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Title	A Cross-National Study of Mother and Infant Activities and Interactions : Some Preliminary Comparisons between Japan and The United States
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Description	
Citation	乳幼児発達臨床センター年報, 9, 1-12
Issue Date	1987-03
Doc URL	https://hdl.handle.net/2115/25227
Type	departmental bulletin paper
File Information	9_P1-12.pdf



A Cross-National Study of Mother and Infant Activities and Interactions: Some Preliminary Comparisons between Japan and The United States

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It is widely thought that some psychological distinctions between Japanese and Americans arise early in life, and the nature of mother-child interaction has been hypothesized to be at least one source of these distinctions. We therefore conducted a preliminary comparison of Japanese and American mothers and their 5-month-old infants interacting in the natural setting of the home. Independent observations of 31 dyads from New York City and 31 dyads from Sapporo were submitted to identical analyses. This report focuses on maternal stimulation, speech, and social play and on infant attention, exploration, and vocalization. First, we assessed similarities and differences among Japanese and American mothers and infants on these activities. Next, we evaluated relations among mother activities within each culture and relations among infant activities within each culture and compared patterns of those relations across the two cultures. Then, we evaluated interactions among mothers and infants in each culture and compared patterns of interactions across these cultures. Finally, we addressed the question of what predictive value for children's cognitive development certain of these mother and infant activities may have.

The main purpose of this study is to compare activities and interactions among Japanese and American mothers and infants. Both professional observers and lay people alike have long noted striking similarities and differences in the psychological make-ups of Japanese and Americans. Moreover, many have offered compelling rationales why the

M. H. B. was supported by research grants (HD20559 and HD20807) and by a Research Career Development Award (HD00521) from the National Institute of Child Health and Human Development, and this research was partially supported by a grant from the Center of Developmental Education and Research, Tokyo, Japan. K. M. was supported by a grant in aid for scientific research (56310016) from the Ministry of Education, Science, and Culture, Japan. C. T.-L. was supported by a New York University Fellowship and Helbein Scholarship. We thank H. Azuma and M. Ogino for guidance and H. Bornstein, F. Cardinal, G. Fitzmaurice, C. Miner, T. Nemoto, and Y. Kanaya for assistance. Request reprints from Marc H. Bornstein, Infancy Studies Program, Department of Psychology, New York University, 6 Washington Place — Room 1065, New York, New York 10003, USA.

two societies merit closer examination (see Azuma, 1986; Benu, 1986; Benedict, 1974; Bornstein, 1986; Caudill, 1973; Fallows, 1986; Stevenson, Azuma, & Hakuta, 1986; Tsunoda, 1985; Weisz, Rothbaum, & Blackburn, 1984).

Beyond the acknowledged values of cross-cultural developmental comparisons (Bornstein, 1980, 1987; Brislin, 1983), two specific considerations motivated our research. First, there exists presently a dearth of information about similarities and differences in Japanese and American child-rearing practices (Caudill & Weinstein, 1969; Sengoku, Davitz, & Davitz, 1982; Shand & Kosawa, 1985); and, unfortunately, prominent studies in this field are at variance over several key conclusions (see Bornstein, 1987). As a consequence, efforts toward obtaining new and expanded data on mother and infant activities and interactions in these two societies are warranted (Chen & Miyake, 1983).

Second, comparison of Japanese and American mothers in interaction with their preschool-age children is particularly timely on account of new findings about familial antecedents of early cognitive development. A set of interrelated cross-national studies shows that Japanese youngsters, even by the time they enter first grade, consistently best their American counterparts in terms of academic achievement (e.g., Azuma, 1986; Azuma, Bornstein, Ogino, & Tamis-LeMonda, 1986; Hess, Azuma, Kashiwagi, Dickson, Nagano, Holloway, Miyake, Price, Hatano, & McDevitt, 1986; Kashiwagi, Azuma, & Miyake, 1982; Kashiwagi, Azuma, Miyake, Nagano, Hess, & Holloway, 1984; Stevenson, Lee, & Stigler, 1986a, 1986b; Stevenson, Stigler, Lee, Lucker, & Kitamura, 1985), even though IQ per se does not apparently differ significantly or meaningfully in the two societies (e.g., Lynn, 1977, 1983; Stevenson & Azuma, 1983). The fact that these differences in achievement obtain among preschoolers suggests that forces both in the family and in very early child-rearing may already be influential. To begin to investigate those factors among Japanese, we studied specific mother and infant behaviors demonstrated to possess predictive validity for cognitive development among Americans (see Bornstein, 1985; Bornstein & Ruddy, 1984).

