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The informative value of emotional expressions: ‘social referencing’ in mother–child pretense

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Abstract

Mothers begin to pretend with their children during the second year, when children still have much to learn about the real world. Although it would be easy to confuse what is pretend with what is real, children at this young age often demonstrate comprehension during pretense situations. It is plausible that social referencing, in which the child uses the mother’s emotional expression as a guide to behavior, might facilitate this emerging knowledge by signaling to the child not to take the pretend situation seriously. Data from 32 pairs of mothers and their 18-month-olds who had engaged in pretend and real snack behaviors were subjected to a sequential analysis to investigate a social referencing interpretation. Consistent with our hypothesis, behaviors suggestive of a baby’s understanding pretense were more likely to follow a specific combination of behaviors consistent with social referencing than other combinations of behaviors. These results provide support for the possibility that children use information obtained through social referencing to assist understanding during pretense interactions.

Introduction

One of the defining features of early childhood is pretend play (Lillard & Witherington, 2004). By $2\frac{1}{2}$ – 3 years of age, most children engage in pretend play regularly. Previous research has shown that children can accurately respond to pretense representations as young as age 2 (Harris & Kavanaugh, 1993), and are knowledgeable of the intention underlying pretense actions by age 3 (Rackoczy, Tomasello & Striano, 2004). However, much earlier – even in their first year – most American children are exposed to pretense by their parents (Farver, 1992; Haight & Miller, 1993; Tamis-LeMonda & Bornstein, 1991). For example, a mother might hold a spoon in front of her child and make it move through the air like an airplane while making sound effects. Surprisingly, children do not usually appear confused by such unusual behaviors (Lillard & Witherington, 2004). And after the pretense episode ends, they do not show evidence of representational abuse, by apparently expecting that all spoons will start flying, and that airplanes can serve as vessels for food (Leslie, 1987). Instead children seem able to differentiate between pretend and real actions. How do children who have so much to learn about the real world begin to understand pretense behavior at this early age?

One possibility is that children are able to use deviant action and content cues, such as the absence of food on the spoon to identify pretense episodes (Lillard & Witherington, 2004). If children relied on these cues, they might interpret pretense as any situation that deviates from their conception of the real world. In our example above, the child might have a representation of spoons as metal objects with a distinct shape that are used to carry food

from a bowl or plate to a person's mouth, and make a curious sound when banged against the table. The mother's use of the spoon as an airplane would not fit the child's representation of the function of spoons, and the child would therefore consider this situation to be pretense. As noted by Lillard and Witherington (2004), if this scenario explained all pretense interpretation and children relied on content and action cues alone, then they would treat every novel action (such as the mother using a spoon to stir) as pretense. However, children rarely make pretense errors! The fact that errors are not common occurrences suggests that deviant cues alone do not indicate pretense.

A second source of information that may aid pretense interpretation is the cues given by the adult pretender. By 18-months of age, children are commonly engaging in social referencing – that is, they use the emotional expression of another as a source of information (Feinman, Roberts, Hsieh, Sawyer & Swanson, 1992). Children might be able to use social referencing to pick up on cues a pretender provides indicating that she or he is pretending. The social referencing phenomenon has been studied in numerous experiments and replicated using several different designs (e.g. Sorce, Emde, Campos & Klinnert, 1985; Feinman *et al.*, 1992; Striano & Rochat, 2000; Moses, Baldwin, Rosicky & Tidball, 2001). Although the literature on social referencing has commonly used strange and/or confusing situations (such as the visual cliff, a black rabbit, or mechanical toys), social referencing may also be seen in situations that are not entirely novel and ambiguous, but slightly 'out-of-the-ordinary'. In a pretense situation, children encounter ambiguous actions that in some important ways do not coincide with their knowledge about the real world. It seems possible that information provided by others, especially their mothers, may help infants to resolve these ambiguities.

Lillard and Witherington (2004) provided evidence that adults might behave differently when pretending in ways that aid children's understanding during pretense situations. They analyzed mothers' behaviors while they pretended to have a snack and really had a snack, and discovered an array of possible cues that children might use in making pretense interpretations. In particular, mothers' emotional expressions varied: they smiled more when pretending, and these smiles lasted longer on average than those in the real condition. Further, mothers' smiles often occurred directly after pretend actions. The placement of these smiles might function as signals for the children, informing them about how to interpret the behavior that just occurred. Children may infer from these smiles that the mother's behaviors were fun and silly, and thus pretense. Mothers also looked more at the child in the pretend condition than in the real condition, which could allow them to time their smiles when they had the children's attention.

