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THE RELATION BETWEEN MOTHER-INFANT INTERACTIONAL CHARACTERISTICS IN EARLY INFANCY AND LATER ATTACHMENT AS ASSESSED IN THE STRANGE SITUATION

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Maternal and infant interactional characteristics in early infancy were investigated in order to examine the causal relationship with later attachment as assessed in the Strange Situation. Although the results of rating for maternal variables at 4 months of age exhibited significant differences between B_1-B_3 and B_4 & C, no significant differences were discovered between B and C. As for infant variables, only negative reactions to the stranger showed significant differences between B_1-B_3 and B_4 & C. Individual differences in this temperament related reactions were also found between B and C.

After analyzing "meshing" between mother and infant, several "meshing" patterns were discovered. With B_1-B_3 mothers and infants very good "meshing" was exhibited, whereas B_4 & C mothers and infants tended to show "out of tune" patterns because of either mother's inadequacy in interacting with her infant (e. g. B_4 mothers) or the infant's negative affect and behavior (e. g. C infants). These results suggest that later attachment as assessed in the Strange Situation may be determined not by maternal variables but by "meshing" or "compensative function in each partner". Infant temperamental disposition especially may function during interaction with the mother, and the temperamental tendency becomes apparent in a critical or stressful situation.

Key words : maternal sensitivity, infant reaction to a stranger, attachment classification, meshing between mother and infant.

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INTRODUCTION

Previous investigations have studied maternal sensitivity as determining the infant's behavior in the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978). Few investigations however have dealt with infant factors such as temperament which explain their behavior in the Strange Situation. Miyake, Chen, and Campos (1985) discussed Japanese mother-infant attachment relationships from this point of view. Ujiie and Miyake (1985) explored Japanese infants' crying response in each episode of the Strange Situation. Furthermore only a few studies have dealt with the relation between mother-infant interaction in early infancy and later attachment. Belsky, Rovin, and Taylor (1984) investigated maternal behavior in the first year and later attachment relationships. Lamb, Thompson, Gardner, Charnov, and Estes (1984) discussed security of infantile attachment as assessed in the Strange Situation. They interpreted infantile attachment from a biological point of view. Lamb, Thompson, Gardner, and Charnov (1985) thoroughly reviewed the origins and developmental significance of individual differences in strange situation behavior. They explained and discussed, in one chapter, the major longitudinal studies which have explored antecedents and consequences of mother-infant attachment relationships. Opinion is devided on antecedents and many results have not been confirmed yet. Therefore, the purpose of this paper is to examine antecedents of mother-infant attachment as assessed in the Strange Situation. The following points will be examined and argued in this paper. (1) Whether maternal sensitivity to infant distress in early infancy is related to later "quality" of attachment as Ainsworth insists, (2) What maternal variables other than sensitivity influence the developmental course of attachment, (3) How mother's mode of interaction and infant temperamental disposition in early infancy are related to later attachment.

METHOD

Subjects

The sample consisted of 29 middle-class mothers and their first-born infants. Twenty-three infants (16 boys and 7 girls) were followed from birth, and the other six (2 boys and 4 girls) from the age of 4 months. They were participants in a longitudinal study of infant's social-emotional development.

Procedure 1 : Home observation of mother-infant interaction at 4 months of age

Mother-infant daily interaction was observed and video-tape recorded by two observers at the subject's home. The observation and video-tape recording were temporarily suspended when the infant fell asleep and resumed after he (she) awoke. Each mother was instructed to behave as usual and to try to reduce their anxiety about being observed. The two observers sat at a corner of the room and made every effort not to interfere with the mother and infant's ongoing flow of behavior. The observation and recording covered both the morning and the afternoon hours. The video camera was situated at one corner of the room so as not to attract attention. A timer image indicated the real time. Total length of recording for each subject both in the morning and in the afternoon was about 90 minutes.

(1) Measurements of infant negative affect and behavior and mother's mode of interaction

Using timer indications on the screen by playing back video tapes, two coders coded frequencies and durations of infant negative episodes which included negative vocalization, fuss, cry and physical movement such as squirming, kicking, and so on. Mother's response time to those episodes was also recorded. With regard to infant's negative episodes, frequency, duration, and latency measures were obtained through this coding.

(2) Rating for maternal variables and infant variables

Two well trained raters independently rated both the maternal and the infant variables from the video tapes. They were blind to not only the purpose of this study but also the results concerning this project. Rating items used were selected from 'Rating Scales of Mother-Child Interaction' developed by Roseanne Clark et al (1980). After sufficient training and discussion so as to get an assessment based on behavior, seven items for maternal variables and two for infant were chosen.