As part of our respective longitudinal studies in Sapporo and in New York City, we have conducted extensive observations of mothers interacting at home with their young infants. In this paper, we coordinate these independent studies to submit Japanese and American mother-infant activities and interactions to identical comparative analyses.

Method

Sample

Sixty-two mothers and their 5-month-old infants were observed interacting at home. Half the dyads were Japanese from Sapporo, and half were American from New York City. All infants were term at birth and healthy at the time of the study. They came from broadly middle socioeconomic status households; each sample was balanced for sex. Babies in the Japanese sample ($M=145$ days) were 12 days younger on the average at the time of home observations than were babies in the American sample ($M=157$ days); still, $t=8.30$, $p<.01$. Although less than 2 weeks of age separated these samples, we partialled infant age at observation in all analyses.

Home Observation Procedure

Home observation coding procedures followed those used previously in our research (e. g., Bornstein, 1985 ; Bornstein & Ruddy, 1984 ; Bornstein & Tamis-LeMonda, 1987). Infants were judged to be predominantly in states of quiet or active alert (modified from Brazelton, 1973) during all home visits. Mothers had been asked to behave in their usual manner and to disregard the observer's presence insofar as possible. The observation period lasted a minimum of 45 minutes, and for scoring purposes was divided into 60-second time-sampling intervals (Seitz, 1984) : a 30-second " on " observation period followed by a 30-second " off " period, during which the observer recorded the occurrence or nonoccurrence of selected mother and infant activities. The termination of each 30-second period was signalled to the observer by a covert automatic timer.

At the initiation of each 30-second " on " period, the observer recorded the infant's state and whether the infant was in view of the mother. Eleven maternal activities and five infant activities were then coded (complete operational definitions are available from the first author). Of the eleven maternal activities, eight coded the mother's dyadic (mother-oriented) or extradyadic (environment-oriented) stimulation of her infant's attention using either physical or verbal means to elaborate on a topic of mutual interest or to introduce a new topic. Two codes assessed maternal speech to the infant, either as reaching an infant register associated with " motherese " or as taking adult conversational tones. The last code assessed maternal social play, that is interpersonal animated physical contact with the infant. The five infant activities consisted of visual attention, coded either as dyadic (mother-oriented) or as extradyadic (environment-oriented), of vocalizing distress and nondistress, and of touching an object.

One observer who was native American coded the American sample ; the second observer who was native Japanese (but fluent in English) coded the Japanese sample. The two observers also coded several American visits in common ; agreement for the 16 categories of activity averaged 87%.

Scoring

We obtained frequency counts of all mother and infant activities, that is the number of sampling intervals in which each activity occurred. Over and above individual frequency counts, we generated composite measures of dyadic and extradyadic stimulation by tallying the number of sampling intervals in which certain pairs of original activities cooccurred. To construct a composite measure, mother or infant could be credited with an activity only once in any sampling interval: For example, " Mother Stimulation Extradyadic " consisted of the number of sampling intervals in which a mother used physical or verbal or elaborative or new strategies to stimulate her infant's attention to a property, object, or event in the environment. Table 1 lists pertinent original variables and composites of basic activities. We also evaluated how much mothers stimulated their infants dyadically and extradyadically as proportions of their total stimulation as well as how much infants looked dyadically and extradyadically as proportions of their total looking ; proportions were arc sin transformed prior to all analyses.

Results and Discussion

We have organized the results of our cross-national study around several kinds of comparisons of similarities and differences in Japanese and American mothers and infants. These include, first, descriptive comparisons of basic mother and infant activities between the two cultures; second, intracorrelations among mother activities and intracorrelations among infant activities within each culture and comparisons of these intracorrelations between cultures; third, intercorrelations of mother and infant activities within each culture and comparisons of these intercorrelations between cultures; and, fourth, predictive correlations of illustrative mother and infant activities for childhood cognitive development.

