

## CHAPTER 10

### *Parent-Child Play*

#### *Descriptions and Implications*

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### Peekaboo across Cultures: How Mothers and Infants Play with Voices, Faces, and Expectations

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#### **Introduction**

A young mother catches her nine-month-old infant's gaze, smiles at him, and brings her hands slowly up and together to cover her eyes. "Uphi? Uphi?" ("Where? Where?") she asks brightly, with high rising pitch. The baby stares transfixed at his mother's hands, a small smile of anticipation beginning to spread on his face as the suspense builds over three seconds. "Na-a-a-a-n ku!" ("Here!") exclaims the mother, uncovering her eyes on the "ku!" and grinning broadly at her son, who shows his pleasure with hearty laughter. The language is Xhosa, a Bantu click language, and the scene is a mud-walled hut in a rural village in the Ciskei homeland of South Africa. Worlds away in a Tokyo apartment, a Japanese mother plays out the same little drama with her twelve-month-old daughter. She covers her eyes with a cloth, then chants "Inai inai ba!" as she pulls the cloth away to reveal her face to the delighted child. The words and the vocal melody of the game are different in Xhosa and Japanese, but the rhythm, dynamics, and shared pleasure in the inevitable outcome are fundamentally similar.

The peekaboo game as played by American mothers and infants has been studied from a variety of theoretical and empirical perspectives. Observers with a psychoanalytical bent have speculated that playing peekaboo helps the infant to master anxiety aroused when the mother disappears (e.g., Call and Marschak 1966; Klee-man 1967). Experimental psychologists have manipulated the degree of response uncertainty and contingency within the peekaboo

game in order to study the development of attention and learning in infancy (Charlesworth 1966; Millar 1988; Parrot and Gleitman 1989). Other psychologists interested in early social development have focused on the power of the peekaboo game to elicit smiling and laughter (Sroufe and Waters 1976; Washburn 1929), and on infants' responsiveness to peekaboo as a possible precursor to humor (e.g., Schulz 1976). Peekaboo has also been considered as a prototypical social routine which may facilitate language acquisition, by giving preverbal infants valuable experience with complex rule structures and role reversibility (Bruner and Sherwood 1976; Ratner and Bruner 1978).

It is often simply asserted that some version of the peekaboo game is "universal" (e.g., Bruner and Sherwood 1976; Kleeman 1967), although no evidence is cited to support this claim. Given the impressive range of developmental angles from which peekaboo has been studied, there is surprisingly little cross-cultural data available on this and other highly engaging mother-infant games. Occasional references to games resembling peekaboo are found in anthropological reports of mother-infant interaction in non-Western cultures (e.g., Martini and Kirkpatrick 1981), although the actions and vocalizations involved in these games are rarely specified. Our goal in this chapter is to explore the common features of peekaboo across a number of diverse cultures. We will start by describing and comparing the gestures and vocalizations accompanying the peekaboo game in seventeen cultures, based on new observational and interview data. We will then review previous observational and experimental research findings on peekaboo from the literature on American and European mothers and infants, in order to understand why the peekaboo game looks and sounds so similar across cultures, and why, for both mothers and infants, this game is a source of universal delight.

### Peekaboo Vocalizations in American English

Figure 10.1 shows pitch contours derived from vocalizations recorded during three rounds of an American mother's peekaboo game with her eleven-month-old son. In the first round of their familiar routine, the mother covers the infant's head with a diaper, asking "Where's Donnie?" (Figure 10.1a). As the baby eagerly snatches the cloth off his head, his mother exclaims "*There* he is!" Her "*There*" is vividly marked with pitch and a big smile, coinciding with the in-

fant's triumphant removal of the diaper. After three repetitions of the game in this format, mother and infant turn their attention to a picture book, returning to peekaboo ten minutes later. This time the mother initiates the game by holding up the book in front of her face. From behind the book she summons the infant's attention by chanting "p-e-e-e-e-k a-a-a-a" in a low voice, drawing out the vowels dramatically (Figure 10.1b). Donnie looks intently at the book, his eyes bright with expectation. When his mother pops out from her hiding place with a high-pitched "boo!" Donnie squeals with laughter and waves his arms. After two repetitions of this version of the game, the baby pulls the book onto his lap and starts fiddling with the plastic spiral binding. His mother attempts to keep the game going, covering her face now with her hands and peeking out between her fingers to monitor Donnie's attention. "Hey!" she calls, to alert him. His attention lingers on the book in his lap for a second before he looks up. His mother waits until she sees his eyes through her fingers, then drops her hands abruptly with a jaunty "Peekaboo!" (Figure 10.1c). This time Donnie smiles cheerfully but doesn't laugh, returning to poking his finger into the spiral binding of the book. His mother follows this shift in attention, pointing to the duck on the book's cover, and for now the game is over.

The three vocal routines shown in Figure 10.1, all typical variants used in the American English peekaboo game, are similar yet different in revealing ways. All three follow the same basic format: the mother gives an alert call to summon the infant's attention, followed by a high-pitched release call to accompany her reappearance after hiding. However, the words and pitch patterns differ to some extent across the three examples. In Figure 10.1a, the alert call consists of a stylized intonation pattern, "Where's Donnie?" which is very much "part of" the game for this mother and infant. After covering the baby's face, the mother sets the stage for their reunion by using this highly stereotyped question vocalization. Similarly in Figure 10.1b, the first two syllables of "peekaboo" are drawn out and dramatically emphasized in a stereotyped manner. This type of alert call not only recruits the baby's attention, but also enhances the build-up of tension as well as the predictability of the sequence of events. Having played this game hundreds of times before, the infant knows that "p-e-e-e-e-k a-a-a-a" will soon be followed by "boo!" and his mother's smile.

