Signs of Pretense Across Age and Scenario

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Abstract

Participation in imagined worlds is a hallmark of the human species, and yet we know little about the context of its early emergence. The experiments reported here replicated and extended in 2 directions Lillard and Witherington's (2004) study of how mothers pretend to have snacks, across different ages of children (15- to 24-month-olds, Experiment 1) and to a different scenario (personal grooming, Experiment 2). Mothers' pretend behaviors changed little as infants aged, but there were some scenario differences. Most striking in this research was the consistency with which particular maternal pretend behaviors were associated with children engaging in pretense behaviors and smiling. The findings are discussed with reference to the child's emerging skills in joint attention and social referencing.

Humans' ability to participate in worlds beyond the here and now is a hallmark of the species, foundational to planning, invention, art, and much else (Walton, 1990). Pretend play is one of the earliest clear instances of such participation, yet we know little about the context of its emergence. In an earlier study, Lillard and Witherington (2004) examined mothers' behaviors when pretending to have a snack of imaginary Cheerios and juice with their 18-month-olds versus when really having such snacks. Many behavioral changes across pretend and real scenarios were discovered, and several were associated with people ages 4 to adult correctly identifying pretense acts as pretense (Richert & Lillard, 2004) and with 18-month-olds' smiling at and participating in pretense acts, potential indicators of understanding (Lillard, 2004).

The experiments reported here extend that work in two directions. The first experiment addresses whether mothers vary their pretend behaviors as children become more competent

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pretenders, from 15 to 24 months of age, and whether different maternal behaviors are associated with children appearing to understand pretending across this age range. The second experiment examined whether the findings replicate in a different pretend context, personal grooming, to know if the pretend "signs" mark all pretense or only pretend snacking. The results of the earlier Lillard and Witherington (2004) work are reviewed first.

Past literature suggested smiling as a possible indicator of pretense (Kavanaugh & Engel, 1998; Piaget, 1962; Wellman & Hickling, 1993). Children and adults use smiling as an indicator of pretend fighting (Boulton, 1993), and nonhuman primates apparently indicate play fighting with the "play face" (Eibl-Eibesfeldt, 1989; van Hooff, 1972). Lillard and Witherington (2004) found that when mothers were pretending with 18-month-olds, they did smile more than when really having snacks, and their smiles lasted longer on average. In addition, Lillard and Witherington found that pretend smiles were frequently judged to be "about" the mothers' own actions, namely because they were placed just after those actions. A child could plausibly reference the mother's pretend smile as an indication of how to interpret her behavior—as funny. In this way, a child might be aided in pretense interpretation by looking to the mother's expression, and using it as a guide to his or her own response, essentially engaging in the phenomenon known as social referencing (Feinman, 1992).

The conditions for social referencing would be better met if the mother watched her child as she pretended, so that she could time her smiles to when the child was looking at her action and then to her face. Children tend to look to adults' faces much more after pretending (Striano, Tomasello, & Rochat, 2001), and perhaps adults show the same behavior. Looking can serve to communicate meaning (Fehr & Exline, 1987), and clearly is in the service of coordinated joint attention (Carpenter, Nagell, & Tomasello, 1998). Lillard and Witherington (2004) found that mothers did look at their 18-month-olds more when they were pretending to have a snack than when really having a snack. One might dismiss this difference in looking as being due to task demands: When really pouring, for example, a mother has to look at what she is doing so she will not spill. However, even if they are made necessary by the practical circumstances, changes in mothers' looking patterns could still assist pretense interpretation. The fact that any specific difference in pretense and real behaviors is required by the situation does not diminish the possibility that the difference could facilitate pretense interpretation, possibly by facilitating social referencing or joint attention.

Language is another potential indicator of pretense, and in fact has been the focus of most prior research on signaling pretend play. This research has focused almost exclusively on preschoolers (Garvey & Kramer, 1989; Giffin, 1984). An obvious indicator, once children know the word *pretend*, is to simply tell children one is pretending. Lillard and Witherington (2004) found that mothers rarely used the word *pretend*, but that they did talk more when pretending to snack, and proportionately more about pretend actions and real objects used to pretend.

A conventionalized nonverbal vocal gesture that indicates pretense is the sound effect. Many have noted that children and parents use sound effects when pretending (DeLoache & Plaetzer, 1985; Haight & Miller, 1993), apparently to represent sounds that would have been made by the real events. As with describing actions, sound effects are a way to communicate the meaning of one's actions. In addition to communicating meaning, sound effects might serve as a simple attention-getting mechanism. Lillard and Witherington (2004) found very large increases in the use of sound effects in the pretend snack condition.

Body movements can also be communicative (Bull, 2001). A recent area of inquiry in psychology is what infants and nonhuman primates might glean about others' intentions by observing their body movements (Brand, Baldwin, & Ashburn, 2002; Rizzolatti, Fadiga, Fogassi, & Gallese, 2002; Woodward, 1998). Information about actor affect can also be derived from observing movement: People interpret affect at better than chance levels even from point-light displays of action (Pollick, Lestou, Ryu, & Cho, 2002; Pollick, Paterson, Bruderlin, & Sanford, 2001), and even preschoolers can identify the emotional content of expressive body movements in dance performances (Boone & Cunningham, 1998). Movements might also specifically indicate pretense. When people pantomime pouring into and drinking from a glass with no objects present, they move faster than they do when carrying out those same behaviors with real objects (Weiss, Jeannerod, Paulignan, & Freund, 2000). In addition, some have claimed that movements are exaggerated or truncated during pretense (Bateson, 1972). Lillard and Witherington (2004) found movements varied in three ways during pretending. First, mothers moved more when pretending: They poured more, drank more, and so on. Second, in pretense the timing of these actions was odd. For the most part, mothers moved more quickly when pretending (as revealed by a motion monitor). One behavior was mistimed in the opposite way: When pretending to eat, mothers held their hands at their mouths significantly longer than they did when really eating. Third, spatial exaggeration of action in pretense was seen for pouring: Mothers moved the pitcher to a higher position above the table than they did when pouring for real.

In sum, Lillard and Witherington (2004) found that mothers changed their behaviors in many ways (looking, smiling, verbally, sound effects, and movement) when pretending to have a snack as opposed to when really having one. A second focus was whether specific pretense behaviors were associated with identification of pretense acts as pretense. This has been examined in two ways. More definitively, in one study, participants ranging from preschoolers to adults gave explicit judgments regarding whether very short video clips showed pretend or real snacks (Richert & Lillard, 2004). Pertinent content cues (like the Cheerios) were blocked by video editing. In a second, less definitive study, Lillard and Witherington (2004, Experiment 3) used toddlers' snack-related pretend behaviors and smiles as a best available indicator of toddlers' pretense interpretations within the snack scenario just described. This is by no means an airtight measure of understanding, but it does correspond with the behaviors that mothers and other researchers (including Piaget) believe indicate understanding pretending, and it is significantly correlated with children's degree of experience pretending as reported in a postexperiment questionnaire asking about the frequency and content of mother–child pretense at home. At the very least, the smiles-plus-behaviors measure can be considered a measure of *engagement* in the pretense scenario, the term used to describe the measure here. This issue is discussed further at the end of the article.