Basic Activities

We first asked how similar or different Japanese and American mothers and their 5-month-old infants are in terms of the rates of some basic activities. Table 1 shows our findings. Overall, similarities outweigh differences, but with interesting exceptions. Mothers of the two nationalities tend to stimulate interactions, speak to, and play with their infants in about the same amounts, although their orientations in interacting differ. Generally, babies of the two nationalities behave remarkably similarly.

Mothers. Basic data for mothers appear in Table 1A. Japanese and American

TABLE 1
Basic Activities: Japanese and American Mothers and Infants

	Japanese <i>M</i> (Range)	American <i>M</i> (Range)	Difference <i>F</i>
<i>A. Mother activities</i>			
Stimulation	14.1 (1-27)	16.5 (2-32)	1.01
Dyadic	5.8 (0-14)	3.4 (0- 8)	2.90 ⁺
Extradynamic	8.7 (1-25)	13.6 (1-32)	3.35 ⁺
Speech	25.6 (6-39)	31.3 (8-45)	0.81
Infant register	4.0 (0-14)	13.1 (0-37)	16.84 ^{***}
Conversational tones	24.4 (4-39)	21.2 (3-45)	4.44 [*]
Social Play	3.7 (0-14)	3.4 (0-11)	1.88
<i>B. Infant activities</i>			
Attention	26.3 (11-34)	35.8 (15-44)	18.46 ^{***}
Dyadic	8.0 (0-20)	12.0 (1-25)	3.29 ⁺
Extradynamic	13.9 (3-27)	21.2 (5-36)	9.78 ^{**}
Vocalization	18.9 (7-39)	15.7 (2-39)	0.50
Distress	5.6 (0-21)	6.6 (0-28)	0.00
Nondistress	14.3 (1-37)	9.5 (2-25)	1.04
Touch	14.3 (2-33)	14.3 (0-30)	0.60

⁺ $p \leq .10$ ^{*} $p \leq .05$ ^{**} $p \leq .01$ ^{***} $p \leq .001$

mothers stimulate their infants' attention in equal amounts, and both tend to stimulate extradynamically more than dyadically. However the goals of stimulation tend to differ in emphasis between nationalities. An analysis of proportions confirms this cultural

difference in maternal stimulation of infant attention: Japanese mothers tend to stimulate in the two styles in more equivalent proportions of 42% dyadic and 58% extradyadic, whereas American mothers tend to favor extradyadic interaction styles 77% to dyadic ones 23%, a significant between-culture difference, $F(1,59)=5.57$, $p<.05$. Nevertheless, a comparison between the two cultures shows that Japanese mothers tend to stimulate dyadically more than American mothers, and American mothers tend to stimulate extradyadically more than Japanese mothers. Similarly, the total amount of speech mothers in the two countries direct towards their babies is the same, but American mothers tend to speak to their 5-month-olds in infant register more often, whereas Japanese mothers tend to favor adult conversational tones. (We want to underscore the tentativeness of this difference, since our judgments of maternal speech in infant register versus adult conversational tones provided the lowest observer reliabilities, $M=72\%$). Mothers in both countries speak in conversational tones more often than in infant register. Finally, the frequency of maternal bids to social play are similar in the two societies.

Infants. Basic data for infants appear in Table 1B. American infants tend to pay more attention in dyadic and extradyadic situations than do Japanese infants. Infants of both nationalities engage proportionally more in extradyadic than in dyadic attention, and do so in exactly similar degrees (63%). Japanese and American babies also vocalize equally often, including both distress and nondistress, and they also manipulate objects equally often.

Intracorrelations: Mothers then Infants

Second, we asked which basic activities among Japanese and American mothers correlate, and which among Japanese and among American infants correlate. Further, we asked how similar patterns of individual intracorrelations were in the two societies. Table 2 shows our findings. Overall, patterns of correlation among mother activities are highly similar in the two societies. However, some differences in terms of maternal coordination of speech and action in the two cultures emerge. Patterns of correlation among infant activities at 5 months are nearly identical in the two societies.