The alert call shown in Figure 10.1c differs from the first two in that it is not a stereotyped vocal pattern. The mother's lively "Hey!" is simply an attention-getting device, not typically part of the game

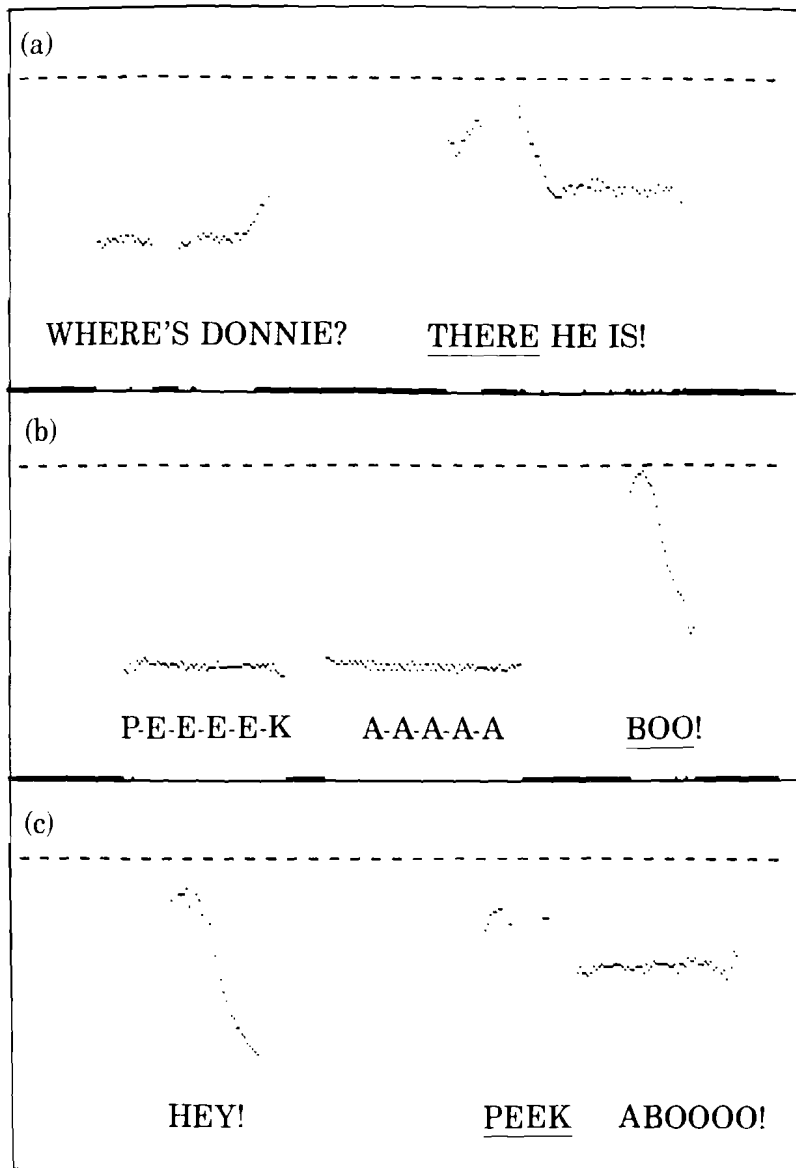


Figure 10.1. Fundamental frequency ( $F_0$ ) contours from vocalizations recorded during three rounds of an American mother's peekaboo game with her eleven-month-old son.

for this particular pair. In this case the baby's interest in the game was waning and the mother had not established eye contact with the infant before hiding. While the elongated and suspenseful "p-e-e-e-e-k" shown in Figure 10.1b is used as part of the build-up, the short, high-pitched "peek" shown in Figure 10.1c is the high point of the release call which marks the mother's reappearance. The variability in these three examples shows that while stereotyped in its overall structure, the peekaboo game is quite flexible in format. The mother varies, within limits, the gestures, words, and melodies, as well as the tempo and dynamics of the game, in order to make each repetition of the familiar routine engaging and slightly different from the last, and to accommodate the fluctuating attention of the infant.

#### A Cross-Cultural Comparison of Peekaboo Vocalizations

The release calls used by mothers playing peekaboo with infants in five other cultures are shown in Figure 10.2. These vocalizations (as well as those shown in Figure 10.1) were recorded in conjunction with a large-scale study of the prosodic characteristics of speech to infants in German, French, Italian, Japanese, and British and American English (Fernald et al. 1989). The subjects in this study were middle-class, monolingual mothers of infants from ten to fourteen months of age, five in each language group, recorded playing with their infants during hour-long observation sessions in the family home. High-quality samples of spontaneous speech were acoustically analyzed using a Visipitch machine (Kay Elemetrics) to extract fundamental frequency ( $F_0$ ), the acoustic correlate of pitch.

The release calls of the peekaboo game in all of these languages are distinctive acoustic signals. When the mother's face suddenly reappears, she marks this climactic moment in the game with a stereotyped vocalization that is either unusually high in pitch or dramatically elongated, or both. In the Italian and Japanese examples in Figure 10.2, the low-pitched alert call is an integral part of the vocal routine, leading up to the high-pitched release. In German, too, the alert call "ku kuck" is stereotyped, anticipating the release on "da!", although in the German game the alert call is high in pitch, while the release is typically low and elongated. The French peekaboo vocalizations resemble those in British and American English, with considerable variability in the format of the alert, followed by a sudden high-pitched release on "cou cou!" However, note