Mothers' looking at the child was associated with correct interpretations of mothers' actions as pretense for adults and children ages 4 and older in Richert and Lillard (2004), and with higher engagement scores for toddlers in Lillard and Witherington (2004). On the other hand, smiles, which are often thought to indicate pretense, influenced engagement mainly for toddlers who had prior experience pretending to have snacks. Oddly timed movements, like fast approaches of the hand to the mouth when eating and the conventionalized gesture of holding the hand at the mouth for a long time when pretending to eat, did not appear to affect toddlers' engagement in pretense. However, for people aged 4 and older, oddly timed movements were associated with more accurate pretense interpretations. Sound effects appeared to have no impact at all on toddlers' pretense engagement, only limited impact on older children's interpretations of pretense, and significant impact on adult's interpretations of pretense. In the experiments with older children and adults, obvious verbal cues ("We're just pretending") were blocked, but with toddlers, for whom such cues were available,

neither use of the word *pretend* nor other verbal patterns characteristic of pretending were associated with pretense engagement, with one possible exception: Mothers who talked more when pretending had toddlers who showed a trend toward more engagement in pretense.

In sum, recent research has found that mothers change their behaviors in many ways when they pretend for toddlers, and some of those changes, such as looking, smiling, and talking, appear to be linked to pretense interpretations or engagement for toddlers.

If mothers change their behaviors when pretending to scaffold children's early pretense, then one might expect mothers to mitigate such modifications as children learn to pretend and no longer need as much support. Between the ages of 15 and 24 months, children go from being fledgling to quite competent pretenders (Haight & Miller, 1993; McCune, 1995). For example, in one study, children's engagement in symbolic play increased 250% from 13 to 20 months of age (Tamis-LeMonda & Bornstein, 1994). The major goal of Experiment 1 was to examine whether mothers' pretend behaviors change across this age range. If mothers are consciously signaling pretense by their behaviors, they might do so more strongly with younger children who are less apt to understand pretending. Mothers adjust many behaviors to children's ages, and it was expected that pretense behaviors would be no exception. A second goal was to see whether different maternal behaviors are associated with toddler's pretense engagement over development.

In addition to examining early pretense across different ages of children, Experiment 1 extended prior work by including new behavioral variables. Among these were acoustical characteristics of maternal speech during pretense and real snacks. Animals use high-frequency noises when anticipating play (Knutson, Burgdorf, & Panksepp, 1998), and in humans, vocal intonation patterns are thought to attract attention (Fernald & Simon, 1984) and to communicate a limited set of meanings (Fernald et al., 1989). Reissland and Snow (1996) studied intonation in mothers who were really having a snack or pretending to feed a stuffed animal or doll with their 11- and 15-month-olds. Higher pitch during pretense was found at both ages, and greater pitch range in pretense was found for the younger children only. An important consideration that this study could shed light on is whether higher pitch was merely a result of the toy, which might have elicited infant-directed speech, or whether higher pitch also characterizes pretense.

Another extension of Experiment 1 was using the Linguistic Inquiry and Word Count (LIWC) system (Pennebaker, Francis, & Booth, 2001). Word counts and proportions for many different variables are automatically provided by LIWC, including the use of unique words (thus lack of repetition) and pronouns suggesting joint attention. Other new variables such as the degree of rotation when the mother poured from a pitcher were also examined.

EXPERIMENT 1

Following the same procedure as in Lillard and Witherington (2004), children engaged in pretend and real snacks with their mothers, and mother behavior across the two situations was examined. Children's engagement (operationalized as smiling and snack-related actions) and its relation to mother behavior in the pretend situation were also examined. Whereas the prior study had examined only mothers with 18-month-olds, Experiment 1 was a cross-sectional study of mothers and their children, aged 15, 18, and 24 months. The major goal was to determine how mothers' behaviors change when pretending with children of these different ages. A second goal was to determine whether the maternal behaviors that are associated with children's engagement in pretense change across this age span. Other extensions of this study were measures of paralinguistic and several other previously unexamined variables across pretend and real situations.

Method

Participants—Three groups of 18 children and their mothers participated: 15-month-olds (M = 65.8 weeks, range = 63–67 weeks; 12 boys), 18-month-olds (M = 78.8 weeks, range = 76–80 weeks; 11 boys), and 24-month-olds (M = 104.3 weeks, range = 101–108 weeks; 10 boys). Four participants were of Hispanic origin; the rest were White. No 18-month-olds in this study were participants in the previous experiments.

Materials—The materials used in the snacks were two sets of plastic bowls and cups, a metal pitcher and serving bowl, and a napkin. In the real snack condition only, Cheerios cereal and apple juice were used. Babies were seated in a clip-on high chair across a 3-ft.^{2} table from their mothers. One digital video camera filmed the mother and another filmed the child. Kay Elemetrics's CSL 4100 analyzed digital recordings of the mothers' voices (Kay Elemetrics, 2001).

Procedure—Half of the mothers were first asked to pretend to have a snack with their children, just as they might at home, and the other half were first asked to really have a snack. After 2 min the experimenter returned and changed the set of materials for the contrasting condition. Mothers did not know pretending was to occur until just before their pretend session. Following the two snack episodes, each mother was asked to rate her comfort level during the procedure, on a scale ranging from 1 (*completely on stage*) to 6 (*just like at home*). Parents were also asked if they ever pretended with their child at home, and if so what they pretended and how often. Positive responses to questions about pretend experience were summed to create a 0-to-7 experience score for each child. To divide the sample by experience for some analyses, children whose mothers said they had specifically pretended to have snacks before this session were considered experienced pretenders.

The coding for mothers and children is described next. For fuller details, please see Lillard and Witherington (2004).

Coding

Mothers: Transcripts of each 2-min session were coded for use of the word *pretend* (reported but not analyzed because it was not of interest in the real condition), total number of words uttered, references to absent objects in the pretend condition and their real counterparts in the real condition (Cheerios, juice), and references to snack-related behaviors and snack-related objects. Cleaned versions of the mothers' transcripts (e.g., removing nonword utterances) were analyzed by the LIWC system (Pennebaker et al., 2001), which automatically generates 74 language-related variables, such as word count, number of dictionary words, number of tentative words, and so on. Planned analyses were conducted on variables pertaining to joint attention (we–us talk) and assisting understanding (repetition). Other LIWC variables were examined in an exploratory fashion but are not reported. Thus there were six verbal variables for which we report analyses. In addition, sound effects were also coded, summed, and analyzed.

For smiles, mothers were first coded according to their baseline level of smiling: whether they maintained a constant grin throughout the session, as some mothers did, or were more neutral in baseline expression. Discrete smiles were then coded in terms of departure from that baseline, according to onset and offset times, and for apparent referents. Thus there were four smile variables: baseline smiling, frequency of smiles, duration of smiles, and smile referent.

For looking behavior, coders judged the mother's dominant look location during each 5-sec interval, and also noted the sequence of looks (child, task, other) within each interval. The 5-

sec interval coding was new to this study, and was done to reduce coding time investment from 10 hr to 1 hr per infant. The same pattern of findings was obtained by each method. Thus there were four looking variables compared across conditions: number of intervals coded as predominantly tasks and child, and number of discrete looks to task and to child.

Functional movements included eating, drinking, pouring, and serving. For eating, onset and offset of the hand approaching the mouth were coded, as were onset and offset of holding the hand at the mouth. Drinking onset was coded when the cup first began to move toward the mouth, and offset when the cup first moved away from the mouth. Pouring onset was coded when the pitcher rotated past a 45° angle, and offset was coded when the pitcher first began to rotate back. (The reason for coding pouring onset at the 45° angle is that after lifting the pitcher off the table, mothers often delayed pouring while they got a cup.) The maximum degree of rotation of the pitcher was also coded. Serving gestures were counted but not timed because of the variety of ways that mothers enacted serving (scooping, pouring). There were six movement variables analyzed: the sum frequency of all movements, the duration of each of four movements separately (pour, drink, eat approach, and eat hold), and the angle of the pour.