Children's understanding of the pretense situation was inferred from their own propensity to smile and engage in the pretend activity. Children who appeared to comprehend the pretend situation were likely to have mothers that looked more at them and smiled more in the pretend condition. The frequency of smiles and the tendency of the mother to smile after her own actions were also associated with pretense understanding for children with previous experience in pretending, as reported by their mothers. Although this was not an ideal measure of pretense understanding, both mothers and research assistants blind to the research hypothesis named these behaviors as indicative of children's comprehension.

Richert and Lillard (2004) also found looking behavior to be important in assessing pretense situations. Pre-schoolers, elementary school students, and adults watched short clips of mothers from the Lillard and Witherington study (2004) and were asked to judge whether the mothers were pretending or acting for real. The results indicated that mothers' looks to the child and mistimed actions (e.g. shorter drinking actions, longer holding actions for eating), another consistent pretend behavior, were particularly salient in the video clips that were most often accurately identified as pretense. This study provides additional support for

use of mothers' looking behaviors as a cue to identify pretense, although surprisingly there was not a significant relationship between smiles and pretense judgments. It is possible that smiling was not a cue in this videotape study because smiles often occur after pretense behavior, and clips were chosen to show only behaviors and not their aftermath. Thus it is possible that these clips were not long enough to capture the smiles that usually occur in mother–child pretense situations.

In sum, previous researchers have found an association between pretender looking and smiling after pretense actions and children's accurate interpretations of pretense. The pattern of looking, smiling, and acting seen in pretense episodes, coupled with children's growing social cognitive capabilities, suggests the possibility that pretense understanding might be aided by the process of social referencing. A more in-depth analysis of the relation between specific pretense behaviors and children's accurate interpretations of pretense could offer insight into the sequence of these events that authors of the previous correlational studies were unable to make.

The current paper uses sequential analysis to investigate specific patterns of mother–child pretense interactions in a more refined manner. It is possible that mothers smile and look more after their children engage in pretense behaviors, or perhaps the mothers are just smiling after the children smile. Sequential analyses will allow us to look at different patterns of behaviors and investigate the specific behaviors or sequences of behaviors that lead to children's accurate pretense interpretations. We hypothesized that young children might use mothers' affective messages to interpret pretense behaviors as amusing and playful. Social referencing could thus lead to children's pretense understanding. We predicted that social referencing sequences of behaviors would occur more often in the ambiguous pretend situation than in the real snack situation.

Two alternative possibilities are also considered as viable interpretations. First of all, children may be simply imitating their mothers' actions without any regard to the situation. A second alternative is that children could be smiling in response to their mothers' smiles only, not the entire behavior sequence. In order to account for these possibilities we compared the frequency of the social referencing sequence of behaviors with alternative sequences representative of imitation or affective mirroring. We hypothesized that the social referencing sequence would occur more often than other sequences of behaviors in the pretend condition.

Method

Participants

The data used in this study were from Lillard and Witherington (2004, Experiment 1). Three mother–child pairs from the original study were excluded due to insufficient overlap of the mother and child videos after they were synchronized. An additional pair was excluded because the child was playing with a toy during part of the session. The final sample consisted of 32 mothers and their 18-month-old children (16 girls, $M = 77.8$ weeks; range 76.1–79.7). Families were recruited from a database of birth announcements from the surrounding area. The sample was predominantly white, with five children of mixed ethnicity.

Materials and procedure

The props used during the snack scenario were matching red or blue cups and bowls, a metal serving bowl and pitcher, and a napkin. Cheerios and juice were used in the real condition. Mothers and their children participated in both the pretend and real conditions. The mother–child pairs sat across from each other at a table and were either initially asked to have a

snack or to pretend to have a snack of Cheerios and juice with their children. The behaviors of the mother and child were recorded on video cameras. Data collection for the pretend and real conditions lasted approximately 2 minutes. Additional details about the materials and procedure are available in Lillard and Witherington (2004).

Coding

The videotapes of the mother–child pairs were coded for the behaviors described below. Prior to coding, the videotapes were synchronized at a specific start time in order to construct sequences from both the mother and child tapes. Twenty percent of the sessions were coded for reliability by a blind coder. The details of the coding and reliability are in Lillard and Witherington (2004).

Mothers' behaviors—In order to test the hypothesis that social referencing facilitates pretense comprehension, we identified specific behaviors of the mothers and children that are present in social referencing sequences. Onset and offset times for each individual smile, look, and snack-related functional movement (behavior associated with the snack scenario: drinking, eating, pouring, serving, and wiping) were coded for each mother. Each look was also categorized as directed toward the child, task or something else.