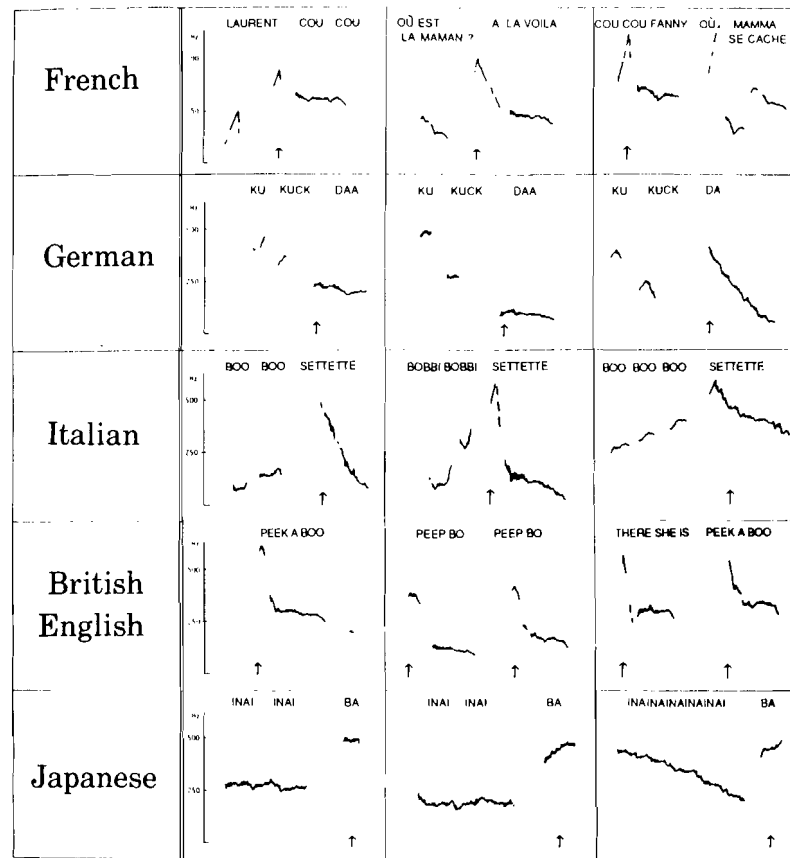


Figure 10.2. Cross-cultural comparison of  $F_0$ -contours from the release calls of peekaboo vocal routines in five languages. Examples are shown from three different mothers interacting with ten- to 14-month-old infants in each language, recorded during naturalistic observations. (Arrows indicate the point in the vocalization when the mother reappears after hiding.)

that even in those vocal routines that include a relatively stereotyped alert call, there is room for variation. Italian mothers alternate between “boo boo” and “bobbi bobbi,” for example. And in Japanese, where the standard format for the alert call is “inai inai,” with each repetition clearly enunciated, mothers also sometimes produce long strings of “inai”s run together rapidly and descending in pitch from high to low over the sequence, as a particularly invigorating variant of the alert.

To supplement our observational data on the peekaboo game in five European cultures and Japan, we collected additional comparative data on hiding-game vocalizations by recording interviews with mothers from several other cultures. The subjects in this informal study were all foreign visitors to the United States who were either mothers or other women experienced with infants. Each was asked whether there was a hiding game like peekaboo in her culture, and how it was played. Subjects were audiorecorded as they described the game and demonstrated the characteristic vocalizations involved, specifying at what points in the vocal pattern the hiding and reappearance occurred. The  $F_0$ -contours from the release calls recorded during these demonstrations are shown in Figure 10.3. The one exception is the Xhosa peekaboo vocalization, which was recorded during extensive field observations of ten mother-infant dyads in South Africa (Fernald and Eisen 1993).

Two common types of prosodic pattern characterize the peekaboo release calls illustrated in Figure 10.3. The first type, shown in the Malaysian, Greek, and Hindi examples, consists of a high, rising pitch contour, abrupt in onset, to mark the mother's reappearance. The three subjects reporting this type of vocal pattern all claimed that there was no stereotyped alert call that was integral to the peekaboo routine in their cultures, although the mother might call the baby's name or vocalize in other salient ways to engage the infant's attention prior to the release call. The second and more prevalent type of prosodic pattern found in the vocalizations illustrated in Figure 10.3 is similar to the pitch patterns in the European and Japanese examples shown in Figure 10.2. These release calls consist of bi- or tri-syllabic vocalizations, generally with high pitch on the first syllable and exaggerated vowel lengthening on the final syllable. In some cases, subjects reported that the mother's reappearance should coincide with the high initial syllable, as shown in the Persian, Russian, and Portuguese examples. In other languages, the reappearance was said to coincide with the emphatic final syllable of the release call, as shown in the Tamil example. It is likely, of course, that in all these languages considerable flexibility is possible in the timing of the mother's reappearance relative to the high and low points of the pitch pattern, just as we found in the American English vocal routines shown in Figure 10.1. The examples illustrated in Figure 10.3 probably represent one popular version of the peekaboo call from each culture, rather than invariant vocal routines.