Analyses were conducted on four aspects of maternal speech provided by the CSL: mean pitch (Fo), pitch variability (*SD*), mean amplitude, and amplitude variability (*SD*). Interference by extraneous sounds was minimal because frequency settings ensure that the CSL tracks particular sounds, in this case the mother's voice. All settings for the recording equipment were kept constant across participants and conditions; the CSL 4100 lacks an automatic gain control function.

In sum, 25 different variables were subjected to analyses using repeated measures analyses of variance (ANOVAs) across conditions. One thus might expect one significant main effect to occur by chance, using a *p* value of .05. This study replicates two prior experiments from Lillard and Witherington (2004); should the same findings obtain, one can be reasonably certain they were not obtained by chance.

Children: Tapes of the children in the pretend session only were coded for snack-related behaviors and smiles. The five types of snack-related behaviors, the frequencies of which were summed for a behavior score, were drinking (coded when a child touched the cup or pitcher to the mouth as if to drink), eating (raising the bowl or hand to the mouth as if to eat), pouring (from the pitcher to any location), serving (pouring or scooping from the a bowl to any location, or holding open hand toward mother as if to serve), and wiping (wiping up pretend spills from the table or wiping one's mouth with the napkin or hand). One might argue that children engaging in these behaviors were doing them "for real," mistaken about the pretend nature of the food and drink. Our reasoning was that a child might try to pour or drink once or twice by mistake, but that repeated such efforts with the same materials were more likely to be pretense, so higher behavior scores would result from a child who was truly more engaged in pretense. Smiles were coded only when they were clear smiles, beyond a reasonable doubt. Only the frequency of children's smiles was recorded. Frequencies of smiles and snack-related behaviors were summed for the child's total engagement score.

Reliability: Because coding for this study was expected to require more than 1 year and involve several dozen coders, a "standard protocol" method of maintaining reliability was implemented. As Bakeman and Gottman (1997) noted, "there is probably no other way to ensure the continued accuracy of human observers when a project requires more than one or two coders and last for more than a month or two" (p. 59). In our standard protocol procedure, a set of training DVDs was used for variables also coded in the Lillard and

Witherington (2004) study. Coders were trained to a minimum reliability of = .75 for categorical data (Cohen, 1960) and = .85 for linear data with these before coding the study proper. Once coding had begun, to guard against reliability decay, additional DVDs that had been previously coded to standard were inserted at intervals (about every 6 participants, but this was unknown to the coders) throughout coding, and on the rare occasions when reliability dropped below the levels just mentioned, reliability was reestablished with new training stimuli and the last set of DVDs since reliability was obtained was recoded. The final reliabilities ranged from = .75 (smile referent) to perfect agreement on baby smiles, and correlations for linear data ranged from .86 for the duration of drinking movements to .99 for the pour angle.

Results

Mother behaviors were analyzed for differences across condition and age. Except where noted, repeated measures ANOVAs were used, with age group as the between-subject variable and condition (pretend, real) as the within-subjects variable. Tukey's post-hoc tests (two-tailed) were used to examine significant effects related to age group. Effect sizes were calculated using partial eta-squared, a function of the square of Cohen's *d*, notated as $p\eta^2$. A small effect size with $p\eta^2$ is .05, medium is .2, and large is .4. Additional analyses also looked at possible condition order and gender effects; only one was found, described later.

Comfort and Experience—Comfort level was analyzed to determine the degree to which mothers felt they were behaving like they would at home. To the extent that they felt "on stage," differences across pretend and real situations might be minimized, in that mothers might act while really snacking. Mother's mean reported comfort level on the scale was slightly above a *little like at home*, and increased slightly but nonsignificantly with the child's age (see Table 1).

Maternal description of child's experience pretending was analyzed to test the assumption that older children had more pretend experience. As shown in Table 1, experience ratings increased at each successive age level, $F(2, 51) = 4.90$, $p = .01$, $p\eta^2 = .16$. A post-hoc Tukey's honestly significant difference (HSD) test revealed the significant change to be from 15 to 24 months, $HSD = 1.9$, $p = .01$, with a trend from 15 to 18 months, $HSD = 1.3$, $p = .09$. Regarding the very specific pretense experience used here, pretending to have snacks, only 4 mothers of 15-month-olds said their children had pretended to have snacks before, in contrast to 10 mothers of 18-month-olds and 13 mothers of 24-month-olds. Thus both in terms of the very specific experience of pretending to have snacks, and the more general experience of pretending, older children had more.

The next concern was whether mother behavior also changed in response to the child's age. Mothers' smiling, looking, movements, verbal, and paralinguistic behaviors were examined for differences across the pretend and the real situation at each age.

Mothers' Behaviors

Smiles: Of the 54 mothers, 23 smiled more at baseline in the pretend condition than in the real one, whereas 14 showed the opposite pattern, sign test, $p = .004$. Mothers of 24-month-olds were more apt to be smiley at baseline than mothers with younger children in both conditions, $\chi^2 = 12.68$ and $\chi^2 = 8.43$, respectively, $ps < .01$ (see Table 1).

Discrete smile frequency (over and above baseline) and duration replicated the prior work as indicated in Table 2: Mothers smiled more when they were pretending, $F(1, 51) = 31.92$, $p < .001$, $p\eta^2 = .39$. In addition, their smiles were longer on average when pretending than when snacking for real, $F(1, 51) = 4.03$, $p = .05$, $p\eta^2 = .07$.

To examine whether smiling might be particularly used in a social referencing framework, mothers' smiles about their own actions were analyzed as a proportion of all their smiles within each condition. Mothers smiled significantly more after their own actions when they were pretending to have a snack than they did when really snacking, $F(1, 51) = 20.95$, $p < .001$, $p\eta^2 = .30$ (see Table 2 for mean percentages and standard deviations). A Condition × Age Group interaction, $F(2, 50) = 3.82$, $p = .03$, $p\eta^2 = .13$, stemmed from this difference in smile placement holding only for the older two age groups (see Table 1). For both 18-months-olds, $t(17) = 4.42$, $p = .001$, and the 24-month-olds, $t(16) = 2.8$, $p = .01$, mothers placed their smiles after their own acts more when pretending than when acting for real, but for 15-month-olds, mothers smiled equally often about their own real and pretend behaviors.

Looking: Dominant look interval frequencies were analyzed using repeated-measures ANOVA. Mothers looked at the child significantly more when pretending than when snacking for real, $F(1, 51) = 36.76$, $p < .001$, $p\eta^2 = .42$. They also looked at the task significantly less when pretending, $F(1, 51) = 54.35$, $p < .001$, $p\eta^2 = .52$ (see Table 2). The number of discrete looks to the child was also significantly greater in the pretend condition, $F(1, 51) = 13.53$, $p = .001$, $p\eta^2 = .21$. The number of discrete looks to the task was significantly greater in the pretend condition as well, perhaps reflecting mothers looking back and forth from child to task more during pretense, $F(1, 51) = 9.18$, $p = .004$, $p\eta^2 = .15$.

One might be concerned that the significant findings for looking and smiling occurred because mothers who look at their children a lot also smile at them a lot. Interestingly, this was not the case; for example, the number of smiles a mother issued in the pretend session and the number of looks she gave her child obtained $r(54) = -.04$.

Functional movements: As shown in Table 2, mothers engaged in more snacking actions (eating, pouring, drinking, and serving) in the pretend than in the real condition, $F(1, 51) = 6.00$, $p = .02$, $p\eta^2 = .11$. Each movement (with one exception, see later) also lasted for significantly less time in pretense, as shown in Table 3. That one exception was holding the hand at the mouth while eating. This was also one of two functional movements for which there was an Age × Condition interaction: Only for the 15- and 18-month-olds, $t(14) = 3.89$ and $t(14) = 5.40$, respectively, $ps < .001$, was the hand held at the mouth longer for pretend eating (see Table 1).

