Specificity in Mother–Toddler Language–Play Relations Across the Second Year

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Relations among specific aspects of language (comprehension and production, semantics and utterance length) and relations between language and symbolic play were evaluated when children were 13 and 20 months of age. The contributions of maternal stimulation to toddler performance and whether associations among toddler abilities might be explained by maternal behaviors were also examined. Although measures of toddler language covaried, language–play associations in toddlers were specific to semantic aspects of language. Associations between mother and toddler behaviors emerged and tended to be specific: Maternal language related to toddler language, and maternal play related to toddler play. Moreover, relations among toddler abilities maintained after maternal influences were partialed. The multidimensional structure of language and specificities in language–play associations were discussed with reference to models of early representational development.

Developmental psycholinguists theorize that nonlinguistic representations of the world contribute to, as well as constrain, the structure of child language and the course of its development (e.g., Bloom, 1973; Brown, 1973; de Villiers & de Villiers, 1992). This cognitive model of language acquisition evolved from Piaget’s (1962) claim that language emerges out of nonlinguistic sensorimotor intelligence and is one of several manifestations of a general underlying symbolic capacity. However, empirical investigation has not supported the strong cognitive claim that sensorimotor intelligence is prerequisite to all aspects of language learning (see Corrigan, 1978, 1979; Curtiss, 1989; de Villiers & de Villiers, 1992, for reviews). For example, children’s performance on Piagetian tasks of object permanence does not relate to global measures of language (e.g., Bates, Benigni, Bretherton, Camaioni, & Volterra, 1979; Corrigan, 1978), whereas specific cognitive achievements (e.g., Piagetian invisible displacement tasks) have been found to predict specific language achievements (e.g., verbal expressions of disappearance or nonexistence; Tomasello & Farrar, 1984).

Accordingly, questions such as whether linguistic achievements are associated with developments in nonlinguistic domains have been replaced with questions such as whether there are specific or identifiable linguistic–cognitive associations at specific periods in development (see Gopnik & Meltzoff, 1984, 1987). This new theoretical orientation is especially relevant to the study of toddlers’ play and language. Both play and language might be conceptualized as multidimensional. The nature of their interrelations and relations to other mental functions in the child will depend on the measure of language or play that is used (see Tamis-LeMonda & Bornstein, 1993). That is, language–play associations are most likely specialized rather than global.

In this longitudinal study, we revisit a cognitive model of early language development by exploring specificities in language–play associations when children were 13 and 20 months while simultaneously considering mothers’ referential language and symbolic play with their toddlers. This study makes two unique contributions to this area of research. First, the developmental approach we take permits examination of concurrent and predictive language–play relations at two points in the second year. Second, by considering mothers’ concurrent and predictive influences in these same areas of development, we ask whether mothers’ interactions mediate identified language–play associations in toddlers. To date, the majority of studies that explore nonlinguistic correlates of language have based assessments on a single age period, and virtually none has considered mothers’ contributions to children’s developments in these areas.

In these assessments, we adopt a multidimensional approach to language at both ages, exploring how different aspects of language interrelate and how they differentially relate to symbolic play. Past research has shown that different measures of language are associated with one another during the second year, but reported relations are usually moderate in size. Therefore, some aspects of language may share variance whereas others may not, and some aspects of language may relate to play whereas others may not (see Bates, Bretherton, & Snyder, 1988; Bretherton & Bates, 1984; Tamis-LeMonda & Bornstein, 1990).
As a part of these investigations, we examined mothers' contributions to specific toddler abilities. American mothers encourage verbal development and play sophistication in their children, so it is possible that links between child language and play—whether concurrent or lagged, specific or general—are influenced by maternal stimulation (Belsky, Goode, & Most, 1980; Bornstein, 1985; Carew, 1980; Fiese, 1990; Hardy-Brown, Plomin, & DeFries, 1981; Olson, Bates, & Bayles, 1984; Tamis-LeMonda & Bornstein, 1989, 1990; Tamis-LeMonda, Bornstein, Cyphers, Toda, & Ogino, 1992; Teti, Bond, & Gibbs, 1988).

We focused on second-year achievements in toddlers because during this period children make extraordinary developmental strides in these two important arenas of mental functioning. We initially observed children at 13 months, because at this time most children have produced their first words and are already advanced in language comprehension. Children were seen again at 20 months. By this time, (a) most children have demonstrated a spurt in productive vocabulary; (b) children are substantially regular in the general semantic meanings they use to express possession, location, action, and so forth; and (c) many children are producing their first word combinations (Bates et al., 1988; de Villiers & de Villiers, 1992). At both ages, these measures of language are characterized by substantial variation, and these individual differences appear to be valid indexes of later linguistic or cognitive functioning (Bates et al., 1988; Bates, O'Connell, & Shore, 1987; Braine, 1976; Slobin, 1982).