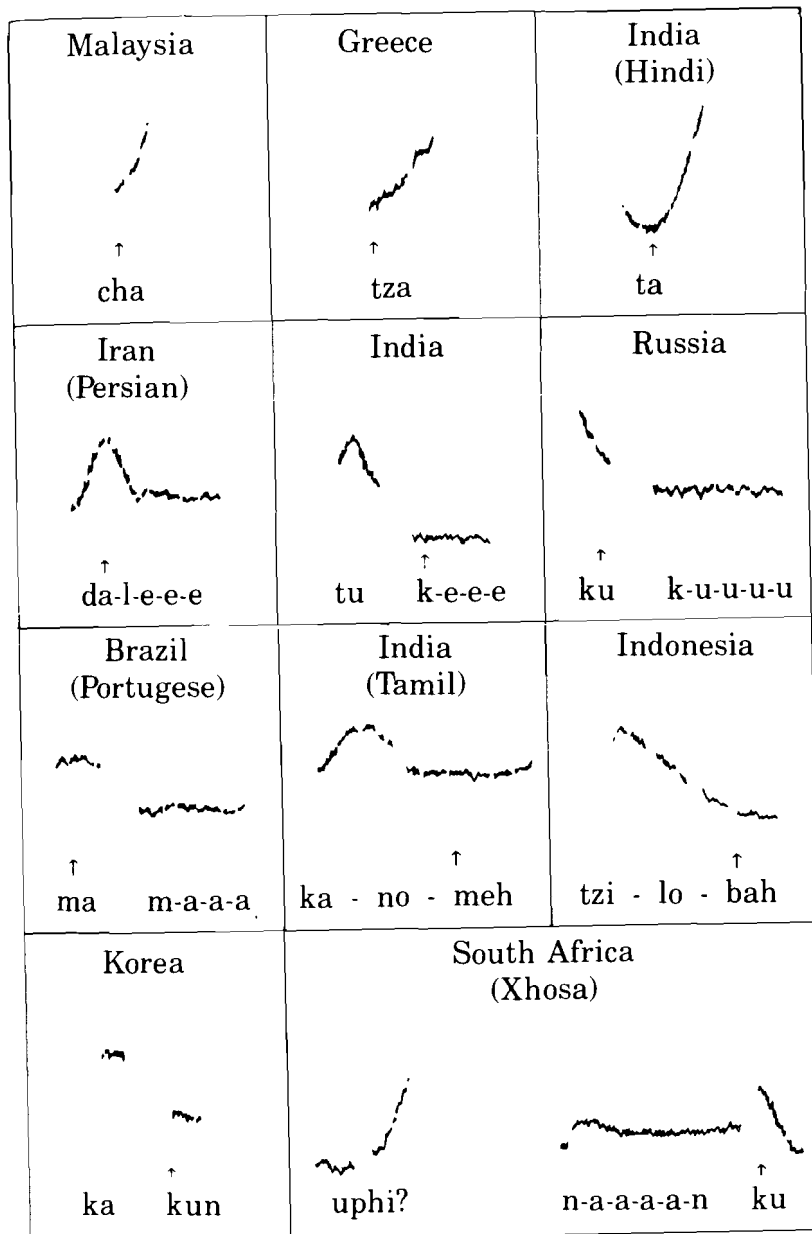


Figure 10.3. Cross-cultural comparison of  $F_0$ -contours from the release calls of peekaboo vocal routines in eleven languages, based on recordings made during interviews. (Arrows indicate the point in the vocalization when the mother reappears after hiding.)

All of the examples of peekaboo vocalizations from the diverse range of Western and non-Western cultures represented in Figures 10.1–10.3 have one critical feature in common: The point in the sequence when the mother reappears is an exhilarating moment, marked by exaggerated and relatively stereotyped vocal and facial gestures. Both within and between cultures, however, several different acoustic cues are used to highlight this culminating moment. A pitch peak signals the mother's return in the majority of the release calls shown in Figures 10.1–10.3, although in some cases, such as German and Tamil, the reappearance is timed to coincide with the low, final note in the sequence. Here the low note is made especially salient through vowel elongation and increased intensity. Variation in vowel quality is another acoustic cue employed to highlight the reunion. In the South African mother's routine, for example, the sustained vowel of "N-a-a-a-n" had a rough and gravelly quality, a kind of playful growling sound used several times by this mother, to her infant's repeated delight.

The "lyrics" of the peekaboo routine are another variable feature of the game. In some languages, for example, Japanese, Korean, and Italian, the standard release call consists of nonsense sounds, while in other languages the words are meaningful. For example, "kanomeh" in Tamil (Figure 10.3) means "where are you," and "da" in German means "there." In Brazilian Portugese, a mother playing peekaboo sings "Ma m-a-a-a" (Figure 10.3), while the father's call is "Pa p-a-a-a." As shown in Figure 10.1, American English release calls alternate between nonsense syllables ("peekaboo") and meaningful words ("there you are"). However, while the lyrics differ in these two American English examples, the melody stays the same. It may well be the case that in other languages too there is semantic variation in the peekaboo release call, perceptually unified through the imposition of a common, stereotyped intonation contour.

### Universal Features of Mother-Infant Games

Is the peekaboo game indeed "universal"? This question can be interpreted in different ways, and must in any case be approached with caution, for two reasons. First, although the data presented here reveal that mothers play hiding games with infants in a number of different cultures, and that these games are very similar in

form, our sample is obviously small. Cultures vary considerably in the extent to which social interaction with infants is viewed as valuable and appropriate. Among the Gusii (Dixon et al. 1977) and the Navajo (Callaghan 1981), for example, mothers spend very little time in face-to-face contact with their infants and talk to them infrequently. Social games like peekaboo are perhaps less likely to be present in the caregiving repertoires of such cultures. Second, even if a traditional form of peekaboo is available in the culture, it may not be practiced extensively. Even in European cultures where peekaboo is widespread, there are notable differences in the frequency of play both between and within groups. In a study of early face-to-face interaction among British and American middle- and working-class mother-infant dyads (Field and Pawlby 1980), differences related both to culture and to socioeconomic status were evident. American mothers played more social games such as peekaboo with their infants than did British mothers, although in both cultures middle-class mothers were more likely than working-class mothers to engage their infants in social games. In another study investigating cultural differences in the frequency of game playing, Snow, de Blauw, and Van Roosmalen (1979) found that peekaboo was a popular activity in their sample of British mothers of six-month-old infants, while Dutch mothers were less likely to play the equivalent Dutch game "Kiekeboe" with infants of the same age.

Although we cannot conclude on the basis of the available data that mother-infant hiding games are universal across cultures, the striking similarities among the peekaboo routines described here suggests that wherever such games *are* found, they will share common structural features and dynamics. As we will argue in later sections, the peekaboo game is effective because it exploits perceptual, attentional, and affective predispositions of the young infant, and because it both engages and accommodates the developing cognitive capabilities of the child. Since such characteristics are common to all human infants in the first year of life, it seems likely that games which engage and appeal to infants in this early period will have universal design features with relatively minor cultural modifications.

A comparative study of mother-infant games in different ethnic groups within the United States offers some valuable insights into features of games that are common across cultures. Van Hoorn (1987) observed immigrant mothers from China ( $n = 20$ ), the Philippines ( $n = 37$ ), and Mexico ( $n = 47$ ), as well as forty-eight U.S. mothers of European descent. These subjects were observed during home

visits as they played games with infants ranging in age from one to eighteen months, and were also interviewed about the types of infant games popular in their culture. Of the 450 games demonstrated or described by the mothers in this study, about 80 percent were traditional games learned from others. Such games invariably involved motor actions such as clapping, swinging, tickling, rocking, and disappearance/reappearance, usually accompanied by words coordinated with the relatively stereotyped action patterns. Mothers typically spoke or sung the words rhythmically, to highlight and entrain the movements in the behavior sequence, as in peekaboo and pat-a-cake. The exaggerated use of repetitive and rhythmic vocal emphasis appeared to help maintain both motoric and affective synchrony between mother and infant during the game. Van Hoorn also observed that mothers conveyed their own pleasure in the game by using exaggerated facial expressions as well as distinctive positive vocalizations, and by maintaining eye contact with the infant as they played together.