Another conventionalized gesture, newly examined in this study, is the angle to which the pitcher was moved while pouring. In pretense, the mean maximum angle was 120°, whereas in really pouring it was only 86°, $F(1, 36) = 112.67$, $p < .001$, $p\eta^2 = .75$. A significant interaction with age group, $F(2, 56) = 3.63$, $p < .05$, $p\eta^2 = .17$, stemmed from mothers marking the conventionalized gesture less with older children, although the difference in mean pour angles across pretend and real activity was significant at all age levels, $t(13) = 6.31$, $t(12) = 6.74$, and $t(11) = 5.39$, all $ps < .001$ (see Table 1).

The duration of drinking was the only result for which a condition-first effect was obtained in this experiment, $F(1, 37) = 5.84$, $p = .02$, $p\eta^2 = 0.14$. Only for the group that had a real snack first was the duration of drinking longer in the real snack condition, $t(20) = 3.84$, $p = .001$. For this group, the pretend drink duration had $M = 2.0$ sec ($SD = .80$), whereas the real drink duration had $M = 2.8$ sec ($SD = .58$). Why this condition-first effect was obtained is not clear; perhaps mothers in this condition especially sought to contrast pretend drinking after really drinking.

Speech: The word *pretend* was uttered during the pretend session by about half of the mothers ($n = 29$), for a mean of 1.41 ($SD = 2.02$) uses. Mothers talked more when pretending, $F(1, 51) = 4.32$, $p < .05$, $p\eta^2 = .08$, and proportionately more about the eating

and drinking, $F(1, 51) = 5.26$, $p = .03$, $p\eta^2 = .09$, and bowls and cups, $F(1, 51) = 3.81$, $p = .06$, $p\eta^2 = .07$ (see Table 2).

Mothers issued many more sound effects when pretending than when snacking for real, $F(1, 51) = 139.96$, $p < .001$, $p\eta^2 = .73$ (see Table 2). Looking at individual patterns, every mother produced sound effects while pretending, with some producing more than 20 during the 2 min. In contrast, only 15 produced a sound effect when really eating, and 14 of those made only one or two.

LIWC: To further examine speech content in this study, analyses are reported on two specific variables coded by the Linguistic Word Count program (Pennebaker et al., 2001). First, although mothers talked more when they were pretending, they also used fewer unique words ($M = 38.3$, $SD = 6.49$ in pretense and $M = 43.63$, $SD = 9.29$ in real), $F(1, 51) = 28.76$, $p < .001$, $p\eta^2 = .36$. Second, when pretending they made more references to I, we, and us ($M = 9.47$, $SD = 4.76$ in pretend and $M = 6.61$, $SD = 3.90$ in real), $F(1, 51) = 13.08$, $p = .001$, $p\eta^2 = .20$.

Paralinguistic changes: The Computer Speech Laboratory revealed that the mean Fo of mothers' voices did not differ across conditions, but there was also a significant interaction of the standard deviation of Fo with condition and age group, $F(2, 56) = 4.12$, $p = .02$, $p\eta^2 = .14$ (see Table 2). Mothers used a more variable pitch when they were pretending versus really snacking with 15-month-olds, $t(17) = 2.56$, $p = .02$, and (as a trend) with 24-month-olds, $t(17) = 2.01$, $p = .06$, but their pitch variability was about the same across conditions with 18-month-olds (see Table 1). Mothers also talked more loudly when pretending, $F(1, 51) = 23.79$, $p < .001$, $p\eta^2 = .32$ (see Table 2).

Child Engagement—The sum of children's smiles and the sum of their snack-related behaviors in the pretend session were significantly correlated, r = .39, p = .003. They were summed for an engagement score, shown in Table 4. Children became more engaged with age, F(2, 51) = 6.9, p = .002, with a significant increase from 15 to 24 months (Tukey's HSD = 5.89, p = .001). Engagement scores were related to the child's age in weeks, r(54) = .47, p < .001, experience pretending in general, r(54) = .35, p < .01, and mother's reported level of comfort during the experiment, r(54) = .33, p < .01.

Relations Between Mother Behavior and Child Engagement—An important issue is whether mother behaviors are related to children's engagement in pretending. Engagement scores were analyzed for correlations with variables on which there were real–pretend differences, controlling for age where age effects were found in the pretend–real comparisons. Relations to engagement scores generally replicated those of the prior study, as shown in Table 5.

First, the number of times the mother looked at the child during the 2-min session was significantly related to child engagement, $r(54) = .24$, $p < .05$. Mothers' smile frequency was also significantly related to child engagement, $r(54) = .28$, $p < .05$, as was the number of mothers' smiles judged to be in reference to their own actions, even with child age controlled for $r(54) = .25$, $p < .05$. Interestingly, these relations were as strong if one looked only at experienced pretenders, but lost all significance for the inexperienced group (see Table 5). In addition, a relation was obtained between mean duration of mothers' smiles and child engagement only for the experienced subgroup, $r(27) = .42$, $p < .05$.

One might be concerned that the relation between smiling and child engagement is due only to children smiling back at their mother when she smiles at them. One finding suggesting that smile frequency and pretend engagement relations are not simply from children

returning smiles is that mothers smiled equally often with experienced ($M = 7.82$, $SD = 3.88$) and inexperienced ($M = 9.11$, $SD = 4.43$) pretenders, $t(52) = 1.14$, ns, and yet these two groups of children have near-significantly different engagement scores, $t(52) = 1.90$, $p = .06$, and for smiling scores only, showed a trend toward experienced pretenders smiling more (even though mothers smiled one to two times more per session with inexperienced children). In addition, maternal smiling was unrelated to children's smiling at 15 months, the age level for which mirroring might be of greatest concern, as 15-month-olds are least likely to understand pretense and therefore be smiling about it (rather than smiling simply at their mother's smiling). Nishida and Lillard (in press), further analyzing data from Lillard and Witherington (2004), discussed later, is also against the idea that engagement scores are the result of affective mirroring or imitation.

A near-significant association was also found between child engagement and the number of words mothers spoke during the pretend session, $t(54) = .21$, $p = .06$. In addition, the greater the proportion of mothers' references to the pretend actions of eating and drinking, the higher was the child's engagement score, $t(54) = .28$, $p = .02$.

Another finding was that the shorter the duration of mothers' drinking actions in pretend, the higher the engagement score, $t(48) = -.30$, $p = .02$. This was particularly true for children with experience pretending, $t(23) = -.42$, $p = .02$. In the Lillard and Witherington (2004) study, the opposing direction of relations was found. A possible explanation for this is that the faster movement assists children only as they get older; younger children might be confused by the faster movement. The data support this possibility. At both 18 and 24 months, shorter durations of the drink action were related to engagement, $t(15) = -.54$, $p = .01$, and $t(15) = -.51$, $p = .02$, and, although not significant, the opposite direction of correlation was found at 15 months, $t(15) = .22$. This same pattern was seen for another action, pouring. For 15-month-olds, the mean duration of pouring showed a positive trend toward being related to engagement: The more slowly the mothers poured, the more likely children of this age were to engage in pretense, $t(15) = .37$, $p = .09$. Yet at 18 months, this trend reversed direction, with children whose mothers poured faster having higher engagement scores, $t(15) = -.41$, $p = .07$, and although not significant, the direction of the correlation was the same at 24 months, $t(14) = -.16$. These data suggest the possibility that as children get older, faster movements assist their pretense interpretation, but that for younger children faster movements do not assist and might even confuse them.

