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ABSTRACT

Characteristics of maternal responsiveness in interactions between mothers and infants in New York City, Paris, and Tokyo are compared. A total of 72 primiparous mothers and their 5-month-olds were observed at home. Of the dyads, 24 were Caucasian American, 24 Caucasian French, and 24 Oriental Japanese. Observations were conducted in an identical manner in all three cities. Mothers and infants were videotaped in naturalistic interaction for 45 minutes. Target infant behaviors scored were social visual attention, environmental visual attention, nondistress vocalization, and distress vocalization. Mothers' response types were categorized as social, environmental, nurturant, imitative, and other. Only the first response the mother gave after the infant initiated behavior was counted. Findings indicated culture-general and culture-specific patterns of responsiveness. In all cities, mothers and infants manifested a high degree of specificity and mutual appropriateness. Differences in maternal responsiveness among the three cultures tended to occur in regard to infant looking rather than infant vocalizing (i.e., differences between environment response and social response). The most salient difference between East and West involved Japanese and Americans and concerned dyadic versus extradyadic loci of interaction. Discussion focuses on potential sources of cultural variation and implications of differences in responsiveness for child development in different cultural contexts. Citations number 100. (Author/RH)

MATERNAL RESPONSIVENESS TO INFANTS IN THREE SOCIETIES: THE UNITED STATES, FRANCE, AND JAPAN

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Abstract

The present study examines and compares characteristics of maternal responsiveness during home-based naturalistic interactions of mother-infant dyads in New York City, Paris, and Tokyo. Results indicate some culture-general as well as some culture-specific patterns of responsiveness. In all three places, mothers and infants manifested a high degree of specificity and mutual appropriateness: Mothers responded to infants' exploration of the environment with encouragement to the environment, to infants' vocalizing nondistress with imitation, and to infants' vocalizing distress with nurturance. Differences in maternal responsiveness among the three cultures tended to occur to infant looking rather than to infant vocalizing, and the most salient West--East difference involved Japanese and Americans with respect to dyadic versus extradyadic loci of interaction. Potential sources of cultural variation and implications of differences in responsiveness for child development in different cultural contexts are discussed.

MATERNAL RESPONSIVENESS TO INFANTS IN THREE SOCIETIES: THE UNITED STATES, FRANCE, AND JAPAN

Strike while the iron is hot.

Il faut battre le fer quand il est chaud.

鉄は 熱い内に 打て。

Systematic childrearing practices are often credited both with providing experiences that influence the course and outcome of individual development and with contributing to the distinctiveness of cultural style. One type of parenting thought to be so influential is responsiveness. Responsiveness encompasses the contingent and prompt reactions parents often display in interactions with infants and young children (see Ainsworth, Bell, & Stayton, 1974; Bornstein, 1989a; Lewis & Goldberg, 1969; Martin, 1989; Yarrow, Rubenstein, & Pedersen, 1975). Responsiveness has attracted increasing attention from developmental researchers for two reasons. First, it reflects faithfully a recurring and significant three-term event sequence in everyday exchanges between child and parent that involves child act, parent reaction, and effect on child. Second, parents' responsiveness has been found to exert meaningful effects, both concurrently and predictively, over diverse domains of their children's development.

For these reasons, we were motivated to examine characteristics of maternal responsiveness in different societies. As part of parallel longitudinal cross-cultural studies, mother-infant dyads in the United States, France, and Japan were observed at home in naturalistic interactions. This report focuses on responsiveness of mothers as it occurs in New York City, Paris, and Tokyo in relation to two prominent infant activities, visual attention and vocalization. We first review relevant aspects of maternal responsiveness and its effects and then provide a rationale for our specific West--West--East comparison.

Maternal Responsiveness

Maternal responsiveness in infancy normally follows prominent infant signals, such as visual exploration and nondistress vocalizing as well as expressions of vocal distress. Mothers respond in many ways, but predominantly by nurturing, imitating, engaging in affectionate social play, or further stimulating exploration.

Whether the infants are normal, healthy, and term or at-risk preterms, whether they are lower, middle, or upper class, and whether they are U.S. American, Kenyan Embu, or Oriental Japanese, maternal responsiveness in infancy appears to exert quite broad and vigorous positive influences over social and emotional as well as cognitive and communicative development

(e.g., Ainsworth et al., 1974; Beckwith & Cohen, 1989; Bornstein, 1989a; Bradley, 1989; Coates & Lewis, 1984; Crockenberg, 1981, 1983; Goldberg, Lojkasek, Gartner, & Corter, 1989; Lewis & Goldberg, 1969; Rheingold, Gewirtz, & Ross, 1959; Sigman, Neumann, Carter, Cattle, D'Souza, & Bwibo, 1988; Yarrow et al., 1975). This literature establishes the predictive validity of maternal responsiveness in child development.

For example, maternal responsiveness in infancy predicts the growth of cognitive competencies, apart from mothers' spontaneous didactic stimulation as well as stability in infants' own contributions to their cognitive development. In one study, for example, Bornstein and Tamis-LeMonda (1989) found that mothers who were more responsive to their 5-month-olds at home had infants who habituated faster and who gave higher novelty-preference scores in the laboratory. Moreover, maternal responsiveness at 5 months predicted language and play competencies in the same toddlers at 13 months. A related longitudinal assessment aimed to evaluate generalizability of the predictive relation between maternal responsiveness in infancy and later cognitive development by analyzing data from another culture. Bornstein, Miyake, Azuma, Tamis-LeMonda, and Toda (1989-1990) found that Japanese mothers who were more responsive to their infants at 4 to 5 months had toddlers who scored higher on the MCC Baby Test at 1½ years and children who obtained higher PPVT scores at 2½ years, even when early maternal didactic

stimulation, which also predicted children's performance in this sample, was partialled.

The United States, France, and Japan

Critics consistently decry implicit generalizations from the monocultural character of most psychological investigation (e.g., Berry, 1983; Kennedy, Scheirer, & Rogers, 1984; Moghaddam, 1987; Russell, 1984; Segall, 1986; Sexton & Misiak, 1984; Triandis, 1980). Moreover, cross-cultural developmental comparisons, like the direct observations of childrearing pursued in this study, are commonly acknowledged by empiricists and theoreticians alike to be requisite for testing the limits of generalization and for gaining a fuller understanding of developmental processes (see Bornstein, 1980, 1989b, 1991; Brislin, 1983; Bruner, 1989; Kessen, 1983; Lewis & Ban, 1977; Nugent, Lester, & Brazelton, 1989; Piaget, 1966/1974; Super, 1981; Whiting, 1981).