What is it about games consisting of exaggerated vocal routines rhythmically timed to accompany simple, repetitive motor activities that is so captivating for young infants? Why do infants enjoy playing these games over and over again, if their rhythms are so familiar and their outcomes so predictable? These questions will be addressed in the following sections, using the peekaboo game as an example. Although almost all of the research on peekaboo is based on the American English version of the game, we can draw on this literature for insights into the widespread appeal of peekaboo and other social games played by mothers and infants across cultures.

### **How the Peekaboo Game Develops Over the First Year**

Disappearance and reappearance are central to the peekaboo game in all its forms. But when mothers play peekaboo with their infants at the age of four, eight, and twelve months, and well into the second year, they are not repeating the same routine over and over again. The nature of the game changes dramatically over the first year, as the infant develops from being a relatively passive observer to becoming an active initiator and innovator in the game. In the earliest versions of peekaboo, the infant is an enraptured spectator, smiling in response to the mother's antics. Gradually the infant comes to predict what will happen next in the familiar sequence, smiling now in anticipation of the climactic reappearance of the mother's face.

And by the end of the first year, the child begins to take the lead, initiating the game, embellishing the moves, and alternating with the mother in the roles of actor and audience.

Beginning when the infant is about three to five months old, the mother introduces an early form of peekaboo simply by moving her face in and out of the infant's view in various ways. She may present her full face to the infant, look to the side or down, and then, with an exaggerated expression present her face again (Stern 1977). Or, she may present her face up close to get the baby's attention, pull her head back about three feet, and then "loom" toward the infant until their faces almost touch. This looming is accompanied by an arousing vocalization such as "Ahhhh boo!" similar to the release calls shown in Figure 10.1 (Bruner and Sherwood 1976; Snow et al. 1979; Stern 1977), and elicits smiling and laughter in very young infants (Washburn 1929).

At about five to eight months, this early looming routine is replaced by the more prototypical version of the peekaboo game, consisting of three steps in a relatively fixed order: (1) establishing mutual attention; (2) hiding; and (3) uncovering and reappearance (Bruner 1975; Bruner and Sherwood 1976; Greenfield 1972; Ratner and Bruner 1978). In these first games of peekaboo proper, as in the looming version of the game, the mother is completely in charge, initiating all three steps in the sequence. To establish mutual attention, the mother uses an alert call, usually during a period of face-to-face interaction. If an object, and not the mother's face, is being hidden, she vocalizes to orient the infant to the object or the hiding instrument. If the mother is hiding herself, she generally hides only her face or eyes and not her whole body, often continuing to vocalize while hiding to maintain the infant's attention (Ross and Kay 1980). The mother may incorporate variation into the game at this stage by changing who or what is hidden, or the nature of the hiding instrument, for example by covering the infant's head with a cloth. The rate of disappearance and the duration of hiding are also sometimes varied by the mother, although only to a limited extent—probably constrained by the infant's short attention span at this age (Bruner and Sherwood 1976; Greenfield 1972). The step of uncovering and reappearance is marked by a release call, after which the mother reappears either quickly or slowly (Ratner and Bruner 1978).

Between eight or nine months and fifteen months, the game of peekaboo changes again, as the infant begins to initiate the steps in the game and assumes the role of agent as well as observer in the

hiding and reappearance. One of the most striking developments during this period is in infants' increasing ability to reverse roles towards the end of the first year (Bruner 1975; Bruner and Sherwood 1976; Golinkoff 1983; Gustafson, Green, and West 1979; Rubin and Wolf 1979). While their participation in the game has been mainly passive up to this point, infants gradually begin to take a more active role around the age of eight months, trying to produce the appearance and reappearance effects on their own (Kleeman 1967; Ross and Kay 1980). In a series of detailed observations of the development of peekaboo in one mother-infant pair, Ratner and Bruner (1978) reported that the mother initiated the hiding in 100 percent of the games observed when the infant was between six and eleven months of age, while the infant Richard initiated the hiding in 78 percent of the games observed at fourteen to fifteen months. Another change in the game occurred as Richard became more actively mobile and began hiding himself behind the sofa, reappearing on his own with a smile.

This trend from passive to active participation is not limited only to peekaboo. Observational studies of several mother-infant games show that as infants get older, they more frequently use newly acquired behaviors such as pointing or showing a toy to initiate games with the mother (Green, Gustafson, and West 1980; Gustafson, Green, and West 1979). With four-month-old infants, mothers primarily play games which engage the infant's attention and involve physical stimulation. However, when their infants are eight months old, mothers engage them more in games involving motoric roles that the infants can readily initiate and maintain by themselves (Crawley et al. 1978). These changes in the content and dynamics of peekaboo and other mother-infant games over the first year of life reflect developmental changes in the infant's perceptual, cognitive, and motor abilities. To accommodate these developmental changes, the mother sensitively modifies the nature of the game as well as the roles both she and the infant play.

### **Faces and Voices as Visual and Auditory Stimuli in the Peekaboo Game**

One reason peekaboo is such a captivating game is that faces and voices are particularly compelling stimuli for young infants. Faces are interesting even to the newborn, not yet because of any social significance, but because as visual stimuli they are high in contrast,

rich in contours, and have other visual features which young infants find especially attractive (Fantz and Nevis 1967). By three months of age, infants prefer to look at faces over other equally complex visual stimuli (Dannemiller and Stephens 1988), and they scan the internal features of faces, rather than the external contours which captured their attention as newborns (Haith, Bergman, and Moore 1977). There is also evidence that 3-month-old infants can distinguish the mother's face from unfamiliar female faces (Maurer and Barrera 1981). Looming visual stimuli, in general, have a powerful effect on infants at this age, causing them to raise their arms and move their heads backwards (Bower, Broughton, and Moore 1970). Thus by three to four months of age, when the earliest form of the peekaboo game first appears in the repertoire of mother-infant play routines, infants find the looming face of the mother to be a highly engaging event.