In parallel with this transition in language competencies, second-year play progresses in sophistication as it moves from exploratory manipulation toward expressions of pretense in which children enact experiences and events through symbolic gesture. Before the first year, sensorimotor acts predominate in children's play activity; children examine objects to produce effects and to explore their concrete functions (e.g., pressing buttons on a toy telephone). Around 13 months, incipient symbolic acts appear as children use gesture in representation, for instance, pretending to talk on a toy telephone or to drink from an empty teacup. Over the next several months, certain concrete forms of play diminish in frequency and are replaced by more cognitively based pretense actions. By 20 months, most children are capable of a diversity of symbolic activities that include incorporating others in pretense scenarios (e.g., putting dolls to sleep) as well as sequencing acts of pretense (e.g., stirring in empty teacups and then pretending to drink; see Belsky et al., 1980; Belsky & Most, 1981; Bornstein & O'Reilly, 1993; Fein, 1981; McCune, 1993; Tamis-LeMonda & Bornstein, 1991, 1993).

With respect to these developments in language and play, our study had two main goals. The first concerned exploration of the differentiated nature of language—play associations. How do different aspects of language relate to symbolic play across the second year? We hypothesized that specific correspondences would exist between semantic aspects of language and symbolic play. Piaget (1962) and Vygotsky (1967) both opined that representational thinking does not so much concern the development of speech per se as much as the child's use and understanding of meaning.

We also hypothesized that at 13 months children's language comprehension would predict symbolic play better than would their language production. At 13 months language production is limited. It has been speculated that variability among children in productive ability at this time indexes a propensity toward talking (e.g., some children wait to talk until they feel they can "get it right"; Bates, Thal, Fenson, Whitesell, & Oakes, 1989) or phonological—articulatory abilities (e.g., Huttenlocher, 1974), rather than underlying representational ability. In support of this notion, prior research in our laboratory uncovered specific relations between children's flexible (context-free) language comprehension and their symbolic play at 13 months (Tamis-LeMonda & Bornstein, 1990; see also Vibbert & Bornstein, 1989). The present study is based on subsequent evaluation of the same children and their mothers when the toddlers reached 20 months of age, and this report includes an evaluation of toddlers' 13-month language and play in relation to their 20-month language and play.

By 20 months, we expected measures of productive language to relate systematically to measures of symbolic play, but again to do so in a specific way. On the basis of the hypothesis that language and symbolic play partly reflect children's ability to conceptualize and represent experience, we hypothesized that semantic diversity: the variety of meaning categories children express (e.g., possession, agency, and location), would be a stronger correlate of symbolic play than vocabulary size or utterance length.

Furthermore, we expected to identify moderate stability in toddler behaviors over time. We anticipated that 13-month language comprehension would predict semantics in language at 20 months and that 13-month language production would predict productive vocabulary size and utterance length at 20 months. These predictions are based on the hypothesis that stabilities in language will exist to the extent that common underlying processes are tapped at both ages. If language comprehension is considered an index of linguistic representation at 13 months, it ought to predict the expression of meaning later. In contrast, Bates et al. (1988) found that total production at early stages of language (e.g., 13 months), rather than comprehension, was a stronger predictor of mean length of utterance (MLU) at 20 months. We also expected to observe predictive relations from language to play and from play to language between 13 and 20 months, again with particular attention to those aspects of language that are rooted in meaning (i.e., language comprehension at 13 months and semantics in language at 20 months were expected to relate to symbolic play at both ages).

The second main goal in this study was to examine maternal contributions to toddlers' language and play. Most researchers who have explored links between language and play in early childhood have ignored the potential role of environmental factors, most notably mothers' own interactive language and play (but see Bornstein, Vibbert, Tal, & O'Donnell, 1992; Vibbert & Bornstein, 1989). Variation among children in language and in play, as well as relations between the two abilities, might be explained by exogenous factors, perhaps maternal verbal stimulation or symbolic representations. To assess mothers' contributions to toddlers' language and play, as well as their contributions to associations among language and play measures within toddlers, we differentiated two facets of maternal activity to parallel our foci on toddler language and play. In the language do-
main, we assessed mothers' referential language because this form of stimulation is associated with various measures of child language, including number of nouns and non-nouns in comprehensibility, MLU, noun phrases, and verbs per utterance (e.g., Furrow, Nelson, & Benedict, 1979; Nelson, 1973; Newport, Gleitman, & Gleitman, 1977; Tamis-LeMonda et al., 1992; Tomasello & Todd, 1983). In the play domain, we also assessed mothers' demonstrating and soliciting specific toddler play actions. Measures of maternal play are consistently valid predictors of children's play sophistication across populations and cultures (e.g., Belsky et al., 1980; DeLoache & Piaetz, 1985; Lockman & McHale, 1985; Power & Parke, 1982; Rogoff, 1990; Slade, 1987; Tamis-LeMonda & Bornstein, 1993; Tamis-LeMonda et al., 1992). By differentiating maternal language stimulation from maternal play stimulation, we sought to examine specificities in mother–toddler associations within and across the second year and to explore whether maternal behaviors mediate language–language and language–play associations in toddlers.

