children with SLI following dyadic play. The combined results for both phases of the investigation provide support for the notion that structured interaction with typically developing peers facilitates the development of play scripts in children with SLI. Specifically, children who participated in dyadic play episodes with peer models demonstrated significant gains in the length of their script reports, the number of different words used, the number of play-theme-related acts present in the scripts, and the number of linguistic markers used (although the low incidence of these terms in the children's scripts make these results difficult to interpret). This was not true for children who did not have the opportunity to interact with typically developing peers in the same way. Children with SLI who were given play opportunities with another child with SLI did not show gains in script reports comparable to those children whose play partner demonstrated age-appropriate language and play skills.

The results of this investigation encourage the exploration of broader themes within the area of event representation and script development. Clearly, something occurred during the play sessions that led to positive increases in the script reports of the children with SLI. Presumably, the peer models were able to share script knowledge, either implicitly or explicitly, about the theme of the play while engaging in the play itself. In addition, they were apparently more effective than their peers with SLI in transferring this knowledge to a play partner. Identification of the behaviors exhibited by the peer models during play episodes would aid in our understanding of how script knowledge is shared and the kinds of interactive behaviors that are effective in relaying script knowledge to children with SLI.

No attempt was made in the current study to measure the possible changes in the play behaviors of children with SLI following treatment. That is, although

increases were noted in the verbal script reports of the children in the experimental group, no data exist to suggest that concomitant changes occur in the ability to carry out the script in subsequent sociodramatic play opportunities. One might hypothesize that a better understanding of the script of a specific play theme may help children with SLI participate more effectively in subsequent episodes of play, both linguistically and socially.

Finally, it would be useful to investigate the ability of children with SLI to generalize the new knowledge gained regarding the playing-house script across other play scripts or real-event scripts. It would be beneficial to our understanding of script acquisition in children with SLI to determine if the increases observed here were specific to this script or whether the increases reflect an underlying change in the child's ability to construct scripts for all events.

## Acknowledgments

The authors wish to thank the parents and children from the West Bend School District who participated in this study. We are also grateful to Sandy Krautkramer and Julie Jacquot who tolerated many disruptions to their normally tranquil classrooms.

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Received July 7, 1995

Accepted July 30, 1996

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### **Appendix.** Themes Common Across Peer-Model Playing House Scripts

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- Food preparation ("You put cookies in the oven.")
  - Food Consumption ("And then you eat it.")
  - Role Playing ("Sometimes you pretend to be a mom.")
  - Cleaning ("You have to wash those dishes.")
  - Doll Play ("You can put the doll in the highchair.")
  - Dress Up ("You can wear the big hat.")
  - Social Interaction ("I talk to the doctor on the phone.")
-