Mothers. Basic intracorrelation among mother activities appear in Table 2A; several constitute part-whole associations, and so we limit comparisons to those that are meaningful. Maternal stimulation is positively and comparably related to total maternal speech, although there is a suggestion that Japanese mothers who stimulate their infants' attention more tend to use conversational tones, whereas American mothers may favor the infant register. Additional light is shed on this distinction when the two forms of stimulation are considered separately. Among both Japanese and American mothers dyadic and extradyadic styles of infant stimulation are independent. However, Japanese mothers who more often engage their infants in dyadic interactions also tend to favor use of the infant register, whereas American mothers tend to favor use of conversational tones; and American mothers who more often engage their infants in extradyadic interactions tend to favor use of the infant register, whereas Japanese mothers tend to favor use of conversational tones. Social play and attention stimulation are basically independent maternal activities in both societies; consonant with the foregoing analysis, however, the more Japanese and American mothers play with their infants, the more they talk to them, but among Japanese mothers, not American, use of the infant register and social play

TABLE 2

Activity Intracorrelations: Japanese and American Mothers and Japanese and American Infants

	1.		2.		3.		4.		5.		6.		7.	
	J	A	J	A	J	A	J	A	J	A	J	A	J	A
<i>A. Mother Activities</i>														
1. Stimulation	—	—												
2. Dyadic	.59***	.25	—	—										
3. Extradynamic	.86***	.96***	.10	-.02	—	—								
4. Speech	.35*	.73***	.34*	.34*	.22	.61***	—	—						
5. Infant register	.29	.47**	.48**	.09	.04	.44**	.53***	.32*	—	—				
6. Conversational tones	.36*	.26	.21	.29	.32*	.18	.93***	.63***	.32*	-.46**	—	—		
7. Social Play	.03	.18	.34*	.13	-.18	.11	.24	.33*	.60***	.11	.04	.19	—	—
<i>B. Infant Activities</i>														
1. Attention	—	—												
2. Dyadic	.39*	.40*	—	—										
3. Extradynamic	.64***	.65***	-.04	-.01	—	—								
4. Vocalization	.19	-.05	.10	.30*	-.06	-.39*	—	—						
5. Distress	-.03	-.14	-.03	.10	-.10	-.39*	.30*	.79***	—	—				
6. Nondistress	.20	.09	.13	.35*	-.01	-.25	.86***	.67***	-.22	.10	—	—		
7. Touch	.42**	.36*	.02	.10	.53***	.62***	.05	-.11	-.20	.04	.16	-.29	—	—

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

J = Japanese; A = American

covary. It is interesting to note, too, that the strengths of association between speech and attention stimulation generally, and in specific extradynamically, are greater in American mothers than in Japanese mothers.

Infants. Basic intracorrelations among infant activities appear in Table 2B. In both Japanese and American babies, overall looking and vocalizing are independent activities, but in both looking (especially extradynamically) is associated with touching, whereas vocalizing and touching are not associated in either.

Intercorrelations: Mothers with Infants

Third, we asked whether in Japan and in America the basic activities of mothers and their infants interrelate. Further, we asked how similar these patterns of interrelations are in the two societies. Table 3 shows our findings. In broad strokes, patterns of intercorrelation between Japanese mothers and their babies parallel analogous patterns between American mothers and their babies; nevertheless, interesting differences also emerge.

Consider, first, patterns of relations between maternal stimulation of infant attention and infant attention itself, and between maternal speech to infants and infant vocalization. Within both Japanese and American dyads, mothers who engage their infants more have infants who attend more. Moreover, both nationalities give evidence of a high degree of specificity of interaction: More maternal dyadic encouragement is met with more infant dyadic orientation, and more maternal extradynamic encouragement is

TABLE 3
Activity Intercorrelations: Japanese Mothers with Infants and American Mothers with Infants