Method

Sample

Forty-one toddlers (20 boys and 21 girls) and their mothers participated in two home observations scheduled 7 months apart. Subjects were recruited from private obstetric and pediatric groups in New York City. Toddlers averaged 13 months 1 week (range = 13 months 1 day to 13 months 2 weeks) at the time of the first observation and 20 months 2 weeks (range = 20 months 1 week to 20 months 3 weeks) at the time of the second observation. Their mothers averaged 34 years of age (range = 28 to 42). Subjects were from middle-socioeconomic-status households (M = 60 on the Hollingshead [1975] Four-Factor Index; Gottfried, 1985), and the majority of mothers (92%) had completed 4 years of college. Four additional toddlers were seen at the two ages, but their data were eliminated from final analyses because they were univariate and bivariate outliers on language measures (Tukey, 1977). Two had extreme high scores (i.e., greater than three standard deviations beyond the sample mean) on receptive language at 13 months, one had extreme high scores on productive language at both ages, and one had extreme high scores on productive language at 20 months.

Procedure

Home visits were scheduled during times when mothers felt their toddlers would be alert and rested. At both ages, dyads were videotaped for 15 min of free play, and mothers were interviewed about their children's language. Mothers were asked to remain with their toddlers and to disregard the experimenter's presence as much as possible. They were instructed to do whatever they would ordinarily do when their toddlers engage in play. No further instructions were given. At both ages, a set of toys was placed on the floor in front of toddler and mother. These toys included a teapot and cover, a clown doll, spoons, cups and saucers, a toy telephone, a book, a ball, blocks, a nesting set, and a toy vehicle.

Data on children's language derived from both interviews and spontaneous speech in the play sessions. Children's play competence, maternal language stimulation, and maternal play stimulation were coded from the play sessions. Toddlers' language and play and mothers' language and play were evaluated by different coders at each of the two ages so that coders of each data set were unaware of the nature of all other data sets.

Toddler Measures at 13 and 20 Months

Thirteen-month language. We interviewed mothers about their children's productive and receptive vocabularies using the Bates et al. (1988) language inventory. We elected to examine early language with this inventory because it distinguishes flexible from restricted aspects of child language. During the language interview, the experimenter read approximately 100 common words or phrases to the mother and asked whether her child demonstrated productive or receptive proficiency with each. If a mother indicated that her child produced or understood an item or both, the experimenter further probed to determine whether any specific gestural, vocal, spatial, or temporal cues were required for the child to display competence with the word or phrase. Language data at 13 months were scored according to procedures developed by Bates et al. (1988) and revised and detailed in Tamis-LeMonda and Bornstein (1990). In summary, children were credited with production if they demonstrated consistent and appropriate use of a sound that approached the phonetic version of the adult target word (e.g., baba for bottle), and they were credited with comprehension if their behavioral response was appropriate to a particular word or phrase (e.g., toddling over to mother if she said "Come here"). Production and comprehension were classified as restricted when contextual or other cues were necessary; items that were independent of contextual cues were classified as flexible (see Snyder, Bates, & Bretherton, 1981). Analyses here focus on flexible measures of language production and comprehension. Two coders independently scored audiorecordings and transcripts of 10% of the language interviews, randomly selected, so that coding reliability could be assessed. Agreement for numbers of words and phrases in production and in comprehension was calculated by dividing the number of agreements by the number of agreements plus disagreements. Reliability averaged 97% for production (range = 86%–100%) and 92% for comprehension (range = 83%–98%); agreement for the flexible–restricted language distinction averaged 92% for production (range = 83%–100%) and 90% for comprehension (range = 83%–98%).

Twenty-month language. Three aspects of children's language were assessed. Lexical development reflected the magnitude of children's absolute productive vocabulary size; utterance length reflected children's use of word combinations, plurals, inflections, auxiliaries, articles, prepositions, and so forth; and semantics reflected the diversity of meanings children express in speech. Utterance length and semantics were determined from transcripts of all child and mother utterances made during the play sessions. All transcripts were coded twice by independent coders and were cross-checked a third time by a different constant coder. Any utterances that were unintelligible to coders were not counted, and utterances whose content coders could not agree on were also omitted from analyses. Agreements among coders were calculated separately for mother and toddler language and for words and phrases. Percentage agreement averaged 90% and 99% for all categories.

Productive vocabulary size was estimated by using the Bates et al. (1988) vocabulary checklist and was collected at the conclusion of the 20-month visit. This checklist includes nearly 700 words taken from general categories, such as animals, clothes, actions, and foods.