New York City, Paris, and Tokyo represent an especially appealing and potentially informative comparative base on which to investigate specific as well as universal aspects of childrearing practices such as maternal responsiveness. These three locales are much alike in terms of modernity, urbanity, economics, ecology, and climate, and therefore it is possible to obtain roughly equivalent samples from the three. In the three societies of which they are a part, the family is typically nuclear in organization, mother is normally the primary caregiver

in the family setting, and parents share many of the same goals for children, notably educational achievement and economic security.

However, substantial differences exist among the three in terms of history, beliefs, and values associated with childrearing. On this basis, the three societies are thought to have established somewhat different expectations of their peoples, and to differ in the childrearing styles they employ to attain central cultural goals. For example, the American mother is believed to be interested in promoting autonomy in her infant and organizes her interactions so as to foster physical and verbal independence in the child; the French mother is believed to share some of these characteristics and goals, but sees emotional support and psychoaffective security as primary and achievement stimulation as secondary; the Japanese mother is believed to see her infant as an extension of herself and works with her child to consolidate and strengthen a mutual dependence between them (see Befu, 1986; Caudill, 1973; Chen & Miyake, 1986; Clancy, 1986; Clarke, 1985; Dion & Pêcheux, 1989; Doi, 1973; Dolto, 1979; Fogel, Toda, & Kawai, 1988; Gramont, 1969; Hess, Azuma, Kashiwagi, Dickson, Nagano, Holloway, Miyake, Price, Hatano, & McDevitt, 1986; Hoffman, 1963; Kojima, 1986; Lamb & Bornstein, 1987; Maranda, 1974; Métraux & Mead, 1954; Miyake, Chen, & Campos, 1985; Morsbach, 1980; Pomerleau, Malcuit, & Sabatier, 1991; Weisz, Rothbaum, & Blackburn, 1984).

On purely empirical grounds, the U.S.--France--Japan triad contrasts two Western with one Eastern culture, and so creates the possibility of evaluating generalities of childrearing patterns across a controlled diversity of culture. Culture has many dimensions (see Jahoda, 1980; Munroe & Munroe, 1980; Triandis, 1989). Most cross-cultural research is geared to evaluate the distinctiveness of some phenomenon in a setting that is exotic or unique, or to compare samples from contrastive settings in order to maximize the potential of uncovering differences. However, such strategies potentially confound childrearing aspects of culture with other dimensions. The particular Western--Western--Eastern comparison adopted here sets up a direct contrast of childrearing conditions by disentangling them (to the degree possible) from economic and educational, urban-rural, and modern-traditional, as well as ecological and climatic factors.

Studies of naturalistic behavioral similarities and differences in Japanese and American mothers and infants, although initiated more than 20 years ago, are still few; Japan is changing rapidly; and maternal responsiveness, though widely acknowledged as important, has not received attention in this literature (Bornstein, 1989b; Bornstein et al., 1990a, b; Caudill & Weinstein, 1969; Otaki, Durrett, Richards, Nyquist, & Pennebaker, 1986; Sengoku, Davitz, & Davitz, 1982; Shand & Kosawa, 1985a; Stevenson, Azuma, & Hakuta, 1986). Moreover,

direct developmental comparisons between American and French, and between French and Japanese, are rare (see, e.g., Bornstein, Tamis-LeMonda, Pêcheux, & Rahn, 1991; Darnton, 1984; Dolto, 1955; Wolfenstein, 1955).

The Present Study

The chief purpose of the present study was to evaluate cross-cultural specificities and universals of prominent categories of maternal responsiveness in relation to prominent categories of infant activity. In the extant literature, responsiveness has frequently been assessed as a unidimensional attribute of mothers (cf. Martin, 1989). For this cross-cultural study, we partitioned responsiveness and examined various prominent types.

Further, we expected that some types of responsiveness in mothers would be similar and some would vary in the cultures studied relative to the aforementioned cultural goals of parenting. Across this variety of cultural settings, we hypothesized that mothers would not differ substantially in responding to infant distress. Indeed, inasmuch as responsiveness to infant distress is thought to have evolved an adaptive, if not survival, significance for eliciting and maintaining proximity and care, responsiveness to vocal distress may be universal (e.g., Ainsworth, 1973; Bowlby, 1969; Lester & Boukydis, 1991; Murray, 1979). Likewise, we hypothesized that

maternal responsiveness to infant nondistress vocalizing would vary only very little across cultural settings. The joint activity that constitutes social communication takes place in a "format" (Bruner, 1982) universally characterized by a turn-taking constraint (e.g., Papoušek, Papoušek, & Bornstein, 1985; Stern, 1985).

However, on the basis of reported cultural differences in parenting beliefs and goals outlined above, we expected that emphases of maternal responsiveness to other infant nondistress activities would differ in content and form among American, French, and Japanese mothers. Specifically, we expected these different cultures to vary with respect to more discretionary types of maternal responsiveness, as in determining which infant behaviors to respond to and how to respond to them. For example, we hypothesized that American mothers would emphasize environment-oriented responsiveness by incorporating the world outside the dyad into their interactions and that French and Japanese mothers would emphasize responsiveness oriented within the dyad. Each society evolves patterns of childrearing adjusted to its own demands and desires; Sameroff (deVries & Sameroff, 1984), Lerner (Lerner, 1989; Lerner & Lerner, 1983), and Super (Super & Harkness, 1981, 1986) discuss this "Goodness of Fit" perspective on social interaction as applied to development in the context of culture.

The present study focused on maternal responsiveness in middle infancy because of the intentionality and flexibility in behavioral organization that infants demonstrate at this time (Emde, Gaensbauer, & Harmon, 1976; Wolff, 1984). By this age, the baby's scope of apperception includes both the dyad and the surrounding environment, and "conversations" between infants and their mothers have taken on many mature characteristics like turn-taking (Belsky, Gilstrap, & Rovine, 1984; Bornstein & Tamis-LeMonda, 1990; Cohn & Tronick, 1987; Kaye & Fogel, 1980; Stevenson, Ver Hoeve, Roach, & Leavitt, 1986). For the infant, attention and vocalization have served as principal gauges of state of arousal and affect, as well as of perceptual, cognitive, and emotional functioning (Lamb & Bornstein, 1987). These are the most frequent and most prominent behaviors in infants, and those which mothers monitor most closely. For these reasons, we assessed and compared maternal responsiveness to infant attention in the "visual channel," that is to the environment and to mother, and to infant production in the "vocal channel," that is nondistress and distress vocalization.

In New York City, Paris, and Tokyo, responsiveness was observed in mothers interacting normally with their 5-month-old infants in the natural setting of the home. The study was designed to provide information about infant behavior and maternal responsiveness under optimal naturalistic conditions, that is during periods when babies are rested and attending

quietly and alertly and mother and infant are alone at home. Analysis of the data focussed on the patterning of mother and infant behaviors across cultures.