Discussion

This experiment replicated several of Lillard and Witherington's (2004) results regarding both changes in mothers behaviors when pretending to snack and which of those changes are associated with young children engaging more in pretense. Taken together, the experiments suggest that mothers smile more and for longer, with more smiles after their own behavior, when pretending to have snacks than when snacking for real. They also look more at their children, and carry out more snack-related actions, most of which are of shorter duration, excepting the conventionalized gesture of holding one's hand at one's mouth when pretending to eat, which lasts longer. They also talk more, especially about the actions and real objects involved in pretending.

This experiment also expanded the set of behaviors known to vary across pretend and real snack situations. The CSL revealed vocal changes, including increased loudness in pretense, and increased pitch variability in pretense at certain ages. Variation in pitch contributes to a sing-song quality of speech and has been described as an attention-getting mechanism (Fernald et al., 1989); amplitude might serve the same function. Unlike for the German-speaking mothers in Reissland and Snow (1996), there were no pitch differences across

condition. The prior study had used a toy in its pretend situations but not in its real ones, and it is possible that the toy elicited infant-directed speech.

Linguistic count analysis revealed that mothers used fewer unique words in pretending, suggesting that repetition is a feature of pretending, and they used more we–us talk, perhaps facilitating joint attention. Mothers also made unrealistic exaggerated motions, like holding the pitcher at a near-vertical angle while pretending to pour.

This experiment also provided novel information by showing that mothers did not vary the majority of their pretend behaviors as children went from 15 months (for most children, prepretending) to 24 months (competently pretending). Although children's pretend engagement increases markedly over this time period, mothers' possible cues to pretense remained fairly constant, with a few exceptions. Mothers turned the pitcher to a more extreme angle when pretending to pour and they held their hands at their mouths for longer while pretending to eat in front of 15-month-olds. This suggests an interest in showing conventionalized gestures more to younger children, who are in earlier stages of learning about pretending. Why mothers do this is not clear, because even somewhat older children do not appear to derive information about pretending from these conventionalized gestures. Mothers also varied the pitch of their voice more for 15- and 24-month-olds than for 18-month-olds. Pitch variation is thought to serve an attention-getting purpose, and thus could assist joint attention. It is unclear why mothers do not use this means of attention getting as much with 18-month-olds in this situation. Mothers also smiled more after their own actions with 18- and 24-month-olds, providing conditions for social referencing. It is interesting that mothers do not smile after pretend acts as much with 15-month-olds, given that children engage in social referencing as early as 12 months of age (Mumme, Fernald, & Herrera, 1996). Perhaps the fact that mothers smile more across both conditions for 15-month-olds provides a clue: Mothers may have been using smiling in this setting more to make 15-month-olds comfortable. The functions of smiles are clearly an interesting issue for more research.

Aside from these few interactions, the overall lack of differences in parent behavior across different ages of children was surprising. Pretending is a prime candidate activity for parental scaffolding (Rogoff, 1990), and many of parents' pretend behaviors seemed aimed at scaffolding (e.g., frequent gaze checking). In other domains, parents do adjust their behavior (Bridges, 1979; DeLoache & DeMendoza, 1987; Gogate, Bahrick, & Watson, 2000; Snow, 1977; Stern, Spieker, Barnett, & MacKain, 1983), but not in the signs of pretense examined here. This suggests that overall, mothers' pretend behaviors were not in response to children's level of engagement or perceived understanding. Instead, mothers were for the most part doing what they do when they pretend to have snacks, regardless of the competence of their audience (within this limited age range).

Finally, this study replicated the associations with child engagement observed by Lillard and Witherington (2004). In particular, children of mothers who had stronger propensities to look and smile at them while pretending participated more in pretense. Interestingly, these behaviors on the part of mothers seemed particularly related to the pretense engagement of children who were more experienced pretenders.

Studies concerning how mothers behave when they pretend have so far only involved pretending to have snacks—a very common activity, but a limited one. An important issue that arises is whether these findings are particular to the very common pretense of having snacks, or might extend to other, less common pretenses, like grooming.

EXPERIMENT 2

Experiment 2 involved a grooming scenario with mothers and their 18-month-olds. Although mothers reported to have engaged in pretend grooming activities with their children before, pretending to groom oneself is less common than is pretending to have snacks (Capatides & Bloom, 1993; Dunn & Dale, 1984; Haight & Miller, 1993), as is probably (for most of us) the real counterpart activity. Parents often invest themselves three or more times each day to teach toddlers to use cups and spoons; less time and attention seem to be given to using washcloths and brushes. Pretend grooming might thus be less scripted than is pretend eating. It was of interest, then, to see if mothers varied their behavior when pretending to groom in the same ways that they varied their behaviors for pretending to eat, and furthermore, whether the set of behaviors that appeared to assist children's engagement in pretend eating also appeared to assist engagement in pretend grooming. If so, it would suggest that what has been described in this work are truly signs of pretending, rather than merely of pretending to have snacks.

As in the previous experiments, mothers were asked to pretend for 2 min, and to do the same things for real for 2 min. Differences in maternal behaviors and associations to children's participation in the scenarios were examined.

Method

Participants—The participants were 37 18-month-old children (M = 78.8 weeks, range = 75–82 weeks; 18 boys) and their mothers. They were predominantly middle-class Whites, with 2 participants of mixed heritage. One additional child was brought into the laboratory but not tested due to fussiness.

Materials—The materials used in the grooming scenario were two sets of colored brushes, face towels, small lotion bottles, and small sponges. In the real condition only, the sponges were wetted with water, and hypoallergenic lotion was put in the lotion bottles. In the pretend condition, the bristles were removed from the brushes. The setup of the room was identical to Experiment 1. For 25 of the participant pairs, the CSL was used as in Experiment 1. For the remaining 12 dyads, an Ascension Technology (Burlington, VT) Flock of Birds motion monitor with software from Innsport Technologies was used to assess the mothers' movements in more precise detail, as in Lillard and Witherington (2004, Experiment 2). This involved attaching small magnets (with Velcro straps) to each mother's wrists, back, and waist. (These two technologies could not be used with the same children, because the motion monitor magnets interfere with the CSL recordings.) Although the sample size was small for the motion monitor, past research suggested it was large enough to pick up on meaningful differences if they existed.

Procedure—The procedure was similar to Experiment 1, except participants were asked to perform (or pretend to perform) four grooming behaviors, just as they might at home: brushing their hair, washing and drying their face, and putting on lotion. The mothers had a small instruction sheet in front of them to remind them of each of the target behaviors. This had not been necessary for snacking, but pilot testing suggested that without instructions most mothers would only engage in a subset of the activities, adding weight to the contention that grooming is less scripted.

Coding

Mother: Verbal coding was exactly as in Experiment 1, except transcripts were coded for references to a different set of absent materials (water, lotion) and to grooming-related behaviors and objects. Mother speech characteristics, smiles, and looks were coded in the

same manner as in the previous experiment. Functional movements included brushing, wiping, drying, pouring, and rubbing. Onset and offset times were coded for each of these behaviors. For brushing, wiping and drying, the number of strokes that occurred during each episode was also recorded. Data from the motion monitor were collected by identifying particular episodes of grooming-related behavior and calculating the displacement of the magnets and peak velocity.

Child: Children's smiles and grooming-related movements were coded for frequencies, and engagement was calculated as in Experiment 1.

Reliability: Trained research assistants blind to the hypotheses of the study coded 20% of the data for reliability. Kappa coefficients were .84 or higher and correlations were above .80. It was not necessary to use a standard protocol method for this study because it involved fewer participants (and therefore coding could be done in much less time, by fewer coders).

Analyses were conducted with repeated measures ANOVAs and Pearson product–moment correlations.

Results

Comfort and Experience—Mothers rated their comfort level on the same scale as in Experiment 1. As indicated in Table 1, the mean was 4.65 or *pretty much like home*. The average experience rating was 3.94 ($SD = 1.09$). Thirty-six mothers (95%) reported that their children had some experience with pretending, and 15 (40%) said they had previously pretended grooming, comparable to the 33% to 66% who in other experiments have reported previous experience with pretend snacks.