Utterance length was based on spontaneous utterances coded for morpheme length following traditional guidelines (e.g., Bates et al., 1988; Bloom, Beckwith, & Capatides, 1989; Bloom & Capatides, 1987; Brown, 1973). Only children's spontaneous utterances were coded, because imitative and responsive utterances might alter estimates of children's ability, for example, in the case of children whose mothers ask many yes–no questions. Mean length of longest utterances (MLU), which is based on the average morpheme length of the child's five longest spontaneous utterances, served as the index of utterance length.

Semantic diversity was also based on children's spontaneous utterances exhibited during the play session. Each utterance was classified into 1 of 14 semantic categories (e.g., agent, action, possession, recipi-
ent, or locative). These semantic categories derive from existing studies of semantics in second-year language and included categories signifying functional relations (e.g., recurrence) as well as grammatical relations (e.g., agent; see Bates et al., 1988; Bloom, 1970; Brown, 1973; Nelson, 1973, 1981; Schlesinger, 1971). In assessing semantics, coders watched the videotaped session and used contextual cues to interpret the function of children’s utterances. In those cases in which an utterance expressed two semantic categories, the child was credited with both. Each child received a semantic diversity score that reflected the number of different semantic categories used; the maximum score a child could achieve was 14. Categories of speech that were not included in this code consisted of routines, objections, words or phrases expressed with no obvious or immediate contextual referents or meaning, as well as those expressed solely to service symbolic play, for example, saying “Hi!” into the toy telephone. (These latter utterances were not considered so as to avoid confounding of the language-play correlations.) Interrater reliabilities of semantic classifications were calculated by having three independent raters code 15% of the sample, randomly selected. Kappa reliability across semantic categories averaged .88.

Thirteen- and 20-month play. Toddler play in the 15-min videotape was coded over 60 contiguous 15-s intervals. During each interval, the coder noted which of eight levels of play the child achieved. The eight levels were defined as follows: (1) unitary functional activity, (2) inappropriate combinatorial activity, (3) appropriate combinatorial activity, (4) transitional play, (5) self-directed pretense, (6) other-directed pretense, (7) sequential pretense, and (8) substitution pretense (see the Appendix for operational definitions and examples). During a given interval, a child could be credited with more than one different level of play.

All categorizations of toddlers’ play actions, including symbolic play, were determined by children’s actions and nonverbal behaviors rather than by their language. Thus, a child could look into a cup and say “hot” but would not be credited with symbolic play; alternatively, if the child tipped the cup to his or her lips pretending to drink, he or she would be credited with symbolic play. Basing judgment of play on action rather than language obviated inflating language-play correlations.

The total number of different play levels (i.e., Levels 1 through 8) achieved was calculated within each interval; these totals were then summed across the 60 intervals. Similarly, the number of different symbolic play levels (i.e., Levels 5 through 8) was calculated within each interval and then summed across the 60 intervals. A comprehensive measure of symbolic play was calculated by dividing the symbolic sum by the total sum. In these calculations, only toddlers’ spontaneous symbolic play was considered (i.e., play acts in which the child exhibited a symbolic activity that was neither demonstrated nor solicited by the mother in the same coding interval or the preceding interval; see also Tamis-LeMonda & Bornstein, 1989, 1990, 1991). This was done so that toddlers’ play scores were not confounded with mothers’ immediate symbolic play. Moreover, by considering toddlers’ spontaneous play only, assessments paralleled those for toddlers’ language that were based on spontaneous utterances (see earlier). These percentages were arc sin transformed for statistical analyses. Intercoder reliabilities for toddler play were obtained by having independent coders score toddler play for 24% of the sample, randomly selected. For each subject scored, observers were said to agree when they both coded the same level(s) of play for a given interval. Kappa agreement for the eight levels of play across intervals and subjects averaged .77.

Maternal Measures at 13 and 20 Months

Referential language. When infants were at both 13 and 20 months, mothers’ referential language was coded from the 15-min free-play session. During each of 60 successive 15-s intervals, the coder noted whether the mother verbally referred to an object, activity, or event in the environment by describing, labeling, or asking her toddler about the unique qualities of the referent (e.g., “That’s a spoon” or “What color is the spoon?”). Comments that were based on actions with the provided toys (e.g., “You’re drinking,” to a child pretending to drink from the toy cup) were also counted as referential language. Thus, over the entire 15-min play session mothers could receive a maximum score of 60.