Children's behaviors—Videotapes of the children were coded for smiles, laughs, and snack-related actions. Because we were interested in the frequency and onset of these events, only onset times were recorded. The frequencies of these three behaviors in the pretense condition were summed to form 'baby understanding', a measure of apparent understanding of pretense (consistent with Lillard & Witherington, 2004). However, since only one child was recorded as laughing in the pretend condition, we did not include laughs in our analyses. In order to make comparisons between the pretend and real conditions, an analogous score was calculated for the real condition. Although children's real snack-related actions and smiles do not necessarily indicate an understanding of the situation, we refer to the measure as baby understanding for ease of interpretation. Looks were not coded because it was difficult to distinguish whether children were looking at the mother's face or the action she was performing (e.g. drinking/eating). Most children appeared to be predominantly looking at the mother for the duration of the session.

Analyses

To assess the validity of our hypothesis that social referencing occurs in pretense situations, we performed a sequential analysis using Bakeman and Quera's (1995) GSEQ statistical program. This program allows one to analyze different sequences of behaviors and compare their frequencies. We reasoned that if social referencing is used by children to understand pretense, then a sequence of behaviors consistent with social referencing is more likely to precede baby's reactions that indicate pretense understanding, and should occur more frequently in the pretense condition than in the real condition. Figure 1 depicts the three main sequences of behaviors examined in this analysis: social referencing, imitation, and affective mirroring.

The 'social referencing' sequence was specified as follows: the mother performs a snack-related action, looks at the child, smiles, then the child smiles or performs a snack-related action. Although the phenomenon of social referencing typically consists of the child's behavioral response to the mother's emotional expression, for the purposes of these analyses, the behaviors of the mother and child that contribute to this sequence are assessed separately. Specifically, the mothers' 'social referencing' sequence of behaviors (perform action-look-smile) was compared to other sequences in order to determine which sequence was likely to be followed by children's indications of pretense understanding.

We assessed two sequences that could potentially account for children's smiles and actions to ensure that the children were not simply imitating the behaviors or expressions of the mothers. A sequence indicative of imitation was defined as a snack-related act by the mother followed by any snack-related action by the child. Affective mirroring consisted of sequences including a mother's smile followed by a child's smile, except for those already specified as 'social referencing'. We also compared the 'social referencing' sequence to different combinations of the same behaviors (e.g. mother looks at child, then performs action without smiling) in order to determine if it was a subset of the 'social referencing' combination that was driving any association with baby understanding.

For each sequence of behaviors, we created a script in the GSEQ program that found particular streams of behaviors within a specified time period. Specifically, each behavior had to follow the preceding behavior within a 1-second time frame to be included in the analysis. One-second windows were used because they were long enough to capture naturally occurring patterns of behaviors, but were short enough so that few random sequences of behaviors would be included. For example, for the imitation sequences, all mother snack-related actions followed by child snack-related actions within a 1-second window were included as sequences. Therefore, sequences in which the child acted then the mother acted, or the child acted five seconds after the mother acted, would not be registered by the program.

The GSEQ program conducts sequential analyses by generating frequencies of the specified sequences. Expected frequencies for each sequence are estimated based on the number of occurrences of each individual behavior within the data set. Thus, sequences with commonly occurring behaviors would have a higher expected frequency than sequences with rare behaviors. The expected frequencies were compared to the actual observed frequencies of behaviors using a chi-square test. Because chi-square values are influenced by the number of times each behavior occurred, standardized estimates of the chi-square coefficients were derived by dividing the chi-square statistic by the total number of target events (the target event was the child's behaviors). These values were then assessed to make comparisons between and within conditions (larger values indicate larger relative chi-square values, a more significant finding).

Results

Our analyses consisted of a series of comparisons within and between conditions. The frequency of the 'social referencing' sequence was compared with other sequences of behaviors within each condition to see if social referencing was more likely to occur than were sequences suggestive of imitation or affective mirroring in the pretend condition. Sequences were also compared across the real and pretend conditions in order to determine if the patterns of behavior we observed are unique to pretense situations or simply reflective of mother-child interactions more generally. The analyses indicated that the sequence of mother-child behaviors indicative of social referencing occurred more often than other sequences of behaviors that reflect alternative interpretations only in the pretend condition. Additionally, the 'social referencing' sequence was significantly more likely to occur in the pretend condition than were other sequences of the component 'social referencing' behaviors.¹ The means and standard deviations for each of the main sequences are shown in Table 1. Below I first discuss the real condition in order to provide an estimation of baseline

¹The multiple analyses run with different combinations of the 'social referencing' sequence of behaviors were not significant in comparison with the 'social referencing' sequence. The results are not included in this paper due to space constraints. For more information please contact the first author.

rates of behavior. Next, the pretend condition will be evaluated and compared to the results of the real condition.