Method

Subjects

In total, 72 primiparous mothers and their 5-month-old infants, recruited from patient populations of private obstetric and pediatric groups in New York City, Paris, and Tokyo, were observed; 24 dyads were Caucasian American, 24 were Caucasian French, and 24 were Oriental Japanese. All infants were term at birth and healthy up to and at the time of the study. Babies in the American, French, and Japanese samples were statistically the same age at the time of the home visits, *M*s = 165, 161, and 163 days, and their mothers were statistically the same age, *M*s = 31, 32, and 29 years, and had similar educational histories, *M* number of years post high school = 4.5, 3.6, and 2.8, all *F*s < 2. The samples were each balanced for sex of baby and came from comparable middle to upper-middle class households.

Home Observation Procedure

Home observations were conducted identically in the three societies. Briefly, mothers were asked to behave in their usual manner and to disregard the observer's presence insofar as

possible; beside the observer, only mother and baby were prese
and observations took place at times of the day that were optimal
in terms of individual babies being in awake and alert states (

). A female observer, always a native of the country, visited the home to conduct the observation. After a period of acclimation, mothers and infants were videotaped in naturalistic interaction for 45 minutes.

Measurement of Infant Activity and Maternal Responsiveness

Every occurrence of four target infant activities and five types of maternal responsiveness was scored from videotapes. Target infant activities included: (1) social visual attention (infant looks at mother's face); (2) environmental visual attention (infant looks at a property, object, or event in the environment); (3) nondistress vocalization (excluding bodily vegetative, grunts, and effort sounds); and (4) distress vocalization. These infant activities were scored in two modes (i.e., groups of mutually exclusive and exhaustive behaviors) using a computer-based coding system on two separate passes through the videotapes. The two modes consisted, respectively, of looking (social, environment, and looking elsewhere, blank staring, or not looking) and vocalizing (nondistress, distress, and bodily sounds or silence). Coders used preprogrammed computers to record the onset of each infant look and

vocalization behavior. For data reduction, computers were programmed to define a vocalization as lasting a minimum of .3 second, and to credit the infant with a second vocalization if a vocalization change or silence of 2 seconds or more were recorded; a look was defined as lasting a minimum of .3 second, and the infant was credited with a new look if the infant engaged in another visual behavior or closed eyes for 1.5 seconds or more. These parameters followed common conventions (see Bornstein, 1985; Fogel et al., 1988; Colombo & Horowitz, 1985).

Mothers' response types were categorized as: (1) social (mother engages infant in an affect-oriented dyadic interaction, including proximal en-face exchange, kissing, hugging, tickling, kinesthetic social arousal, and games like peek-a-boo); (2) environmental (mother physically and/or verbally indicates a property, object, or event in the immediate environment); (3) nurturant (mother engages in feeding, pacifying, diapering, or picking up to comfort); (4) imitative (of vocal behavior); and (5) other.[1] Only the first response mother gave after the infant initiated behavior was counted.

In order for maternal activities to be credited as responsive, the mother had to demonstrate a change in her ongoing behavior within 5 seconds of the infant's target attentional or vocal act that related to the infant's act. For social and environmental attention and for distress vocalization, responsiveness was credited using a "leading-edge trigger;" that

is, the onset of the response had to occur within 5 seconds of the onset of the antecedent infant target activity. In the case of infant nondistress vocalization, responsiveness was credited only if the onset of the mother's response occurred according to a "trailing-edge trigger;" that is, within 5 seconds of the offset of the infant's vocalization.[2]

The following measures were calculated: (1) base-rate frequencies for each infant behavior; (2) the frequency of total maternal responsiveness; (3) the frequency with which mothers responded to each of the four target infant activities; (4) the frequency of each of the five types of maternal responses displayed; and (5) the frequency of each type of maternal response to each target infant behavior. Prior to any statistical appraisal, univariate data were inspected in box plots. No outliers were found that altered basic patterns of results. Approximately 1.7% of the French data was prorated since six tapes were missing an average of 3.8 minutes each. Preliminary analysis indicated no systematic sex differences in the base-rate and responsiveness data from the three cultures, and therefore analyses collapsed across this factor.

The two infant activity modes and maternal responsiveness were scored by different coders so that coders would be blind to different data sets. Reliability of scoring infant activity modes was assessed by having coders randomly and independently score approximately 10% of the tapes for each mode. Coders

averaged a kappa of .50 for the visual mode and .81 for the vocal mode. Maternal responsiveness was coded by individuals who were fluent in both English and the language of the society. Reliability of scoring maternal responsiveness was assessed by having different coders independently score 25% of the tapes against standards of another experienced coder. Coders averaged a kappa of .59. (See Cohen, 1968; Hartmann & Wood, 1982.)

Infant State

Another set of independent coders rated the infant's state in the first second of each 60 seconds of the observation according to a six-level scale (modified from Brazelton, 1973). American, French, and Japanese infants were judged to be in states of quiet or active alert in 94%, 93%, and 94% of these momentary samples, respectively (Suen & Ary, 1989).

Results

Infant base-rates for the four kinds of activities and maternal responsiveness in the three societies were assessed and compared in several ways. Proportions of maternal responsiveness to each of the four specific kinds of infant activities, proportions of the four maternal response types, and proportions at which mothers displayed different response types to the four specific infant activities were all examined and analyzed separately. For each data type, we examined the main effect of

culture using MANOVA or nonparametric ANOVA. We also examined two channels of information exchange between mother and infant, visual and vocal, via two types of visual and two types of vocal behavior, allowing for the analysis of culture by behavior within each channel. Mothers in the three cultures were compared on their relative responsiveness to infants' social- and environment-oriented behaviors (i.e., the differences between mothers' responsiveness to infant look-social and infant look-at-environment were compared across cultures). Similarly, mothers in the three cultures were compared on their relative responsiveness to infants' nondistress and distress vocalizations.

Infant Base-Rates

Table 1 displays means and standard deviations for base-rates of four infant activities in three cultures. Frequencies of infant base-rates were compared across cultures using a one-way MANOVA; this analysis revealed no significant effect of Culture. A limitation of one-way MANOVA is that it does not directly include interactions. Consequently, interactions within visual and vocal channels were examined by differencing the variables within each channel (e.g., look-social minus look-at-environment) and analyzing these differences using one-way ANOVA. Error in pairwise comparisons was controlled at alpha < .05 using the Newman-Keuls range test. Examination of Culture X Base-Rate

interactions within both visual and vocal channels revealed no significant effects.

Statistical comparisons among base-rate frequencies of different behaviors are not appropriate. Base-rates are based on different definitions and, therefore, are not expressed in the same units (i.e., one unit of vocal distress may or may not be comparable to one unit vocal nondistress with regard to a particular latent variable). However, Culture X Base-Rate comparisons are appropriate because they focus on differences rather than actual frequencies. Differences were obtained identically across cultures.