Although mothers did much talking during the sessions, referential language was distinct from sheer talkativeness. There were many utterance types that were excluded from this category. For example, comments or questions about nonpresent events, people, or objects (e.g., “Daddy will be home soon” or “Do you remember going to the zoo yesterday?”), affect (e.g., “You’re happy” or “Mommy likes to see you play”), non-object-oriented actions (e.g., “You’re waving”), praise (e.g., “Good!”), commands (e.g., “Sit down”), reprimands (e.g., “Don’t do that”), affirmations and exclamations (e.g., “Yes!”), and play solicitations or demonstrations (e.g., “Feed the doll” or “Mommy is feeding the doll”; see later) were not counted as referential language. Intercoder reliabilities for referential language were obtained by having independent observers code 17% of the sample, randomly selected. For each subject scored, observers were said to agree when they both coded referential language in the same interval. Kappa agreement across intervals averaged .73.

Play. During each 15-s interval, coders noted whether mothers exhibited a play action by modeling specific play activities for their toddlers or by prompting toddlers to engage in specific play activities themselves. Each maternal play act was also coded for its level of sophistication with the same play scale as that developed for toddlers. As for toddlers, one comprehensive measure of mothers’ symbolic play was calculated by summing across the frequencies of intervals for Levels 5 through 8 and dividing by the total frequency obtained for Levels 1 through 8; these percentages were arc sin transformed before analyses. Intercoder reliabilities for mother play were obtained by having independent coders score mother play for 17% of the sample. Kappa agreement across the eight levels of play for matched intervals averaged .86.

Results and Discussion

We first report descriptive statistics for toddler and mother language and play at the two ages. We next present mother-toddler language-play associations at 13 and at 20 months, followed by predictive mother-to-toddler and toddler-to-mother language-play associations between the two ages. We then report concurrent relations among toddler measures at 13 and at 20 months and predictive associations between toddler 13- and 20-month performance. Finally, we reevaluate within-toddler associations after partialing maternal stimulation to assess whether language-play links within toddler are explained (in part) by maternal stimulation.

Because measures of language production appeared skewed at the two ages, square-root and logarithmic transforms of production variables were inspected where appropriate. Results did not differ from untransformed data; reported results are based on untransformed data.

Descriptive Statistics and Mother–Toddler Correlations at 13 and 20 Months

Table 1 presents descriptive statistics (means, standard deviations, and ranges) for toddler and mother measures, and Table

1 A comprehensive list of the semantic categories coded along with their operational definitions can be obtained from Catherine S. Tamis-LeMonda or Marc H. Bornstein.
Table 1
Descriptive Statistics of Toddler and Mother Variables at 13 and at 20 Months

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
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</thead>
<tbody>
<tr>
<td><strong>13 months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toddler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive vocabulary</td>
<td>38.7</td>
<td>18.8</td>
<td>10-75</td>
</tr>
<tr>
<td>Productive vocabulary</td>
<td>6.2</td>
<td>6.0</td>
<td>0-27</td>
</tr>
<tr>
<td>% symbolic play*</td>
<td>10.0</td>
<td>9.0</td>
<td>0-32</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referential language</td>
<td>29.6</td>
<td>10.1</td>
<td>8-48</td>
</tr>
<tr>
<td>% symbolic play*</td>
<td>35.0</td>
<td>15.0</td>
<td>9-78</td>
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<tr>
<td><strong>20 months</strong></td>
<td></td>
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<tr>
<td>Toddler</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Productive vocabulary size</td>
<td>162.1</td>
<td>116.8</td>
<td>8-434</td>
</tr>
<tr>
<td>Mean length longest utterance</td>
<td>2.6</td>
<td>1.0</td>
<td>1-5.4</td>
</tr>
<tr>
<td>Semantic diversity</td>
<td>7.7</td>
<td>2.9</td>
<td>1-12</td>
</tr>
<tr>
<td>% symbolic play*</td>
<td>24.0</td>
<td>18.0</td>
<td>2-70</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referential language</td>
<td>31.2</td>
<td>9.7</td>
<td>9-53</td>
</tr>
<tr>
<td>% symbolic play*</td>
<td>46.0</td>
<td>20.0</td>
<td>14-96</td>
</tr>
</tbody>
</table>

* Nontransformed percentages; percentages were arcsin transformed in statistical analyses.

Table 2 shows that in half of the correlations, variability in children's abilities was associated with variability in mothers' stimulation, and specificity in mother–toddler associations was apparent at both ages. Table 2 (top left) shows 13-month concurrent correlations. Toddlers' receptive and productive vocabularies were significantly associated with their mothers' referential language, and, similarly, toddlers' symbolic play was significantly associated with their mothers' symbolic play. Mother–toddler language–play cross-correlations were not significant. Thus, in both domains, it was not absolute amount of maternal stimulation per se that predicted language or play in toddlers, but instead the nature of that stimulation that was telling (e.g., mothers who talked more about objects did not have children who played more, but mothers who specifically prompted play did have children who played more). Not shown is the finding that mothers' referential language was independent of mothers' symbolic play ($r = -.07$).