As a form of acoustic stimulation, the exaggerated high-pitched vocal melody which accompanies the peekaboo game is also well designed to capture infants' attention. Several studies have shown that infants prefer to listen to the special infant-directed speech style known as "motherese," characterized by elevated pitch and highly modulated intonation contours (Cooper and Aslin 1990; Fernald 1985; Werker and McLeod 1989), in contrast to the relatively flat intonation of adult-directed speech. The exaggerated pitch contours alone, even without linguistic content, are sufficient to elicit this listening preference for motherese speech in four-month-old infants (Fernald and Kuhl 1987). Further evidence for infants' special attentiveness to motherese speech comes from a study of heart-rate response to infant- and adult-directed pitch contours, showing that four-month-old infants respond with greater cardiac orienting to exaggerated intonation (Fernald and Clarkson 1993).

Infants not only pay more attention to exaggerated pitch contours, they also respond with more positive emotion. Wolff (1963) observed that a high-pitched voice is the most effective elicitor of smiling in very young infants. Two recent studies have found that when listening to highly modulated infant-directed speech, four- to five-month-old infants smile more than when listening to adult-directed speech (Fernald *in press*; Werker and McLeod 1989). When adults listen to content-filtered speech addressed either to infants or adults, they are able to identify the speaker's communicative intent, for example, praise versus prohibition, much more reliably in infant-directed speech (Fernald 1989). This finding suggests that motherese pitch contours may be more distinctive and informative for infants as well. Indeed five-month-old infants respond with

more appropriate affect when listening to infant-directed speech than when listening to adult-directed speech, smiling more to praise vocalizations and showing more negative affect to prohibition vocalizations even in completely unfamiliar languages (Fernald *in press*). Thus it seems likely that the vocal melody in itself, independent of semantic content, is the dimension of infant-directed speech which affects infants' emotions. The fact that infants at this age are able to recognize melodies which have been transposed into a different frequency range (Trehub, Bull, and Thorpe 1984) is further evidence that pitch contour information is accessible to infants. These findings on early auditory processing abilities and preferences suggest that the high-pitched, prosodically exaggerated vocalizations which accompany the peekaboo game are prominent and appealing auditory stimuli for young infants. Moreover, the stereotyped intonation contours of the "peekaboo" melody may in themselves be salient to infants, easily recognizable across variations in semantic content (Fernald 1984; 1992).

Although the visual and auditory components of the peekaboo routine are each compelling stimuli on their own, the combination is even more effective. Auditory stimulation recruits visual attention in young infants (Haith 1980), and when a face is accompanied by a voice, two-month-old infants scan the eyes even more intently than when viewing the face in silence (Haith, Bergman, and Moore 1977). Peekaboo can be played without vocalization, and eight-month-old infants often smile to the silent reappearance of a face (Sroufe and Wunsch 1972). However, in a study of peekaboo with a four-month-old infant, Greenfield (1972) found that vocalization was critical in eliciting a smile the first time the game was played in a new location. Although the infant eventually smiled to the face alone, and the role of vocalization declined over trials, the voice was essential to the success of the game in unfamiliar settings. Games with older infants, including peekaboo, continue to have a strong vocal component accompanying the action. In a study of thirty-six games played by mothers with twelve-month-old infants, Ross and Kay (1980) found that fifteen of the games involved a stereotyped vocalization, repeated on 95 percent of the adult turns. Eleven other games also included a central auditory element, often nonvocal, and in the ten remaining games mothers verbalized on 64 percent of the turns. Thus mothers tend to combine auditory stimulation with visual, tactile, and vestibular stimulation when playing games with infants throughout the first year.

One obvious motivation for combining auditory with other forms of stimulation in mother-infant games is that dynamic, multi-



modal stimulation is much more likely to elicit laughter and smiling in young infants than are visual stimuli alone (Sroufe and Waters 1976). However, Greenfield (1972) suggests another important reason, with special relevance to the peekaboo game. Auditory signals can contribute "informational redundancy" by virtue of two critical design features: First, sounds can help the infant in *spatial* localization, guiding visual attention to the mother's face. And second, sounds can mark and enhance the *temporal* organization of a multimodal event, by imposing "points of articulation" on the continuous flow of visual and other stimuli (Greenfield 1972, p. 296). Thus the alert call in the peekaboo game (see figure 10.1) not only summons the infant's attention to the mother's disappearance, but also gives the infant important information about *where* and *when* to expect the next move in the familiar sequence. The release call which accompanies the mother's reappearance then marks the climax of the game, adding acoustic emphasis to an already exciting visual event.

### The Role of Expectations in the Peekaboo Game

In the earliest games of peekaboo, the three-month-old infant responds directly to the sights and sounds of the mother's playful looming approach. The young infant's pleasure in the game is based on immediate sensory stimulation, not yet influenced by anticipation of things to come. Bruner and Sherwood distinguish this early form of interaction from later rule-governed versions of the game:

... at the outset, peekaboo is not a game in the sense of it being governed by rules and conventions that are in any respect arbitrary. It is, rather, an exploitation by the mother of very strong, preadapted response tendencies in the infant, an exploitation that is rewarded by the child's responsiveness and pleasure (1976, p. 60).

Increasingly, however, the child's pleasure in the game is mediated by expectations about what will happen next, and when and where it will happen. As the infant develops the cognitive competencies needed to predict future events and to compare them to past events, the peekaboo game takes on new dimensions.

The ability to form expectations, and to recognize and appreciate new variations on old familiar themes, begins to develop early

in the first year of life. By the time infants are three months old, they can form simple expectations about where an event will occur in a regular spatiotemporal sequence (Haith, Hazan, and Goodman 1988). Over the next year, infants become able to make increasingly complex predictions about the reappearance of objects that have disappeared (Gopnik 1984). Four-month-old infants understand that objects do not cease to exist when out of sight, although they are unable to act upon this understanding except to register their surprise when their expectations are not met (Baillargeon 1987). One month later, infants predict that an object will reappear when they turn away from it and then turn back towards it, and that an object will reappear after moving behind a screen (Bower, Broughton, and Moore 1971; Charlesworth 1966). By nine months of age, infants begin to search actively for objects that have disappeared, lifting a cloth or looking into a container in their attempts to find a hidden toy (Piaget 1954).