Maternal Responses to Specific Infant Activities

Table 2 displays proportions for mothers' responding to each of the four kinds of infant activities. Also displayed in Table 2 is the average ranking of mothers in each culture relative to the total sample. Maternal responses to specific infant activities were computed by dividing the total number of maternal responses to a specific infant behavior by the base-rate for that behavior. In this way, maternal responsiveness to each infant behavior controlled for the frequency of occurrence of that behavior. The numerator and denominator of this variable are from different populations. In addition, numerators and denominators correlate among and between one another. Consequently, the distribution of this variable is not known and

may differ substantially from multivariate normality. For these reasons the nonparametric Kruskal-Wallis (Siegel, 1956) one-way ANOVA was used to compare each type of maternal response to each specific infant behavior across cultures. Kruskal-Wallis analyses for the Culture main effect were conducted on ranks. Where the omnibus Kruskal-Wallis proved significant, pairwise comparisons between cultures were conducted using a Mann-Whitney test for independent samples (Siegel, 1956). Allowing for a Type-One error of .05 for each orthogonal comparison, a modified Bonferroni test was used to control for additional nonorthogonal comparisons (Keppel, 1982). Interactions within visual and vocal channels were tested by differencing the two variables of interest and comparing the difference across cultures using the Kruskal-Wallis test. As before, where the overall Kruskal-Wallis proved significant, error in pairwise comparisons was controlled using a modified Bonferroni test.

Kruskal-Wallis for the country by within-channel difference was significant, $X^2(2) = 26.13$, $p < .001$. Pairwise comparisons using the Mann-Whitney test showed significant interactions for Japan/U.S. and Japan/France comparisons, $U = 63.0$ and 90.5, respectively, $ps < .001$. Figure 1 displays these interactions: Japanese mothers showed proportionally more responsiveness to their infants' looking-at-environment than to their infants' looking-social relative to French and U.S. mothers. In part, this interaction is ascribable to the Japanese displaying

significantly higher proportions of responsiveness to their infants' looking social relative to U.S. and French mothers, U = 90.5 and 78.5, respectively, $ps < .001$. The U.S./Japan X visual channel interaction is a crossover and thus cannot be explained as an artifact of scaling (i.e., the result of a single main effect in conjunction with a floor- or ceiling-effect). Consistent with this result, U.S. mothers showed a significantly higher proportion of responsiveness to infants' look-at-environment than did Japanese mothers, $U = 170.5$, $p < .02$.

No significant main or interaction effects were found within the vocal channel.

Maternal Response Types

Table 3 shows proportions of total maternal responsiveness (including other) for four main categories of maternal response types. These proportions were computed by dividing the frequency of each mother's response type by her total responsiveness. Thus, these proportions are independent of infants' overall activity (i.e., each mother's proportions, regardless of her infant's activity, sum to one). It is not appropriate to correct individual mother response types for specific infant behaviors (e.g., response type-social divided by the base-rate for infant social-oriented behavior) because any response type can occur to any infant activity (with the exception of imitation, which could only occur in response to either vocal distress or nondistress).

The propensity for a particular response type to occur to a specific behavior is, in part, the subject of study. In this case, numerators are a subset of denominators, so the distribution can be assumed more or less multivariate normal, and therefore permit the use of parametric tests. A one-way MANOVA was used to compare relative proportions of response types across cultures. In addition, how Culture interacted with Response Type was of interest. As in the case of base-rates, these interactions were examined by comparing difference scores across cultures. Thus, each mother's proportion of social responsiveness was subtracted from her proportion of environmental responsiveness, and the differences analyzed using one-way ANOVA. Alpha in pairwise comparison of differences was controlled at < .05 using the Newman-Keuls range test.

The Culture X Environment/Social interaction effect was significant, $F(2,71) = 5.13$, $p < .01$. Subsequent pairwise analyses showed that this interaction was significant for U.S./France and U.S./Japan comparisons. As can be seen in Figure 2, U.S. mothers' proportion of social responsiveness was much lower than their environmental responsiveness, relative to French and Japanese mothers. In part this difference is ascribable to the main effect of Culture on environmental responsiveness, $F(2,69) = 8.23$, $p < .001$; U.S. proportions were significantly higher than French or Japanese. Because the U.S./Japan case is again a crossover, the interaction cannot be explained as a main

effect of culture. The U.S./French interaction should be interpreted with caution, however, as it may be ascribable to scaling (that is, French mothers, having shown a significantly lower proportion of environmental responsiveness, can "decline" less on social responsiveness relative to U.S. mothers).

The overall MANOVA was significant, $F(8,132) = 4.72$, $p < .001$. Univariate analyses indicated that this result is ascribable to the effect of Culture on environmental responsiveness (noted above) and to the effect of Culture on social responsiveness, $F(2,69) = 7.84$, $p < .001$. U.S. and Japanese proportions were significantly higher than French.

Mothers in the three cultures did not differ in their proportions of nurturant or imitative response types. Maternal imitation was coded only with respect to infant vocal behavior. Thus, in computing proportions for responsiveness, imitation may be underestimated (i.e., it is not given as many opportunities to occur as the other response types). This will bias analyses comparing the proportion of imitation with other response types; however, since infants in the three societies displayed statistically equivalent base-rates of vocal behavior (i.e., opportunities for mothers to imitate), cross-cultural comparisons were not biased.

Maternal Response-Types by Infant Target Activities

Proportions of mothers' responding to specific infant activities were computed by dividing the frequency of each mother's response type by her total responsiveness to the particular infant activity examined (e.g., the frequency of response type-social to infant look-social divided by the frequency of all response types to infant look-social).

Infant look-at-environment. Table 4A displays proportions of three maternal response types to infant look-at-environment. A significant Culture X Environment/Social interaction emerged, $F(2,60) = 3.76$, $p < .05$, ascribable to relative differences between environment- and social-type responsiveness in U.S. and French mothers. However, this was not a crossover interaction and so may be a result of significant main-effect differences between the two cultures. Indeed, an overall MANOVA proved significant, $F(6,112) = 2.28$, $p < .05$, with univariate analyses revealing a Country effect on response type-environment, $F(2,58) = 5.03$, $p = .01$. Pairwise comparisons showed that U.S. and Japanese mothers displayed higher proportions of environmental responsiveness to their infants' looking at objects than did French mothers. Significant environmental response-type differences, coupled with zero and near-zero rates of social responsiveness, suggest that the Culture X Environment/Social interaction should be interpreted with caution.