Table 2 (bottom right) shows 20-month concurrent correlations. Variation among toddlers in productive vocabulary size and semantic diversity was associated with their mothers' referential language, and toddlers' symbolic play again related to their mothers' symbolic play. Mothers' symbolic play also related to semantic diversity in toddler speech. Relations among mothers' referential language and toddlers' MLLU and play, as well as toddlers' vocabulary and MLLU and mothers' play, were not significant. In mothers, referential language related significantly to their symbolic play ($r = .28$, $p < .05$).

Table 2 (top right) shows predictive mother-to-toddler relations. Mothers who referred to objects more at 13 months had children with larger productive vocabularies, higher MLLU, and greater semantic diversity at 20 months. In contrast, mothers' earlier symbolic play did not predict their toddlers' later

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2 We analyzed mothers' referential language with respect to noun versus non-nouns in children's comprehension and production at the two ages. (In this article, we report language totals.) There was no systematic prediction to noun classes only. For example, mothers' referential language at 13 months relates to common nouns in toddler comprehension .40; non-nouns, .43; and total comprehension, .35, and predicts 20-month noun production .33 and non-noun production .44.
symbolic play performance. A curious and unexpected finding is that mothers' symbolic play at 13 months showed an inverse relation to toddlers' later productive vocabulary size. One possible explanation is that at 13 months, high levels of symbolic play, in which objects are vehicles of representation (i.e., they are principally used to reenact past experiences and to stand for things they often are not), may confuse children. In contrast, the relation between mothers' early referential language, in which things are more concretely labeled for what they are, and toddlers' later vocabulary, is .50.

Table 2 (bottom left) shows toddler-to-mother predictive correlations. Neither receptive nor productive vocabulary nor symbolic play in toddlers at 13 months predicted mothers' later referential language. In contrast, all three early toddler measures predicted mothers' later symbolic play: Specifically, toddlers with greater receptive and productive vocabularies, and who had more symbolic play at 13 months, had mothers who engaged them in more symbolic play at 20 months.

Two points might be made about these toddler-to-mother associations. First, at a broad level, they suggest reciprocal influences of dyad members on one another. Although these data are correlational and do not directly test causal influences, mothers and children appear to influence each other's behaviors both in the immediate context as well as over time. Second, the results highlight the specific nature of toddlers' influence. Toddlers predict mothers' symbolic play, rather than her referential language. The toddler-to-mother prediction may be attributed to a context-appropriate adjustment of mothers at 20 months to their relatively precocious 13-month-olds. That is, by 20 months, a more sophisticated pattern of interaction in a play session might be for a mother to engage her toddler in symbolic themes that extend the limits of reality. Such engagements would be reflected in high numbers of symbolic demonstrations and solicitations by mothers but would not be reflected in high levels of labeling and questioning about present toys (referential language). Thus, at 20 months a more advanced interactive style would be one that uses toys to service symbolic play (e.g., “Let's have a tea-party”) rather than one in which toys are the topic of discussion (e.g., “That's a cup”). The outcome would be that children at 13 months, who are already advanced in language and play, may lead mothers to later prompt and maintain pretense-based exchanges.

**Within-Toddler Correlations at 13 and 20 Months**

Figure 1 shows a correlogram of within-toddler associations at each age and across the two ages. Both zero-order correlations among the toddler variables and partial correlations among variables after covarying mothers' stimulation are shown (partial rs appear in parentheses). For partial correlations, mothers' 13- and 20-month referential language and symbolic play were partialled from toddler language and toddler symbolic play at each age, respectively. Specifically, language-language correlations partialled mothers' language at the associated age(s); play-play correlations partialled mothers' play at the associated age(s); and language-play correlations partialled both mothers' language and play at the associated age(s). Hence, the number of maternal covariates ranged from one (when relating child performance within age and within domain) to four (when relating child performance across age and across domain).

**Zero-order within-toddler correlations.** At 13 months, receptive vocabulary related significantly to productive vocabulary and to symbolic play; language production did not relate to symbolic play (Tamis-LeMonda & Bornstein, 1990). Interrelations among the language variables at 20 months indicated that productive vocabulary, MLLU, and semantic diversity all covaried positively. As hypothesized, only semantic diversity related to symbolic play at 20 months (see Figure 1).

Predictively, toddlers' productive vocabulary size, but not play, was stable between 13 and 20 months. Toddlers' 13-month receptive vocabulary predicted semantic diversity at 20 months; productive vocabulary predicted MLLU, semantic diversity, and symbolic play; and children's symbolic play predicted only their semantic diversity. Given that 13-month language comprehension and production and 20-month productive vocabulary size are based on maternal report, concurrent and predictive relations between these aspects of language at 13 and 20 months and observed language and play at these two ages suggest that report measures may provide accurate estimates of children's early language proficiency (see also Bates et al., 1988). Neither early receptive vocabulary nor symbolic play predicted productive vocabulary nor MLLU at 20 months, nor did early receptive vocabulary predict later play.