Observational studies of peekaboo suggest that mothers intuitively respect the initial limitations and gradual developments in the infant's grasp of object permanence over the first year. In the looming version of the game played with three-month-old infants, the mother's face is kept continually in the infant's view, and the arousing event consists of her approach from a distance. It is typically not until the infant is about five months old that the mother starts to "disappear" before the infant's eyes during the peekaboo game. And it is not until five to seven months of age that infants first show *anticipatory* looking and smiling during the alert call prior to the mother's reappearance (Charlesworth 1966; Greenfield 1972; Ratner and Bruner 1978). Early games of peekaboo, with their structured format and limited variation, may provide the infant with a forum to test, or to play with, some of these developing notions about the existence, disappearance, and reappearance of objects. Towards the end of the first year, however, the mother lets the infant take the lead, as the child begins to search actively for her when she hides and initiates the uncovering to make her reappear (Bruner and Sherwood 1976; Gustafson et al. 1979).

Infants also begin early to form expectations about more complex social situations, as well as about objects. By four months of age, infants know something about particular face-voice relationships, expecting the mother's face, and not the face of another person, to accompany the mother's voice (Spelke and Cortelou 1981). Young infants also react with negative affect and gaze aversion if the mother interrupts her normal interactive behaviors and as-

sumes a still face (Fogel et al. 1982; Tronick et al. 1978). As they grow older, infants reveal more elaborate expectations about the rules governing social interactions. Ross and Lollis (1987) observed nine- to eighteen-month-old infants in a situation in which the adult playing with them suddenly discontinued her involvement in the game for fifteen seconds. Even nine-month-old infants attempted to keep the interaction going by vocalizing, repeating their own turn, looking repeatedly at the adult, and touching the adult, with older infants using more sophisticated strategies. It is also around this age that infants begin to show signs of having mastered the various steps involved in peekaboo, and of making moves to engage their mothers more fully in the game. One eleven-month-old infant observed by Bruner and Sherwood (1976) stayed hidden and did not uncover her face until the mother said "boo!" showing an awareness of the turn-taking structure of the game. Another fourteen-month-old infant struggled to coordinate his own actions of hiding and reappearance with vocalizations approximating those he had heard his mother use when playing peekaboo. Both of these examples reflect the presence of complex and highly structured expectations developed by the infant in the course of many repetitions of the game.

One way in which infants learn to form expectations is through experiencing contingencies between their own behaviors and subsequent events. Research has shown that infants are sensitive to contingencies very early in life, responding more vigorously when their own behavior makes something interesting happen. For example, two-month-old infants increase their response rates when their leg movements make a mobile rotate (Watson 1972), or when their arm movements trigger an audiovisual display (Alessandri, Sullivan, and Lewis 1990). By three months of age, infants still remember associations between their own behavior and interesting environmental consequences when tested two weeks later (Enright et al. 1983). It is interesting to note that three-month-old infants seem to display an attentional preference for *moderate* contingency over perfect contingency. In an experimental paradigm involving mobiles, infants learned more slowly when the contingency was either low or perfect, with the fastest learning occurring in a situation of moderate contingency (Watson 1979). Watson (1985) concludes that this bias may result because infants experience moderate levels of contingency more often than perfect contingencies in their normal interactions with the world.

A study with older infants suggests that the appreciation of contingencies may change with age, as infants' sense of control and self-efficacy come to play a larger role. Millar (1988) used the peek-

aboo game in an experiment investigating seven- and ten-month-old infants' affective responses to contingency and noncontingency. In Millar's paradigm, the mother appeared from behind a curtained window, remaining for two seconds before the curtain closed again. In the contingent condition, she reappeared whenever the infant pulled a lever; in the noncontingent condition, she reappeared at intervals independent of the infant's behavior. The results showed that seven-month-old infants displayed more positive affect in the noncontingent condition, that is, when the mother always appeared unexpectedly, while ten-month-old infants smiled more when they controlled the mother's reappearance. Millar suggests that smiling in the younger infants may not yet be dependent on the infant's sense of being in control of the situation. For the ten-month-old infants, however, noncontingent events may elicit less positive affect because such events signal lack of control to infants at this age.

Two other studies have used experimental analogues of the peekaboo game to investigate infants' responses to violations of expectation. Charlesworth (1966) varied the location in which an inanimate face reappeared, while Parrot and Gleitman (1989) varied both the location and the identity of a person reappearing from behind a screen. In Charlesworth's study, five- to nineteen-month-old infants were shown a terrycloth face which appeared from behind a screen at two different locations, accompanied by a tape-recorded voice saying "ah... peekaboo." Three experimental conditions varied in the degree of uncertainty as to where the face would appear on each trial. Charlesworth found that even five-month-old infants persisted longest in the condition of highest uncertainty, when the side on which the face would reappear was unpredictable. Infants played the game for fewer trials when the face always appeared on the same side, although the greatest amount of anticipatory looking was observed in this condition. These results suggest that although infants were able to anticipate the location of the face more often in conditions where the face always reappeared in the same place, they persisted in playing the game longer in conditions where there was most uncertainty. However, infants apparently found it reinforcing when an anticipatory look was confirmed by the reappearance of the face. If a confirmed anticipatory look occurred on one trial, there was a significantly greater probability that an anticipatory look would occur on the following trial. It would appear from these findings that infants like to have their expectations in the peekaboo game confirmed, but only if there is some kind of challenge involved. When the game becomes too predictable, infants quickly lose interest.

The findings of the Parrot and Gleitman (1989) study suggest, however, that persistence in playing the game may not be the most appropriate index of infants' engagement. These authors investigated infants' affective responses to violations of expectations about the location and the identity of the person reappearing in the peekaboo game. Six to eight month olds participated in a game which included occasional "trick" trials, where one adult hid and another adult "reappeared" in his or her place, or where the location at which the adult had previously reappeared was suddenly switched. Infants raised their eyebrows more, and smiled less, after both types of trick reappearance, leading Parrott and Gleitman to conclude that infants' enjoyment of the game is generally enhanced by conformity to their expectations.