Infant look-social. Table 4B displays proportions of three maternal response types to infant look-social. Again, a

significant Culture X Environment/Social interaction emerged, $F(2,66) = 4.96$, $p < .01$, this time ascribable to relative differences between environment and social type responsiveness in U.S. and Japanese. As can be seen in Figure 3, U.S. mothers displayed higher proportions of environment response types and lower proportions of social response types, whereas Japanese mothers showed the reverse. The overall MANOVA was significant, $F(6,124) = 4.73$, $p < .001$. Univariate analyses revealed significant environment and social response type cultural differences, $Fs(2,64) = 4.96$ and 7.73, $ps < .01$, respectively. Pairwise comparisons showed that U.S. mothers had higher proportions of the environment response type than French and Japanese mothers. Japanese and U.S. mothers showed higher proportions of the social response type than French mothers.

Infant vocalize nondistress. Table 4C shows proportions of four maternal response types to infants' vocalizing nondistress. The overall MANOVA was significant, $F(8,130) = 2.57$, $p = .01$. Univariate analyses revealed a main effect of Country for social response type only, $F(2,68) = 4.73$, $p = .01$. Pairwise comparisons showed that U.S. mothers were likely to display the social response type more than French mothers.

Infant vocalize distress. Table 4D shows proportions of four maternal response types to infants' vocalizing distress. Neither the overall MANOVA nor the interactions proved significant.

Discussion

The chief purpose of this study was to examine mothers' responsiveness to their young infants in two Western and one Eastern culture in order to understand how infants on the one hand and cultural childrearing patterns on the other influence naturally-occurring maternal responses. We first review and comment on the results of the study in terms of cultural universals and specifics in maternal responsiveness, and next discuss more general issues about maternal behavior and culture.

It is important to note at the outset, however, that the samples in these countries are comparatively restricted in terms of sociodemographic level, urban location, and educational history. These restrictions actually aided the comparisons we undertook, since the three samples are similar on these SES variables; however, these restrictions also have implications for the generalizability of the findings in the sense that different results could emerge in mothers (and conceivably in infants) coming from other regions of the SES scale, from less metropolitan environments, or less educated families. Moreover, we concentrated these analyses on selected infant and mother activities occurring in open interaction; analyses of other infant behaviors and other kinds of responses in mothers in other situations may result in similar or different patterns of findings (see below). Certainly, studies of infants of different ages can be expected to yield a different pattern of results.

Nonetheless, the everyday activities we defined are common in mothers and infants in these countries, and we observed individual variation within cultures not only in infant base rates, but also in the various kinds of maternal responsiveness we assessed.

The results of this study point to several areas of cultural similarity in infant activity and in maternal responsiveness, and observed comparabilities in turn point up a significant methodological finding. First, infants of 5 months in these three societies behaved in terms of looking at the environment and at their mothers and in terms of vocalizing nondistress and distress at statistically equivalent rates. Moreover, infants in all three cultures looked more at the environment than socially, and they vocalized nondistress more than distress; these are typical findings for American infants (Bornstein & Ludemann, 1990; Bornstein & Tamis-LeMonda, 1990; Fogel et al., 1988).

Mothers in both the Western and in the Eastern culture showed similarity in certain types and proportions of responsiveness as well, and these findings submit to cross-cultural evaluation the universality of certain developmental processes related to responsiveness. Across these cultures, mothers as a group appeared relatively more responsive to their infants' vocalizing than to their infants' looking; in addition, maternal responsiveness to the two kinds of vocal signals and to social looking were equivalent. In response to vocal channel

signals, mothers appeared equally sensitive to infant nondistress and distress; but in response to visual channel signals, mothers appeared more sensitive to infants' looking at them than at the environment. In the first months of life, neither infants nor their mothers (or others around them) adopt an especially extradyadic, relative to, say, a dyadic, focus. However, that emphasis is already shifting by the middle of the first year, when babies look at their mothers' faces less than at objects, even though those faces belong to the infants' own mothers, faces are structurally complex stimuli in their own right, and mothers tend to be animated during en face interactions with their infants, presumably working in the relationship to maintain their infants' attention (e.g., Bakeman, Adamson, Konner, & Barr, 1990; Belsky et al., 1984; Bornstein & Ludemann, 1990; Bornstein & Tamis-LeMonda, 1990; Cohn & Tronick, 1987, Field, 1981).

As predicted, across cultures mothers responded with nurturance equally, and they responded with imitation equally. Overall, too, mothers responded most with imitation, more with environment-oriented than with social-oriented actions, and least with nurturing.

Notably, a high degree of shared specificity and appropriateness between infant activity and maternal responsiveness emerged in these analyses. As predicted, mothers responded to their infants' exploration of the environment with encouragement to the environment, to infants' vocalizing

nondistress with imitation, and to infants' vocalizing distress with nurturance. In short, mother and infant activity patterns influenced one another in a bidirectional manner: specific maternal behaviors are keyed to specific infant behaviors and, presumably, vice-versa (Bornstein, 1989; Bornstein & Tamis-LeMonda, 1990; Hunt, 1979, 1986; Wachs & Chan, 1986).

The similarity of pattern in mother-infant activity across cultures that emerged also reflects well on methodological choices made for this study. The activity and responsiveness codes were originally developed in an American setting. The consistency -- and face validity -- of the pattern of findings resulting from this cross-cultural application give evidence of their generalizability to other culturally contrasting settings.

Infants in the three cultures behaved at essentially similar rates in each of the four categories of activity, providing similar "starting points" for mothers in all three cultures. Yet, certain forms of maternal responsiveness to these behaviors varied across cultures. Where differences in responsiveness emerged, they tended to occur to infant looking, rather than to infant vocalizing. As suggested, mothers appeared less "free to vary" when responding to infant vocal nondistress or vocal distress, perhaps for the reasons indicated in the Introduction. By contrast, maternal responsiveness in these three cultures varied with respect to infants' attention allocation.

As predicted, the most salient Western--Eastern difference involved Japanese and Americans with respect to dyadic versus extradyadic loci of interaction. American mothers responded more to their infants' looking at the environment relative to looking socially, as compared with Japanese mothers. Moreover, when responding to their infants, Japanese mothers tended to direct their infants' attention to themselves whereas American mothers tended to direct their infants' attention to the environment. These cultural differences in maternal responsiveness are consonant with more general values in the two cultures. It is widely believed that Japanese emphasize the mother-child bond and work to promote conventionality, uniformity, and sensitivity to others and the group. Americans promote self-assertiveness and achievement in their children and desire them to become expressive and competitive (Befu, 1986; Caudill, 1973; Chen & Miyake, 1984; Doi, 1973; Hess et al., 1986; Kojima, 1986; Morsbach, 1980). Accordingly and from a very early point in time, mothers in these two cultures appear to respond in differential ways to their infants' actions.