**Partial within-toddler correlations.** It would be premature to characterize stability or predictive validity of toddler measures as reflecting endogenous processes without considering the potential role of mother. First, concurrent associations between toddler and mother measures were generally significant (Table 2, top left and bottom right). Second, mothers' early referential language predicted all three dimensions of children's later language and all toddler measures predicted mothers' later play (Table 2, bottom left and top right). Moreover, mothers demonstrated significant stability in their referential language and symbolic play over this 7-month period (rs = .32 and .49, p < .05 and .001, respectively). Thus, it is possible that lagged associations in toddler competencies could be ascribable to maternal stimulation. Accordingly, we reanalyzed concurrent as well as predictive within-toddler associations after removing the correlative contribution of maternal stimulation.

As indicated in Figure 1, both within and across the two ages, nearly all the zero-order correlations among toddler variables remained significant after mothers' contributions were taken into consideration. An exception to this was the relation between toddlers' 13-month productive vocabulary size and toddlers' 20-month play. The zero-order correlation of .42 was attenuated to a nonsignificant .24 after partialing mothers' earlier and later contributions.

**Conclusion**

In the present study, we examined associations between features of language and play, as well as their stability and predictive validity, during the second year. We distinguished several aspects of early language, such as comprehension and production, semantics and utterance length, to explore specificity in concurrent and predictive language-play relations. Our findings lend support to a modified cognitive model of language repre-
Receptive vocabulary

Productive vocabulary

Symbolic play

-commerce

Semantic diversity

MLLU

Figure 1. Correllogram of zero-order and partial correlations (presented in parentheses) among toddler measures at and between 13 and 20 months. Partial correlation coefficients represent relations among toddler competences over and above maternal contributions. For these, language–language correlations partialed mothers' language at the associated age(s); play–play correlations partialed mothers' play at the associated age(s); and language–play correlations partialed both mothers' language and play at the associated age(s).

sentation in which specific linguistic abilities relate to specific cognitive attainments at specific periods in development. The nature of the language–play associations we identified suggests that relations between linguistic and other cognitive achievements will exist when common principles and structures are required (e.g., Corrigan, 1978, 1979; Curtiss, 1989). Finally, the present study extended prior research in the area of toddler play and language by documenting specificities in mother–toddler relations as well as continued specificity in associations among toddler competencies after mothers' contributions to play and language were considered.

In summary, our findings show that toddler language ability does not generally predict toddler play; instead, only certain aspects of language relate to play. At 13 months, language comprehension, rather than production, related to symbolic play; at 20 months, only semantic diversity in language related to symbolic play. Moreover, 13-month symbolic play predicted semantic diversity in language at 20 months. These findings indicate that symbolic play is associated specifically with aspects of language that concern children's use of meaning as opposed to children's sheer productive quantity or utterance length (Piaget, 1962; Vygotsky, 1967). It could be that conceptual and structural aspects of language are functionally independent when relations to nonlinguistic domains of intelligence are examined. In accord with this perspective, Curtiss (1989) presented data from the case studies of two groups of individuals with selective language impairments. She first described case studies of linguistic isolates, in which semantic and conceptual features of language are found to be intact but syntactic competencies are impaired. These individuals are contrasted with persons who show pervasive cognitive deficits and severe impairments in semantic features of language yet are capable of fully elaborated morphological and syntactic language structures.

A question arises as to why semantic diversity in particular should relate to symbolic play. Semantic diversity largely captures children's use of functional and grammatical relations. As noted by Bloom (1973), semantic categories depend on and derive from meaning relations between words. Children do not
have a cognitive notion of agent or object of action, but rather, these categories represent relational experiences such as things doing things to other things and things changing with respect to other things. These word usages differ from the performative use of words or phrases (e.g., bye-bye, clap hands; Bates et al., 1988), which make reference to classes of objects and events based on formulae and are highly dependent on the gestural routines that accompany them, as they do from substantive word forms (e.g., labels; Bloom, 1973), which make reference to classes of objects and events on the basis of perceptual features. Symbolic play, like semantic categories, shares this feature of relational meaning. Pretense activities are enactments of relations among agents, actions, and objects; like semantic language, symbolic play reflects children’s construction of predications about such objects and events.