	Infant Activities													
	Attention		Dyadic		Extradynamic		Vocalization		Distress		Non-distress		Touch	
	J	A	J	A	J	A	J	A	J	A	J	A	J	A
<i>Mother Activities</i>														
Stimulation	.44**	.55***	.32*	.08	.53***	.65***	.06	-.38*	-.13	-.21	.14	-.39*	.11	.42***
Dyadic	.28	.08	.55***	.61***	.01	.02	.14	.06	-.03	.07	.20	-.03	-.06	-.06
Extradynamic	.38*	.54***	.04	-.09	.65***	.68***	-.04	-.44**	-.18	-.27	.05	-.42**	.18	.47**
Speech	.20	.49**	.46**	.34*	-.09	.33*	.48**	-.04	.18	-.09	.39*	.04	-.03	.05
Infant Register	-.12	.36*	.55***	-.16	-.22	.30*	.10	-.16	.15	.07	.03	-.28	-.25	.21
Conversational tones	.23	.22	.28	.47**	.03	.05	.50**	-.01	.24	-.24	.38*	.24	.06	-.26
Social Play	-.01	-.05	.48**	.15	-.31*	-.21	-.22	.12	-.28	.10	-.08	.07	-.11	-.20

* $p \leq .05$ ** $p \leq .01$ *** $p \leq .001$

J = Japanese ; A = American

met with more infant extradynamic orientation. This relation is perhaps best summarized in the intercorrelation of mother and infant proportions: For example, relatively more maternal extradynamic to dyadic focus of interaction is met with relatively more infant extradynamic to dyadic focus of attention among Japanese, $r = .70$, $p < .001$, and among Americans, $r = .46$, $p < .01$. (Further, among American dyads, maternal stimulation of infant attention, especially extradynamic, relates to infants' tactual exploration). This mother-infant consonance in mutual attention is not mirrored in conversation. Japanese mothers who speak more (in total or in conversational tones) have infants who vocalize more (especially of a nondistress sort); no such relation holds between American mothers and their infants.

Consider, next, patterns of crossrelations between maternal speech and infant attention. For Japanese dyads, there is a strong and consistent association between maternal speech (in total or of either kind) and infant dyadic attentiveness; by contrast, for American dyads, there is a strong and consistent association between maternal speech and infant extradynamic attentiveness. Finally, the data do not show conceptually meaningful crossrelations between maternal attention stimulation and infant speech.

Predictive Correlations

Finally, we asked what predictive relevance, if any, the infant and maternal activities we measured at 5 months may have for the infants' later development. We were particularly interested in Japanese children's cognitive growth since we and others have found in the U. S. that certain infant and maternal activities possess predictive validity for children's cognitive performance.

In specific, 26 of the original 31 Japanese infants were tested on the Japanese version of the Peabody Picture Vocabulary Test (PPVT)¹ when they reached 32 months of age.

1. PPVT was administered at a suggestion of G. Hatano and K. Takahashi.

Thanks are extended to them.

TABLE 4
 Predictive Correlations: Selected Japanese Mother and Infant
 Activities at 5 months to Japanese Child PPVT at 32 Months

5 months	32 months
<i>A. Mother Activities</i>	
Verbal Stimulation	.35*
New Stimulation	.36*
<i>B. Infant Activities</i>	
Vocalize Nondistress	.32*
Look	.32*
Touch	.38*

* $p < .05$

Table 4 shows illustrative predictive relations. In particular, two kinds of mother activities and three kinds of infant activities at 5 months moderately predict children's PPVT performance at 32 months. Infants whose mothers verbally stimulate more or stimulate more often by didactically introducing new things to their attention later as children score higher on the PPVT; in addition, infants who vocalize (nondistress) more and who explore their environments more by looking or by touching score higher on the PPVT. Parallel longitudinal results are known from research in the U. S. Previously, for example, Cameron, Livson, and Bayley (1967) found a similar linkage between vocalization in infancy and IQ performance in middle childhood, and Bornstein (1985) found that children who attended more efficiently to the environment as infants eventually scored higher on the Wechsler series. Likewise, Bornstein (1985) found that maternal encouraging of infant attention predicted childhood Wechsler performance.