Real condition

During snack episodes, mothers and children were unlikely to engage in the target ‘social referencing’ sequence of behavior. Table 2 shows the results of the real condition. There were 22 such sequences of maternal behaviors followed by child smiles and acts, which is not significantly different from what would be expected given the observed frequencies of individual behaviors in this scenario ($\eta^2 = .06$, $df = 1$ (all chi-square tests used one degree of freedom), ns, standardized (STD) $\eta^2 = .0002$). Imitation ($\eta^2 = 1.17$, ns, STD $\eta^2 = .005$) and affective mirroring sequences ($\eta^2 = .49$, ns, STD $\eta^2 = .006$) also occurred at expected frequencies. These results suggest that mothers and children were not performing a substantial number of social referencing, imitation, and affective mirroring sequences during real snacks.

Pretend condition

The results for the pretend condition are shown in Table 3. When mothers and their children were pretending to have a snack, 51 behavior sequences consistent with social referencing were followed by a behavior suggesting baby understanding. This was significantly more than would be expected given the relative frequencies of the component behaviors ($\eta^2 = 4.37$, $p < .05$, STD $\eta^2 = .02$). In contrast, the 47 instances of imitation ($\eta^2 = .88$, ns, STD $\eta^2 = .005$) and 15 of affective mirroring ($\eta^2 = .55$, ns, STD $\eta^2 = .008$) were not significantly different from expectations.

The standardized chi-square coefficients were used to compare the frequency of different sequences of behaviors. Social referencing sequences followed by baby understanding were more likely to happen than either imitation or affective mirroring (STD η^2 values = .02, .005, .008, respectively). Other sequences of the social referencing behaviors were also examined (such as mother smile, look, and then perform an action), but occurred significantly less often than the ‘social referencing’ sequence.

Additional analyses were run to investigate the different child behaviors included in our measure of baby understanding: baby smiles and snack-related actions (e.g. pretend eating and drinking). Since we used a composite measure in our analyses, we wanted to determine if both behaviors (smiles and actions) followed social referencing, or if the results were being driven by only one of the infant’s responses. The results indicate the latter conclusion: 18-month-old children were significantly more likely to smile than perform an action, after the ‘social referencing’ sequences of mothers’ behaviors (baby smile only $\eta^2 = 16.22$, $p < .001$, STD $\eta^2 = .24$).

Comparison across conditions

Figure 2 shows the standardized chi-square values for different sequences of behaviors for the pretend and real conditions. Social referencing followed by baby understanding did occur at a significantly higher frequency in the pretend condition (STD $\eta^2 = .02$) than in the real condition (STD $\eta^2 = .0002$). In comparison, imitation and affective mirroring did not occur more than expected in either the pretend (STD $\eta^2 = .005$, .008, respectively) or real conditions (STD $\eta^2 = .005$, .006). Thus, our results indicate that social referencing sequences are more likely to occur in pretend episodes than in real episodes, and outnumber instances of imitation or affective mirroring, especially in the pretend condition.

Discussion

Children use their developing social cognitive skills to learn about pretend play. In an ambiguous situation where their mother is eating and drinking out of empty vessels, 18-month-old children use the emotional expression of their mother to interpret her unusual actions. Using sequential analysis, we examined whether children and mothers engage in behaviors consistent with social referencing during pretense episodes. We compared different sequences of behaviors, and sequential analyses revealed that behaviors suggesting children comprehend pretense are significantly more likely to follow what we term a 'social referencing' sequence of behaviors than the other combinations of behaviors we examined. Consistent with our hypothesis, there were more 'social referencing' sequences in the pretend than in the real conditions. Importantly, these sequences could not be explained as imitation or affective mirroring. These findings support our hypothesis that social referencing may influence children's behaviors during pretense situations. The finding that the children did not smile and act whenever their mothers smiled or acted also provides validation of the use of the baby understanding measure as indicative of pretense knowledge. Children appear to be using their mothers' affective expressions as a guide to their subsequent behavior in early pretense situations.

The results of this study suggest that children may use their mother's positive emotional expressions about pretense actions to infer information about the pretense scenario. Thus, social referencing occurs in slightly 'out-of the ordinary' situations, not just those that are ambiguous or threatening to children. It is of interest that children at this young age were not just responding to their mother's behaviors or smiles with imitation, but were instead responding to specific sequences of behaviors that signaled crucial information about the scenario.