What can we infer from these diverse findings about how infants' expectations influence their pleasure and engagement in the peekaboo game? The results of these studies are unfortunately difficult to interpret given the particular manipulations used. For example, the negative affect displayed by infants in Parrott and Gleitman's (1989) study does not seem surprising, since a change of identity occurred. In playing peekaboo with a six- or eight-month-old infant, the mother might vary slightly the location at which she reappears, although it is not usually until and child is mobile that variability in location becomes a regular feature of the game. More likely, the mother will vary the duration of hiding or the timing of her reappearance. She will never, however, reappear with a different face. Indeed, the experimental studies as a whole do not seem to capture what Stern (1977) and Bruner (Bruner and Sherwood 1976; Ratner and Bruner 1978) describe as the most fascinating feature of the peekaboo game—the manner in which a mother plays with the *timing* of its constituent features. Both Bruner's and Stern's observations suggest that up until twelve months, the timing of mother's reappearance is the most critical and captivating source of variation in the game. However, no studies to date have described in detail how mothers time their reappearance in relation to alert calls and to the duration of hiding, nor how this temporal variability influences infants' persistence and pleasure in playing the game.

### Changing Sources of Delight in the Peekaboo Game

Changes in the structure and dynamics of the peekaboo game over the first year of life can be partly understood in terms of the infant's

developing perceptual and cognitive abilities, as suggested in the preceding sections. However, these perceptual and cognitive developments are intimately linked to changes in the infant's affective response tendencies over the first year, and it is through affect that the infant shows delight in the game and shares this pleasure with the mother. Research showing that infants smile and laugh for different reasons at different ages offers further insights into the nature of early mother-infant games such as peekaboo.

The first elicited smiles appearing at around one month of age are generally referred to as "social" smiles, because they occur most frequently in response to faces and voices (Wolff 1963). In this early period, smiling derives primarily from *stimulation per se*, rather than from the content of the stimulus. Increasingly, however, smiling is influenced by the infant's *cognitive engagement*, and the infant smiles more readily to "meaningful" stimuli than to stimuli that are merely dynamic and interesting (Sroufe and Wunsch 1972). The development of laughter follows a similar progression from stimulation-produced arousal to cognitively produced arousal. Laughter first occurs in the fourth month in response to vigorous multimodal stimulation, and intense tactile and auditory stimulation remain the most potent means of eliciting laughter in infants up to six months of age. By eight months, however, infants begin to laugh at more subtle visual events involving social stimuli, such as the mother crawling on the floor or shaking her hair (Sroufe and Waters 1976). Such events amuse the infant not because of any pre-emptory sensory qualities, but because they are *discrepant* from expectations the infant has developed about how the mother usually behaves. By the end of the first year, infants laugh most in situations which include some obvious element of cognitive incongruity, and laugh in *anticipation* of arousing events within familiar routines. At this age, infants also laugh heartily during their own attempts to reproduce an incongruous situation. For example, Sroufe and Waters (1976) observed a twelve-month-old infant laughing as his mother appeared with a cloth in her mouth, then laughing even harder as he pulled it out and tried to stuff it back in again. Summarizing this developmental progression, Sroufe and Waters describe the infant's gradual transformation from passive recipient to active participant:

... in the development of both smiling and laughter, the infant's progress is from response to intrusive stimulation and to stimulation mediated by active attention, toward smiling and laughing in

response to stimulus content, and finally toward an ever more active involvement in producing the stimulus itself (1976, p. 179).

This same progression is mirrored in the changing nature of the peekaboo game over the first year. At first the infant is a passive spectator, delighted by the immediate stimulation provided by the mother's looming face and melodic voice. As the infant matures and gains experience with the game, however, expectations come increasingly into play, and the infant begins to take pleasure in subtle variations in the game. As Bruner and Sherwood (1976) point out, the basic rules of appearance and disappearance hold constant, but the potential sources of variation within the standard format are endless: Who or what is hidden; what kind of mask is used; who initiates the uncovering; what vocalizations are used; and how they are timed in relation to the disappearance and reappearance—all of these features of the game can be modified in fascinating ways. And through such minor variations, the mother plays with the expectations of the infant, introducing suspense and playful tension into the familiar routine. For the ten-month-old infant, the mother's face and voice in and of themselves are no longer the primary source of delight in the peekaboo game. Rather the child's pleasure at this age is strongly influenced by how and when and where the mother disappears and reappears. The how and when and where can now be anticipated, which is exciting for the infant, but they are never completely predictable, which makes the game even more exciting. Bruner and Sherwood acknowledge the impressive skill of the mother in maintaining this balance between novelty and predictability, "knowing how to keep the child in an anticipatory mood, neither too sure of outcome nor too upset by a wide range of possibilities" (1976, p. 61). By the end of the first year, the child's pleasure derives more and more from active participation and agency. The cognitive challenge of the peekaboo game has been transformed from that of *predicting* the reappearance of the mother in a routine that incorporates increasing variability to that of *initiating* the hiding and reappearance and making these exciting events happen in the first place.

### Conclusions

The peekaboo game is widespread across cultures, a source of great pleasure for both mothers and infants. Mothers play the game be-

cause it is so effective in eliciting infants' attention and in making them smile and laugh, as long as the game is skillfully modified over time and adapted to the developing abilities and interests of the child. Infants play the game because it engages them perceptually, cognitively, and emotionally, presenting compelling challenges that change continually as the infant changes over the first year. Shultz (1976) has made the interesting observation that mother-infant games often center around potentially threatening actions and events. Watching the mother disappear, being tickled, or being chased, among the most popular activities in infant games across cultures (Van Hoorn 1987), are all events that under other circumstances could be perceived as intrusive and terrifying to an adult. Perhaps the deep and universal appeal of peekaboo is also related to this potential emotional ambiguity in its central theme, as Shultz suggests, as well as to the cognitive challenges the game presents to the developing infant. In any case, cross-cultural research on universals of mother-infant games is a virtually unexplored source of insight into central issues in early human development. The peekaboo game is a microcosm in which we can observe both extraordinary changes in the infant's capacities and dispositions over the first year of life, as well as the parental skills and intuitions which so successfully use play as a means of accommodating and encouraging these developmental changes.

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