Finally, we assessed the combined contributions of infant and mother at 5 months to child PPVT performance at 32 months using a hierarchical multiple regression, with infant variables entered first. We chose to test infant vocalize and touch and mother stimulate, which are all independent of one another. (Because visual attention overlapped with the two other infant variables as well as with the two maternal variables, it was omitted). Together, infant vocalization and touch account for 19% of the variance in PPVT. Separate analyses were then performed to determine which of the maternal variables adds more to the infant variables in accounting for children's PPVT performance. The increase in PPVT variance explained, beyond that already accounted for by the infant variables, was 10% for maternal new stimulation and 8% for maternal verbal stimulation. In both analyses, each infant and maternal activity accounts for approximately equal amounts of the unexplained variance; overall, however, the two infant activities in combination with maternal new stimulation produce the better fit, accounting for 29% of the variance, $F(3,22) = 3.04$, $p = .05$.

Summary and Conclusions

This comparison of behavioral observations of mother-infant dyads in Japan and in the United States was undertaken in a preliminary effort to document similarities and differences in infants' activities and experiences and in mothers' activities between the two cultures. The study was motivated by several separate but related rationales. Some concerned the need for basic cross-cultural comparisons of infant and maternal behaviors, particularly between Japan and the United States. Others concerned the significant roles that maternal child-rearing practices may play in children's cognitive growth.

We took advantage of ongoing independent studies of corresponding cohorts of mothers and babies in New York City and in Sapporo. In each location, we coded 31 5-month-old infants and their mothers interacting as they normally do in the natural setting of the home. For all data sets, activity codes and experimental techniques were extensively pretested and were found to transfer readily between cultural settings. The activity categories themselves were informed by theory, derived from the literature in social interaction generally and infant cognitive development specifically, and reflect discrete behaviors that represent interaction and are recognized to influence the development of cognitive and social competence in children.

We found several patterns of similarity and of difference between Japanese and American mothers and infants, and highlight and elaborate one salient example of each here. Consider one among many differences. Our comparisons seem to articulate with generally acknowledged cultural distinctions in maternal orientations and goals for infants in the two societies. It is widely held that Japanese mothers see the infant as an extension of self and organize their interactions so as to consolidate and strengthen the mother-infant bond; by contrast, it is equally widely held that American mothers wish to promote autonomy in the infant and organize their interactions so as to foster physical and verbal independence (Befu, 1986; Bornstein, 1986; Caudill, 1973; Chen & Miyake, 1983; Doi, 1973; Kojima, 1986; Morsbach, 1980). We have found that these cultural values are reflected in the everyday activities of mothers with their infants. Japanese and American mothers stimulate their babies equivalently, but Japanese mothers tend to organize their 5-month-olds' attention and activities within dyadic interpersonal interactions, whereas American mothers tend to organize extradyadic environment-oriented interactions. To support these tendencies, Japanese and American mothers tend to deploy attention-recruiting "baby talk" strategies selectively, as maternal use of the infant register is recognized as an intuitive, effective, and virtually universal way to attract and to hold an infant's attention (Fernald, 1985; Papoušek, Papoušek, & Bornstein, 1985). Among Japanese mothers engaging in dyadic interaction and addressing their babies in the infant register covary, and among American mothers engaging in extradyadic interaction and addressing their babies in the infant register covary. In this regard, stimulation and support appear to work together effectively towards the respective goals of Japanese and American mothers. Among American dyads, more maternal speech and more infant register as well as more extradyadic orienting are associated with the infant's focus on the inanimate environment; whereas among Japanese dyads, more maternal speech and more infant register as well as more dyadic orienting are associated with the infant's focus on the interpersonal world. Beyond attentional focus, it will be important, additionally, to

explore the meaningfulness of these infant activities and mother–infant interactions for differences in the evolution of infant temperament in the two societies (e. g., Bornstein, 1987; Bornstein, Gaughran, & Homel, 1986; Miyake, Chen, & Campos, 1985; Campos, Barrett, Lamb, Goldsmith, & Stenberg, 1983).

Equally noteworthy to these differences are some significant similarities between Japanese and American mothers and babies. Past research in the U. S. has shown long-term continuity of infant activities and the long-term predictive value of maternal interaction style in infancy for cognitive competence in childhood. Our longitudinal study revealed quite similar patterns among Japanese infants and their mothers. The fact that individual and interactive mechanisms found to have predictive value in one culture function analogously in a considerably different culture argues for the potential universality of these mechanisms. Our isolation of infant-rearing strategies that may efficaciously promote the growth of children's cognitive performance in different cultures call for further study (Bornstein, 1987).

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