Several sources of variation could account for cultural differences. Since maternal responsiveness and infant activities were observed in an interactive context, systematic differences in the behavior of infants in different cultures could be responsible, at least in part, for differences in their mothers' responsiveness. All of the analyses of mother-dependent

variables used proportions and so either control for, or are independent of, infant activity levels.

Differences in maternal responsiveness could also arise if infants were in different states of alertness, or if mothers in these cultures spent different amounts of the observation period in the company of their infants. The times mothers and babies were observed were selected to provide for favorable assessment conditions of interaction in terms of babies' state, and babies in the three cultures were observed to be in equivalent and high states of alertness throughout the course of the observation. To test the maternal availability hypothesis, we reevaluated all of the videotapes for the total duration of the session mothers actually spent with their babies. Mothers in the three cultures spent equivalent amounts of time in the company of their babies.

Thus, the differences in responsiveness among mothers cannot be ascribed to differences in infant behavior, infant state, or maternal availability. Nor can the variation readily be ascribed to differences in indigenously maternal variables. We attempted to "equate" mothers who participated in these studies on factors like age, parity, SES, as well as years of education. Mothers were the same age, and they were all primiparous with babies the same age. Of course, socioeconomic class may not indicate exactly similar standings in the United States, France, and Japan. Further, even though the Japanese educational system is modeled on the American and the two show rough comparability with

the French system, what curricula these mothers followed in school and more particularly what they learned (in and out of school) obviously also vary considerably. Mothers in different cultures could also hold differing views on being observed. While New Yorkers, Parisians, and Tokyo people might normally be reticent to invite strangers into the home, nonetheless mothers in all three locales volunteered participation, and all expressed interest in the study and cordiality and openness toward the observers.

Finally, factors external to childrearing style per se could play a part in conditioning activities of mothers with their infants, and some specific ones -- prominently urban-rural locale or differing physical layouts of homes in different cultures -- could conceivably influence maternal responsiveness differentially. In several respects, however, this New York City--Paris--Tokyo comparison overcomes these potential shortcomings. These three cities are among the most cosmopolitan metropolitan areas in the world. Moreover, participating families in the three cities lived in comparable spaces, usually apartments in multistory buildings. These considerations tend to diminish the possibility that general location or structural differences in dwellings alone systematically affected maternal responsiveness.

Taken together, these results support findings of culture universals as well as culture-specific differences in

responsiveness of American, French, and Japanese mothers. Moreover, they implicate cultural differences in childrearing philosophy, values, and beliefs as mediating differences in childrearing practices. The association between cultural attitude and action has been modeled in several fundamentally different ways. One traditional and influential paradigm suggests that cultural norms, convictions, images, rules, what-have-you influence the development of parental beliefs about children, their abilities, character, needs, temperament, and so forth, and in turn these parental beliefs (somehow) translate themselves into goals of childrearing, and more directly into verbal and enactive practices parents use to achieve those goals (e.g., Bateson & Mead, 1942; Caudill, 1973; Tapp, 1980; Whiting & Child, 1953).

As is well-recognized, Eastern and Western peoples differ dramatically in cultural zeitgeist. Adherence to collectivist versus individualist philosophies is one prominent example, and the two are believed to manifest themselves in terms of childrearing patterns in developmentally meaningful ways. Parents in collectivist cultures (as can be found in Japan) tend to emphasize obedient, reliable, and proper behavior in children, whereas parents in individualist cultures (as can be found in the U.S.) tend to emphasize self-reliant, independent, and creative behavior (Kohn, 1987; Triandis, 1989). In the one, children are encouraged to follow rules and conform to norms; in the other,

children are allowed a good deal of autonomy and are encouraged to engage in independent exploration of their environment. Our selection of locales contrasted cultural collectivism and individualism (Hofstede, 1980), holding other global cultural factors constant. The resultant analyses suggest that contrasting Japanese and American cultural emphases on the collectivist-individualist continuum may be evident in maternal behaviors directed to very young infants.

Another central distinction between Oriental and Occidental cultures is the relative emphasis on rational, scientific thinking; it may also be related to maternal responsiveness. Barrett (1962, p. 80-81) writes: "Oriental man remains intuitive, not rational. Great sages like Buddha and Lao-tse rose above the mythic, but they did not become apostles of reason. The lifting of reason fully out of the primeval waters of the unconscious is a Greek achievement. And from the differentiation Western civilization takes on, subsequently, the character that distinguishes it from the civilizations of the Orient. Science itself, a peculiarly Western product, became possible only through this differentiation of reason and its exaltation as the crowning human power." A typical example of the Western view of the individual-as-scientist can be found in Kelly's theory of personal constructs. According to Kelly (1955, pp. 8-9), individuals continually test hypotheses in their environment, as each "... looks at his world through transparent patterns or

templets which he creates and then attempts to fit over the realities of which the world is composed." Similarly, the prevalent Western social scientific view of humans is as rational beings (Herrnstein, 1990). It is possible that Western mothers, in orienting infants to their environment are, in essence, continually encouraging infants to test hypotheses -- to become scientists of their environment. Eastern culture, with its emphasis on intuitive thought in everyday life, may actually discourage infants from treating the external environment as a scientist does an object of study. Redirecting an infant's exploratory behavior to the mother's person could be one way to achieve this.

In pursuing this study, we plan to interview mothers directly about their goals for their infants, their sense of responsibility and their beliefs about their own role in helping their infants reach those goals, as well as about their understanding of the meaningfulness and role of responsiveness and other parental actions in development. As D'Andrade (1986, p. 117) observed: "To understand people, one needs to understand what leads them to act as they do; to understand what leads them to act as they do, one needs to know their goals; to understand their goals, one needs to understand the overall interpretive system they have that triggers these goals."

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FOOTNOTES

[1] Other responses included activities not defined as social, object, nurturant, or imitative. They included verbal affirmations, such as the English "Yes!" or "Good boy!", the French "Ah oui, ah oui!" or "Oh, la, la!", and the Japanese "Hai, hai" or "Nani"; nonimitative babbling or other unintelligible sounds to the infant; as well as physical change of location or stimulation. The category of other responses is included in cultural comparisons of overall maternal responsiveness; however, comparisons of response types across cultures concentrate on the four substantive categories of maternal responsiveness, and not on other. Including this fifth category of response-type in the denominator, and analyzing the four chief response types of interest, eliminated statistical limitations of linear dependence.