As in Experiment 1, mother behaviors were analyzed for differences across pretend and real conditions. Additional analyses investigated gender and condition order effects, but they were very rare and not deemed of sufficient interest to report.

Mothers' Behaviors

Smiles: In the grooming scenario, there were no differences in baseline levels of smiling across conditions (see Table 1). The vast majority of the 37 mothers had neutral baseline expressions. There were also no differences in terms of smiling frequency and duration. However, in terms of smile placement, more of mothers' smiles appeared to be about their own actions in the pretend than in the real condition, $F(1, 36) = 4.74$, $p = .04$, $p\eta^2 = .12$ (means are shown in Table 2).

Looks: There were more intervals coded as looks toward the child in the pretend condition than in the real condition, $F(1, 36) = 4.71$, $p = .04$, $p\eta^2 = .12$. The difference in the number of intervals coded as looks to task was not significant. There were also more individual looks to the child tabulated across the 2 min in pretend than in real, $F(1, 36) = 4.47$, $p = .04$, $p\eta^2 = .11$ (see Table 2).

Functional movements: For functional movements, there was a trend toward mothers engaging in more grooming-related actions when pretending than when grooming for real, $F(1, 36) = 2.81$, $p = .10$, $p\eta^2 = .07$ (see Table 2). This was not due to mothers simply being more activated when pretending, because in terms of movement within episodes (e.g., the number of strokes engaged in while brushing hair), there were differences on only one of four measures: Mothers used many more lotion strokes when pretending (real $M = 9.24$, $SD = 10.25$ vs. pretend $M = 19.32$, $SD = 17.61$), $F(1, 36) = 65.58$, $p < .01$, $p\eta^2 = .65$.

Movement speed and displacement: Motion monitor: The lack of differences in the durations of functional movement meant that movements would not be faster unless physical displacements were greater. Initial analyses revealed that physical displacements of the hand during specific movements were similar across conditions. In keeping with this, only one movement (for which physical displacement data were not coded) obtained a faster average peak velocity in pretense: rubbing lotion into one's skin, $M = 0.64$ m/sec ($SD = 0.18$) for pretend, and $M = 0.56$ ($SD = .017$) for real, $F(1, 7) = 5.88$, $p = .05$, $p\eta^2 = .17$.

Speech: When engaged in grooming, mothers spoke an average of about 200 words in each 2-min session, and referred proportionately more often to real or imagined grooming substances (lotion or water) in the pretend condition, $F(1, 36) = 4.32$, $p = .05$, $p\eta^2 = .11$ ($M = 3.65$, $SD = 2.26$ in pretend; $M = 2.70$, $SD = 2.34$ in real). The number of verbs referring to grooming was not significantly different, nor was the number of references to grooming objects present in both conditions (see Table 2). There were no condition differences in numbers of sound effects produced; in fact, mothers rarely produced sound effects when grooming. However, the real condition mean was very much influenced by a single mother who made 10 sound effects while really grooming and none while pretending. Although 20 mothers made no sound effects in either condition, 7 made more in the pretend than in the real condition (ranging from 1–4 more) and just 2 made more in the real condition.

Paralinguistic changes: The CSL revealed no significant differences in the pitch, amplitude, pitch variability, or amplitude variability of mothers' speech across conditions when pretending to groom. This was consistent with lack of findings for 18-month-olds in Experiment 1.

Child Engagement—Children's engagement scores are shown in Table 4. Note that engagement at 18 months in the grooming scenario is about the same as it was at 18 months with the snacking scenario of Experiment 1.

Relations Between Mother Behavior and Child Engagement—Correlations with child engagement were examined between mother variables that either were correlated in prior work, or had shown condition differences in this study. Results are shown in Table 5. Because of the smaller sample size, experience subgroups were not created. However, in this experiment correlations in the real condition between mothers' behavior and children's smiles and grooming-related behaviors were calculated.

First, even though maternal smiles varied little across conditions, child engagement was significantly correlated with two smile-related variables in the pretend condition: the discrete number of smiles, $r(37) = .50$, $p = .001$, and the number of smiles coded as being in reference to the mother's own behaviors, $r(37) = .38$, $p = .01$. The mean duration of smiles showed a trend toward significance, $r(37) = .26$, $p = .06$. Importantly, only one of these relations was significant (or even near significant) in the real condition: frequency of mothers' smiles, $r(37) = .35$, $p = .01$.

A positive association was also found between the number of intervals in which a mother looked predominantly at the child and child engagement in the pretend condition, $r(37) = .31$, $p = .03$. In the real condition, there was no relation between mother looks and child smiles and actions. An association was also found between the number of behaviors a mother enacted and child engagement in the pretend, $r(37) = .39$, $p = .01$, but not the real condition.

Mothers who talked more while pretending had children who indicated somewhat more engagement ($r = .20$), but with $n = 37$, this did not obtain significance—it is reported only

because a similar relation has been seen in other experiments, and no relation was obtained for talking in the real condition. The more mothers used verbs pertaining to their pretend activities, the higher were children's engagement scores, $r(37) = .33$, $p = .02$. Mothers' use of sound effects was also associated with child engagement in this experiment, $r(37) = .55$, $p < .001$, although sound effects were infrequent, so this finding should be regarded cautiously.

Discussion

All in all, the discrepancy across pretend and real was not as strong when grooming, although many of the same general patterns obtained. The reduction in strength may be because pretending to groom oneself is less common than pretending to eat with one's children. The behaviors are therefore less practiced and perhaps because of less practice, they are less accentuated. In addition, behaviors serve multiple functions: Smiling can both mean that one is being silly and that one should feel comfortable, among other things. A less common scenario like grooming might inspire more of certain behaviors like smiles and talk in the real condition, making some pretend–real differences less accentuated.

Despite their being less accentuated, several significant condition differences in the grooming scenario replicated those found for snacking. Mothers still looked more at children when pretending, both in terms of looking longer overall and checking them more with individual looks; they made more references to the imaginary substances, lotion and water, than to their real counterparts; they engaged in more grooming-related actions when pretending; and they smiled proportionately more with reference to their own behaviors.

Especially in the face of the relatively diminished strength of pretend–real condition differences, the strength of the associations between maternal pretend behaviors and children's engagement was striking. The findings here replicated very well those findings obtained in prior work, suggesting that specific maternal behaviors do lead young children to engage in pretend activities. Importantly, with one exception, these same maternal behaviors in the real condition did not lead to more child engagement. Two aspects of maternal smiling were uniquely associated with children's pretend engagement: average smile duration and smiling about maternal action (social referencing smiles). Also replicating the prior work, mothers' tendency to look more at their children while pretending was also significantly related to the child's tendency to smile and engage in pretend behaviors. There was also a mild relation to mother's overall amount of talking. These behaviors all serve joint attention and social referencing, discussed later.

There were also interesting differences in the grooming scenario, as opposed to the snacking paradigm used previously. One was that mothers referred proportionately more to the imaginary substances, like lotion, in pretense. Perhaps this was because in a grooming scenario the contents of the bottle and sponge seemed less self-evident than the contents of the pitcher and food bowl in a snack scenario. The finding is against the hypothesis raised for the snacking experiments that mothers did not refer more to juice and Cheerios to avoid upsetting referential relations; they did refer to absent substances more often here. Another difference was that in the snacking scenario mothers had talked proportionately more about the support structures for pretending—the bowls and pitchers, for example—and their pretend actions. This finding did not obtain for grooming. Perhaps mothers labeled the grooming objects and behaviors more in the real condition because the real activity was more novel than was snacking.