The fact that semantic diversity, but not productive vocabulary size, relates to symbolic play further supports the idea that different linguistic–cognitive abilities are tapped by the different measures of language. Further analysis of the language–play relations shows that semantic diversity continues to be predicted by 13-month symbolic play and to be concurrently related to 20-month symbolic play after controlling for productive vocabulary size (r = .46 and .45, ps < .01, respectively). This suggests that semantic diversity will continue to relate to symbolic play in the presence of either high or low productive vocabulary. In fact, a post hoc cluster analysis of toddlers on semantic diversity and symbolic play measures identified four groups of children. One group was low on all language and play measures; a second group was average on all measures; and the third and fourth groups scored high on semantic diversity and high on symbolic play. However, what distinguished the latter two groups was their productive vocabulary sizes. Group 3 had high productive vocabularies at both 13 and 20 months, whereas Group 4 had relatively low productive vocabularies at the two ages. The results of this analysis suggest that children might be high on the representational abilities shared by symbolic play and semantics, independent of the size of their lexical vocabularies. In short, talking about the names of a lot of things may be different from talking about how things relate to one another.

In contrast to the significant symbolic play-to-language cross-age correlation, early language did not predict later symbolic play. One possible interpretation of this asymmetry is that certain nonlinguistic attainments of representation (e.g., symbolic play) are necessary prerequisites (though not sufficient) to the attainment of certain linguistic achievements (e.g., semantic diversity; see also Bates et al., 1979; Veneziano, 1981). Alternatively, it may be easier for children to express themselves through gesture than through language at early stages of symbolic emergence once requisite cognitive skills are in place (Goodwyn & Acredolo, 1993).

Considering maternal contributions to children’s performance in play and in language (Bornstein et al., 1992; Vibbert & Bornstein, 1989), results point to the existence of specific mother–toddler relations, and they lend support to a model of environmental specificity (Bornstein, 1989; Wachs, 1987). In this model, child cognition and environmental influence are each characterized as multidimensional. Experience does not influence child abilities globally, but rather certain experiences operate selectively in relation to certain child abilities. We found that mothers’ language tends to covary with toddlers’ language, mothers’ play tends to covary with toddlers’ play within age, and mothers’ language predicts toddlers’ language across age. However, most relations between toddler language and play also maintained over and above the significant contributions of select maternal activities. This suggests that the specific language–cognition relations in children that were identified here are not solely mediated by maternal language and play. This approach provides key support for the hypothesis that variation among children in emerging aspects of language and symbolic play might reflect variation in an underlying capacity to understand and express experiences in several modalities, through language and through representational action.

Note that the language–play relations observed in this study at and between 13 and 20 months might apply specifically to the procedures and measures we selected. The variables chosen for study here constitute only a sampling of the range of possible language, play, and stimulation indexes available from toddler and mother. Consider the present assessment of symbolic play. Symbolic play included reality-based pretense (e.g., pretending to feed doll with a spoon) and substitution pretense (e.g., pretending to feed doll with a stick) as well as both single and sequenced acts of pretense. A different definition of symbolic play might show different relations to language. For example, Shore, O’Connell, and Bates (1984) observed no significant relations between MLU and symbolic play, when symbolic play collapsed across reality and substitution play. However, when they further analyzed symbolic play into levels of abstraction, significant associations between sequence length in substitution play and MLU in language emerged. This result led Shore et al. to conclude that the transition to multiword speech involves information-processing changes that transcend language proper, for example, increased memory or combinatorial abilities. Our data lend further support to such a cognitive model of early language acquisition.

References


Catherine S. Tamis-LeMonda and Marc H. Bornstein


Appendix

Toddler Play Levels

<table>
<thead>
<tr>
<th>Play level</th>
<th>Definition</th>
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<tbody>
<tr>
<td><strong>Nonsymbolic</strong></td>
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<tr>
<td>1. Unitary functional activity</td>
<td>Production of an effect that is unique to single object (e.g., squeeze foam ball)</td>
</tr>
<tr>
<td>2. Inappropriate combinatorial</td>
<td>Inappropriate juxtaposition of two or more objects (e.g., put ball in vehicle)</td>
</tr>
<tr>
<td>3. Appropriate combinatorial</td>
<td>Appropriate juxtaposition of two or more objects (e.g., put lid on teapot)</td>
</tr>
<tr>
<td>4. Transitional play</td>
<td>Approximation of pretense but without confirmatory evidence (e.g., place spoon in cup, no stirring)</td>
</tr>
<tr>
<td><strong>Symbolic</strong></td>
<td></td>
</tr>
<tr>
<td>5. Self-directed pretense</td>
<td>Clear pretense activity (e.g., eat from spoon or cup)</td>
</tr>
<tr>
<td>6. Other-directed pretense</td>
<td>Clear pretense activity directed toward other (e.g., kiss or hug doll)</td>
</tr>
<tr>
<td>7. Sequential pretense</td>
<td>Linking of two or more pretense actions (e.g., feed doll and wipe mouth with sponge)</td>
</tr>
<tr>
<td>8. Substitution pretense</td>
<td>Pretense activity involving one or more object substitutions (e.g., pretend block is sponge and scrub floor)</td>
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