[2] Prior research indicated that mothers' responsiveness is predominantly "co-occurring" when their infants look at objects or at mothers or vocalize distress, whereas mothers' responses to their infants' nondistress vocalizations are predominantly "lagged." Given an infant's behavior B_i, there is a distribution over time of a mother's response R_m to B_i. In order to label mother's behavior a response to B_i, rather than a spontaneous activity or a response to something else, we want to be able to say that a particular maternal action belongs to the distribution

of R_ms. (In H_0 formulation, we want technically "not to be able to say" that a particular response is outside the distribution of R_ms.) To do this, we examined temporal parameters in all of the U.S. data, determining the mean latency of each maternal response R_m to each B_i and the constructing a confidence interval around the mean of R_m that included 95% of mothers' behaviors from the point immediately following the onset or offset of her infant's behavior. In normal distribution terms, this amounts to an interval that begins immediately following the onset or offset of B_i and ends 1.64 standard deviations after the mean R_m. Any maternal activity outside this interval does not belong to the distribution of R_ms. In practice, this 1-tail 95% confidence interval ended 5 seconds after the onset of infant distress vocalizations and infant looking at mother or the environment and 5 seconds after the offset of infant nondistress vocalizations.

TABLE 1

INFANT BASE-RATES BY CULTURE

	Attention				Vocalization			
	Environment		Social		Nondistress		Distress	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
United States	82.4	(25.7)	29.1	(16.1)	99.8	(33.1)	9.7	(13.0)
France	75.9	(21.6)	28.5	(19.6)	124.0	(47.7)	12.9	(13.3)
Japan	64.3	(27.9)	22.2	(12.5)	105.0	(47.5)	16.9	(17.7)
Mean	74.2	(26.0)	26.6	(16.4)	109.6	(43.9)	13.2	(14.9)

TABLE 2

PROPORTION OF MATERNAL RESPONSES TO SPECIFIC INFANT ACTIVITIES BY CULTURE

	Attention						Vocalization					
	Environment			Social			Nondistress			Distress		
	M	(SD)	Rank	M	(SD)	Rank	M	(SD)	Rank	M	(SD)	Rank
United States	.12	(.09)	49.7	.20	(.21)	29.0	.31	(.23)	36.6	.48	(.31)	37.8
France	.03	(.03)	25.7	.20	(.24)	26.1	.29	(.15)	36.0	.37	(.27)	32.8
Japan	.08	(.10)	34.2	.54	(.32)	52.5	.36	(.31)	36.9	.31	(.28)	27.9
Mean	.08	(.09)		.32	(.30)		.32	(.24)		.38	(.29)	

TABLE 3

PROPORTION OF MATERNAL RESPONSE TYPES BY CULTURE

	Environment		Social		Nurturant		Imitative	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
United States	.26	(.20)	.04	(.06)	.02	(.03)	.17	(.16)
France	.06	(.08)	.00	(.01)	.02	(.03)	.17	(.17)
Japan	.14	(.21)	.06	(.06)	.03	(.05)	.19	(.15)
Mean	.15	(.19)	.03	(.05)	.02	(.04)	.18	(.16)

TABLE 4A

PROPORTION OF TOTAL MATERNAL RESPONSES TO INFANTS' LOOKING AT THE ENVIRONMENT BY CULTURE

	Environment		Social		Nurturant	
	M	(SD)	M	(SD)	M	(SD)
United States	.89	(.13)	.01	(.07)	.01	(.07)
France	.68	(.40)	.00	(.00)	.00	(.00)
Japan	.90	(.15)	.02	(.08)	.00	(.00)
Mean	.83	(.26)	.01	(.06)	.01	(.04)

TABLE 4B

PROPORTION OF TOTAL MATERNAL RESPONSES TO INFANTS' LOOKING AT MOTHER BY CULTURE

	Environment		Social		Nurturant	
	M	(SD)	M	(SD)	M	(SD)
United States	.19	(.35)	.13	(.16)	.00	(.00)
France	.01	(.05)	.02	(.07)	.01	(.04)
Japan	.04	(.11)	.18	(.17)	.00	(.00)
Mean	.08	(.22)	.11	(.16)	.00	(.02)

TABLE 4C

PROPORTION OF TOTAL MATERNAL RESPONSES TO INFANTS' VOCALIZING NONDISTRESS BY CULTURE

	Environment		Social		Nurturant		Imitative	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
United States	.08	(.24)	.04	(.07)	.01	(.06)	.29	(.21)
France	.02	(.05)	.00	(.01)	.01	(.02)	.22	(.20)
Japan	.02	(.03)	.02	(.05)	.00	(.00)	.32	(.16)
Mean	.04	(.15)	.02	(.05)	.01	(.04)	.27	(.19)

TABLE 4D

PROPORTION OF TOTAL MATERNAL RESPONSES TO INFANTS' VOCALIZING DISTRESS BY CULTURE

	Environment		Social		Nurturant		Imitative	
	M	(SD)	M	(SD)	M	(SD)	M	(SD)
United States	.11	(.18)	.01	(.03)	.25	(.36)	.00	(.01)
France	.07	(.19)	.00	(.00)	.23	(.32)	.01	(.03)
Japan	.08	(.13)	.03	(.04)	.24	(.24)	.10	(.24)
Mean	.09	(.17)	.01	(.03)	.24	(.31)	.04	(.14)