'Social referencing' sequences were especially likely to be followed by children's smiles only. It is possible that the large numbers of smiles are representative of a developing concept of pretend. Children's smiles after their mothers' behaviors might be indicative of an implicit understanding of the pretense act. Perhaps most children did form opinions about the ambiguous pretense situation, but were not able to actively express this knowledge through overt actions. Children's smiles might signal their appreciation of the mothers' pretense actions, and their lack of confusion at the ambiguous events taking place in front of them. It seems plausible that by 18 months of age, children have an implicit knowledge of pretense situations, and are beginning to develop the means to express this knowledge explicitly through actions.

It is important to note that our definition of social referencing varies from the conventional notion of social referencing found in the literature. Typically, social referencing is gauged when the child actively looks toward another person and uses the information conveyed in their emotional expression to guide subsequent behavior. In this study we were unable to determine where the child was looking when the mother engaged in 'social referencing' sequences of behavior. It is possible that children were not actively referencing the mother, or missed seeing her emotional cues. However, our videotapes indicate that for the duration of the session children were continuously monitoring their mother and her actions, looking back and forth between the two, an indication that the children were engaging in referencing behaviors. Mothers also looked more at their children in the pretend condition, perhaps to make sure the children were paying attention to their silly behaviors. Thus, it seems reasonable to infer that social referencing episodes did take place.

This is the first study that assessed the possibility that social referencing occurs in pretense interactions. Future research should investigate if these results generalize to other pretense

situations. In our study, all that differed between the pretend and real condition was the presence or absence of juice and Cheerios. In situations that might be even more confusing, it is possible that social referencing would be even more likely to occur. Additional studies should also assess the social referencing interpretation using different ages. Infants can engage in social referencing by 11–12 months; thus it is possible that children could use mothers' emotional cues in pretense situations earlier than we investigated. However, because spontaneous pretend play does not appear until much later it is also plausible that young infants need more time to develop their emerging social cognitive skills.

Mothers may also convey affective messages through other modalities besides facial expressions. In a recent examination of social referencing, Vaish and Striano (2004) found that vocal cues were more effective than facial cues in eliciting reactions from children. In the present study, vocalizations by the mother were not assessed as behavioral cues. However, in face-to-face interactions, facial cues may be just as effective as vocal cues in conveying information. Future research should examine different types of affective messages that mothers may convey in pretense situations and their effectiveness.

Although social referencing is typically conceived of as a phenomenon that occurs during novel or ambiguous situations, the results of this study demonstrate that social referencing also occurs during slightly 'out-of-the-ordinary' scenarios. During a pretend snack episode, instead of merely imitating their mothers' behaviors or expressions, children primarily responded to maternal 'social referencing' sequences. This study presents preliminary evidence that social referencing may occur during pretense episodes, and even may lead to young children's understanding of these situations.

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Figure 1.

Three models of possible sequences of mother and child behaviors: (A) Social referencing, (B) Imitation and (C) Affective mirroring.

Figure 2. Comparisons of standardized chi-square values for different sequences of behaviors in the pretend and real conditions.

Table 1

Means and standard deviations for occurrences of pretend and real sequences

	Pretend				Real		
	Social referencing sequence	Social referencing sequence with baby smile only	Affective mirroring	Imitation	Social referencing sequence	Affective mirroring	Imitation
Mean	1.65	0.81	0.45	1.48	0.71	0.39	2.35
St Dev.	1.62	1.11	0.81	1.95	0.94	0.72	1.43

Social referencing sequence: Mother action→Mother look→Mother smile→Baby understanding.

Affective mirroring sequence: Mother smile→Baby smile.

Imitation: Mother action→Baby action.

Table 2

Sequence of behaviors in real situations

Model	Total observed	Total expected	Chi-square	Significant	Standardized chi-square
Social referencing	22	20.9	0.06	ns	0.0002
Imitation	74	83.9	1.17	ns	0.005
Affective mirroring	12	9.8	0.49	ns	0.006

Table 3

Sequences of behaviors in pretend situations

Model	Total observed	Total expected	Chi-square	Significant	Standardized chi-square
Social referencing	51	38.1	4.37	$p < .05$	0.02
Imitation	47	53.9	0.88	ns	0.005
Affective mirroring	15	12.4	0.55	ns	0.008
Social referencing Baby smile only	25	11.4	16.22	$p < .001$	0.24