Another difference across scenarios was how few sound effects were issued when pretend grooming, indicating that pretend sound effects are not generically delivered to indicate pretense. When snacking, most sound effects were made to mimic eating and drinking,

which normally have a sound. Pouring lotion and washing one's face may be done making no or less sound, so perhaps this is why there were few sound effects for pretend grooming. Sound effects might commonly indicate pretense only for activities that are naturally noisier.

GENERAL DISCUSSION

These experiments replicated and extended Lillard and Witherington (2004) by examining whether mothers adjust their behaviors for children of different ages, and whether the behavioral changes held for another pretense scenario, personal grooming. One striking finding in the first experiment was that mothers made few adjustments to snack behavior when pretending with 15-month-old children—very novice pretenders—as compared with 24-month-old children, who are becoming well versed in pretense. Age differences that were observed were more smiling after mother's own behavior with 18- and 24-month-olds, longer holding of the hand at the mouth when pretend eating with 15- and 18-month-olds, and more pitch variability with 15- and 24-month-olds. This is contrary to mother behavior with young children in many other domains. It suggests that mothers' ways of pretending are canonical and not delivered with partner understanding in mind. Perhaps this is in part because the age range tested was not sufficiently broad. Although our coders observed a wide range in engagement across these ages, the age range was only 9 months. A more stringent test of the canonical nature of pretense behaviors could include play partners of a larger age range.

A striking finding in the second experiment was that although mothers varied their pretense behaviors much less in the less practiced activity of pretend grooming, the relations between particular behaviors in pretense and child engagement were as pronounced or even more pronounced than they were in Experiment 1 and in the prior study (Lillard & Witherington, 2004). Three distinct sets of behavioral variation have emerged across the experiments thus far. The largest effect sizes were found for the durations of movements while engaged in pretend snacks. When pretending to eat, drink, and pour, mothers moved faster and did more. This movement difference extended to one grooming action: Mothers rubbed pretend lotion into their skin using many more motions than they used when rubbing actual lotion in.

Another condition difference that surfaced consistently across all studies, although with effect sizes that varied from large to small, concerned looking. In one way or another (number of looks, or amount of time looking, or both), across ages and scenarios, mothers have their eyes on their children more when they pretend than when they behave for real. The experiments reported here do not inform as to the reason for this increased looking. Looking might be to gauge understanding, but the lack of maternal behavioral changes as children age is against this. A second potential reason, which we favor, is to better capture and sustain the child's joint attention.

A third set of behavioral differences across experiments concerned smiles. Effect sizes again varied from large to small across studies, but in every experiment, there was some way in which mothers were smiling more (more frequently or for longer) when pretending than when doing the same things for real. Smiles can communicate many things: one's own happiness or finding of humor, one's embarrassment, one's desire that the recipient feel comfortable, and so on. Discrete analysis of facial musculature reveals many different types of smiles, each with particular purposes (Ekman & Rosenberg, 1997). Recently D. Witherington (personal communication) found that pretend smiles in the snack scenario differ from real ones by including more additional facial movements, like eye widening, mouth opening, or brow raising. Thus, in addition to there being more smiles in pretend, the smiles might have distinct features. Whether young children are sensitive to these differences remains to be seen, but clearly mothers smile more when they are pretending. In

addition, they issue more smiles in apparent reference to their own behavior, allowing for social referencing (see Nishida & Lillard, in press).

Looking and smiling also emerged as most significant for children's engagement in pretense, gauged by children's smiling and performing more pretense actions. Across studies, these correlations were generally consistent and medium to large (.23–.58). A less strong but consistent finding was a mild relation between the number of words a mother said during the pretense session and her child's engagement; in these two experiments, references to pretend behaviors were also linked to engagement. These findings might all achieve pertinence in terms of their assisting the achievement of joint attention and social referencing, discussed later.

First, an important issue that arises in this work is whether child engagement (the sum of smiles and scenario-related actions) is an index of understanding in the pretend condition. Certainly it is not in the real condition: Children of the ages tested surely understand that a snack is occurring, and whether they eat and drink could be driven by hunger or thirst. However, for the pretend condition, Lillard and Witherington (2004) argued that the sum of smiles and snacking behaviors was a measure of understanding. We believe it is, for two reasons. First is raw observation: Children who simply stare at their mothers and do nothing but look confused while their mothers pretend clearly do not understand, and children who do lots of pretend pouring and eating, smiling all the while, do appear to understand. Second, the data tell the story: The measure is related to children's experience pretending, and to several maternal behaviors to which it is unrelated in the real condition. For these reasons, although clearly not definitive, we think children's smiles and scenario-related acts in the pretend condition go beyond measuring mere engagement, and begin to reflect understanding. We propose that understanding of the pretense scenario is engendered via mother behaviors and at least two skills that children of these ages possess that help them coopt meaning: joint attention and social referencing.

Joint Attention

Coordinated joint attention is a context for communicating meaning (Bakeman & Adamson, 1984). Communicating meaning is especially pertinent in pretense because pretend meaning must often be inferred. Recent work, in fact, suggests that children are particularly apt to engage in symbolic behaviors in joint attention contexts (Adamson, Bakeman, & Deckner, 2004). When pretending, mothers might look often at their children to check that their children are watching at crucial moments, and to time their own actions to those moments, or to respond to infants' looks away by getting their attention in other ways. We hypothesize that increased looking during pretense is a major basis for the creation of joint attention, which then allows the communication of pretend meaning.

Mothers' increased speech and sound effects during pretense snacks are another way that mothers might have attracted infants' attention and communicated meaning. Mothers' more frequent we–us talk in Experiment 1 also suggested an effort to maintain joint attention in pretense. Via these joint attention behaviors, mothers might be attempting to scaffold their children's engagement during pretense episodes, creating situations in which mothers could communicate the meaning of the interaction to young pretenders.

Social Referencing

In addition to mothers' communicating the meaning of pretense actions through joint attention, we believe that mothers also help young children interpret pretense by providing the conditions for children to engage in social referencing. Not only did mothers smile more or for longer when pretending than when snacking for real, but pretend smiles were also

placed at particular points in the behavioral stream, occurring particularly often just after the mother engaged in a pretend act. It appeared that these smiles were about the behavior that just occurred, and essentially served to dub that behavior as silly. In support of this, mother smiling that appeared to be about mother behavior was significantly related to child engagement. Mothers' increased looking at the child, possibly gaze checking, might also serve social referencing, in that mothers might time their smiles to correspond to when the child is looking at them.

Recently, sequential analysis (Bakeman & Quera, 1995) was employed to investigate this hypothesis more carefully (Nishida & Lillard, in press). The sequence mother action–mother smile–child smile, with the child and mother looking at each other throughout, was significantly more likely to occur during pretend snack scenarios than it was during real snacks. Furthermore, the sequence was followed by a child smiling or engaging in snacking behavior significantly more often (as a proportion) in the pretend than in the real condition. Alternative explanations, like affective mirroring (children simply smiled after their mother smiled) and imitation (after the mother acted, the child acted), were not supported by the data. Mothers' placing smiles right after their pretend behaviors appeared to assist child engagement in pretense, but did not appear to impact children's behaviors in similar ways (leading to more smiles or snack-related behaviors) in the real snack condition. This study adds weight to the hypothesis that social referencing may sometimes assist children's interpretation of pretense situations. It also adds weight to the idea that mothers are not simply reacting to children's engagement in pretense, because child behavior specifically followed mother behavior. It is possible that mothers were reacting to some other behavior on the part of the child that led mothers to show more signs of pretense (perhaps a quizzical look, or interest and attention), but children's indications of understanding pretense appeared to follow on mothers' look–act–smile sequences.