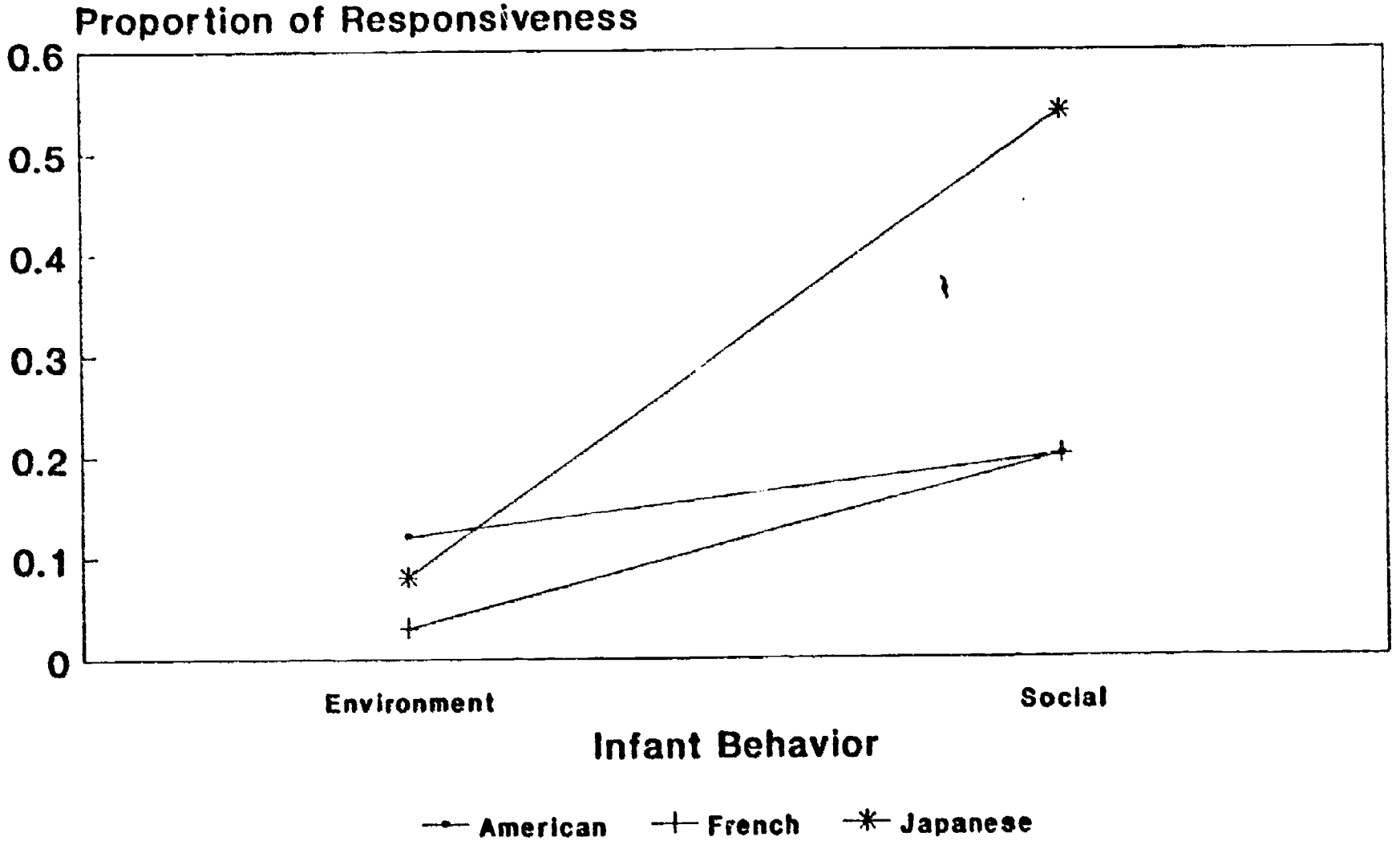
Figure Legends

Figure 1. Proportions of maternal responsiveness to infants' environment and social behaviors.

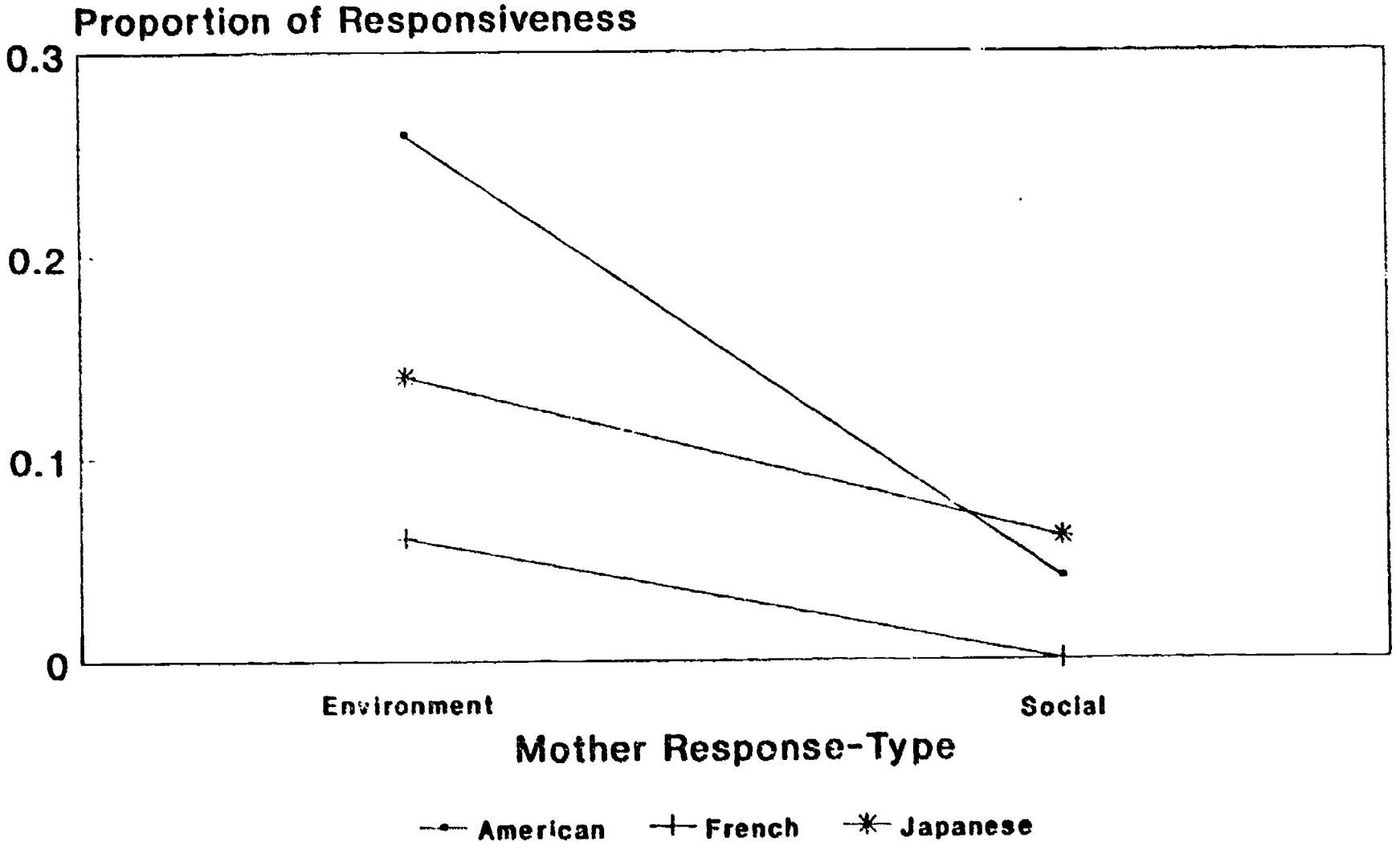
Figure 2. Proportions of mothers' overall responsiveness that are social or environment oriented.

Figure 3. Proportions of mothers' responsiveness to infant look-at-mother that are social or environment oriented.

PROPORTIONS OF MATERNAL RESPONSIVENESS TO INFANTS' ENVIRONMENT AND SOCIAL BEHAVIORS



PROPORTIONS OF MOTHERS' OVERALL RESPONSIVENESS THAT ARE SOCIAL OR ENVIRONMENT ORIENTED



PROPORTIONS OF MOTHERS' RESPONSIVENESS TO INFANT LOOK-AT-MOTHER THAT ARE SOCIAL OR ENVIRONMENT ORIENTED