In sum, this experiment, coupled with Lillard and Witherington (2004) and Nishida and Lillard (in press), suggests that mothers' behaviors vary in predictable ways when they pretend with toddlers, and that certain of these ways are associated with children apparently understanding, or at least engaging in, the pretense scenario. Specifically, in four experiments thus far, either significantly or as a trend, mothers have used more words in pretense (two experiments), they have referred more to pretense behaviors (three experiments) and objects (two experiments), and they have used more sound effects (three experiments); they have smiled more at baseline (three experiments) and have smiled more often (three experiments) and used longer smiles (three experiments), and more of those smiles appear to be in reference to the mothers' own behaviors (four experiments); they have looked more frequently at the child (three experiments) and have been more often judged to be looking predominantly at the child (four experiments); they have engaged in more scenario-related behaviors (four experiments) and have done at least some of those behaviors faster (four experiments) with the exception of a conventionalized behavior, holding the hand at the mouth longer while pretend eating (seen in all three snack experiments). In addition, of the three experiments examining links to engagement, at least a trend toward a relation has been seen for the number of words mothers spoke (two experiments), the proportion of references to scenario-related behaviors (two experiments), the frequency and duration of smiles and the tendency for smiles to be about the mothers' behaviors (all three experiments, and especially for experienced pretenders), duration and frequency of looking at the child (two experiments), and shorter durations of some movements (which may help more experienced pretenders, and interfere with less experienced ones). These findings constitute novel information about the roots of early pretending, one of humans' first forays into imagined worlds.

Acknowledgments

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TABLE 1

Selected Means, Standard Deviations, and Sample Sizes by Condition and Age Group in Both Experiments

	Experiment 1				Experiment 2			
	15 Month[a]		18 Month[a]		24 Month[a]		18 Month[b]	
Variable	M	SD	M	SD	M	SD	M	SD
Mother comfort	3.70	0.89	4.14	0.81	4.31	0.86	4.65	1.09
Child experience	3.67	2.09	5.00	2.06	5.56	1.34	3.94	1.09
	Pretend	Real	Pretend	Real	Pretend	Real	Pretend	Real
n smiley at baseline	5	1	3	3	15	10	6	6
% smile after own act								
M	31	27	46	13	29	08	18	14
SD	21	21	.22	19	27	13	20	21
Duration hand at mouth:								
Eat (secs)								
M	.56	.34	.47	.35	.42	.36	NA	NA
SD	.25	.15	.24	.12	.24	.16		
Maximum pour angle								
M	128	88	118.7	77.5	113.9	92.7	NA	NA
SD	18.0	9.4	20.1	13.6	16.2	9.3		
SD of pitch								
M	58.1	53.8	57.1	59.3	54.4	51.8	53.62	53.74
SD	9.3	10.5	12.4	10.6	9.5	11.0	3.9	5.1

[a] n = 18.

[b] n = 37.

TABLE 2

Means and Standard Deviations of Mother and Child Behaviors in Both Experiments

| | Experiment 1[a] | | | | | Experiment 2[b] | | | | |
| | Pretend | | Real | | | Pretend | | Real | | |
	M	SD	M	SD	pη²	M	SD	M	SD	pη2
Smile freq	8.46	4.19	5.48	3.30	.39	6.70	4.59	7.68	5.46	.03
Avg smile dur (sec)	2.89	1.70	2.44	1.10	.07	1.52	.68	1.38	.57	.06
% Sm own act	36	24	16	19	.30	18	20	11	14	.12
Looks to child: Intervals	14.89	3.99	11.00	3.99	.42	15.78	3.90	14.46	3.83	.12
Looks to task: Intervals	5.26	3.34	9.15	3.76	.52	7.11	3.50	6.08	4.19	ns
Looks to child: Discrete	28.96	6.39	25.59	6.60	.21	38.38	9.02	38.08	7.39	.11
Looks to task: Discrete	27.13	6.09	24.39	6.61	.15	36.24	9.21	33.60	7.81	.13
No. of actions	12.72	5.88	10.81	4.12	.11	6.30	1.89	5.62	2.15	.07
No. sound effects	9.35	5.77	0.39	0.79	.73	0.43	0.93	0.41	1.71	.00
No. words	162.8	46.86	151.85	48.23	.08	199.03	56.42	204.46	52.52	.03
% of words: Bvrs	2.40	1.77	1.73	1.46	.09	15.43	5.77	14.14	5.61	.07
% of words: Obj	2.31	2.34	1.69	1.29	.07	3.65	2.34	2.70	2.26	.11
Fo (Hz)	247.93	28.93	244.57	28.15		194.88	10.49	192.96	11.87	.05
Amplitude (dB)	51.74	7.02	49.64	6.42	.32	57.05	4.34	56.82	3.65	.01

Note.. L & W refers to Lillard and Witherington 2004. Effect sizes were not published. $p\eta^2$ (partial eta-squared) is a function of Cohen's *d*, and is the measure of effect size used in the present research. See the end of the Methods section for Experiment 1.

[a] *n* = 54.

[b] *n* = 37.

TABLE 3

Mean Durations and Standard Deviations of Snack-Related Functional Movements in Seconds for Experiment 1

| Movement | Duration | | | | | | | |
| | Pretend | | Real | | | | | |
	M	SD	M	SD	n	F	P<	η^2
Eat hold	0.52	0.25	0.35	0.14	46	31.08	.01	.42
Eat aprch	0.57	0.30	0.91	0.39	44	25.24	.01	.38
Drink	2.23	0.80	2.76	0.60	39	13.03	.01	.27
Pour	1.71	0.69	2.23	0.67	42	23.90	.01	.38

TABLE 4

Mean, Standard Deviation, and Range for Child Engagement in the Pretense Condition in Both Experiments

	Experiment 1				Experiment 2
	15 Month[a]	18 Month[a]	24 Month[a]	Average[b]	18 Month[c]
Smile					
M	1.17	2.11	3.61	2.42	2.95
SD	1.65	1.57	2.40	2.20	2.46
Range	0–5	0–5	0–10	1–10	0–9
Behavior					
M	3.50	5.67	6.94	5.42	4.43
SD	3.19	3.61	4.61	3.92	2.48
Range	0–10	0–12	0–16	0–16	0–10
Engagement					
M	4.67	7.78	10.56	7.87	7.38
SD	3.48	4.60	5.87	5.23	4.24
Range	0–11	1–16	2–24	0–24	0–17

[a] n = 18.

[b] n = 54.

[c] n = 37.

TABLE 5

Summary of Correlations Between Various Mother Behaviors and Child Engagement in Experiment 1, Experiment 2, and Lillard & Witherington (2004), Experiment 3.

	Experiment 1		Experiment 2		L&W	
	All[a]	**Experienced Subgroup**[b]	**Pretend**[c]	**Real**[c]	**All**[d]	**Experienced Subgroup**[e]
Look frequency	.24*	.32+	.31*	.15	.31*	.42*
Smile frequency	.28*	.27+	.50*	.35*	.22+	.35*
Smile duration	−.10	.42*	.58*	.14	.23*	.27+
Smile after own act	.25*	.31+	.38*	.12	.19+	.33*
Number of words	.21+	.13	.19	.08	.22+	—
% references to scenario behavior	.28*	.18	.33*	.21	—	—
Shorter drink duration	−.30*	−.42*	NA	NA	.19+	.28+
No. of acts	.02	−.39^	.39*	.17	—	—
No. of sound effects	.12	.02	.55*	.01	—	—

Note. L & W = Lillard & Witherington (2004).

[a]
n = 54.

[b]
n = 27.

[c]
n = 37.

[d]
n = 52.

[e]
n = 28.

*
p .05.

+
.05 < *p* < .10.