(i) Explanations of maternal variables

Numbers at the beginning of an each explanation are the original ones in Clark's scales (Reference Note).

(9) Amount of expressed positive affect
Toward child (e. g., touch, smile, affection, hugs, enthusiasm).

1. None.
2. Slight positive affect (one or two times for a brief period).
3. Some positive affect (three or four times for a brief period).
4. Moderate positive affect expressed (five or more times for a longer period than in # 3). Not frequently or characteristically.
5. Considerable positive affect expressed frequently, easily and characteristically.

(11) Mother's involvement with child-connectedness
Engagement ; in tune with.

1. No involvement, distant ; totally unaware ; rarely even looks at child ; unconnected.
2. Very little involvement ; makes only brief, fleeting periods of contact ; this may also manifested by "going through the motions"; quality of interaction.
3. Moderate but sporadic or less intense involvement, involved some of time.
4. Considerable but not characteristic involvement. Brief, fleeting periods of uninvolvement.
5. Very involved ; engaged ; connected ; in tune with child.

(12) Mother's intrusiveness
This variable evaluates the mother's intrusiveness and focusses on her interferance and domination of her child. This includes overstructuring, overcontrolling, interfering, etc., so that the child's initiative is often thwarted.

1. Very intrusive ; domineering.
2. Frequently intrusive (one or two instances of respect for child's initiation).
3. Moderately intrusive.
4. Slight intrusive behavior (one or two brief instances).
5. Not at all intrusive ; may or may not include respecting child's autonomy.

(15) Spontaneous, Creative
Initiating novel interactions with child ; may include following child, extending and elaborating child's initiation.
Raters may infer mother's ingenuity and resourcefulness.

1. Not creative.
3. Some indication of creativity ; ingenuity ; resourcefulness.
5. Very creative ; original ; resourceful.

(22) Mother reads child's cues and responds sensitively and appropriately. This variable is composed of mother's ability to accurately observe her child's cues, to understand what the child's needs and wants (empathize) and demonstrates the capacity to respond appropriately to the child needs. This may also include comforting and soothing a child when he is distressed.

1. Insensitive to child ; oblivious to child's cues ; consistently misreads or misinterpretes child's cues.
2. Basically insensitive and/or oblivious to child's cues.
3. Demonstrates some capacity to read child's cues and to respond somewhat appropriately.
4. Reads child's cues and responds appropriately and sensitively most of the time.
5. Very empathic; characteristically reads child's cues and responds sensitively and appropriately.

(24) Mirroring
This variable measures the behavioral indicators of the mother's emotional availability to the child. It can be seen in the mother's reflection of the child's affect and/or behavior through imitation, echoing, (with infants), gazing, smiling, confirming behavior, approval, encouragement, and praise.

1. No evdience of mirroring.
2. Slight evidence (one or two instances of minimal intensity).
3. Some evidence of mirroring.
4. Considerable number of instances.
5. Optimal mirroring characteristic.

(25) Structures and mediates environment
This variable attempts to assess the mother as the child's first or auxiliary ego, i., e., a mother's demonstrated capacity to take the role of an adult caretaker as appropriate to her child's needs. This can include modulating affect and stimulation, and structuring the interaction between them and limit setting. This can be measured by looking at how much she gains, helps to focus, and sustains attention to the relevant aspects of the situation. With young infant, this is manifested by good caretaking.

1. No instances of providing structure or mediation of environment.
2. A few attempts to structure/mediate.
3. Moderate amount of structuring/mediating.
4. On most occasions takes role of adult caretaker where this is appropriate.
5. Characteristically takes role of adult caretaker.

(ii) *Explanations of infant variables*

(38) Irritability

Irritable ; tense ; moody ; fussy. May include difficult to care for, difficult to soothe. Raters should keep in mind frequency, intensity and duration.

1. Extremely irritable.
2. Generally, but not exclusively irritable.
3. Moderately irritable.
4. Slightly irritable.
5. No irritability.

(39) Pleasant, cheerful, easy-going

1. Not at all.
2. Slightly pleasant, cheerful, easy-going (brief periods of cheerfulness).
3. Moderately cheerful ; somewhat pleasant or easy-going.
4. Usually pleasant, cheerful, and easy-going. Not characteristic.
5. Characteristically pleasant, cheerful, or easy-going.

Interrater agreements for both maternal and infant's variables ranged from 80% to 100%. With regard to disagreements over 2 points, final decision was made after thorough examination and discussion among the raters.

Procedure 2 : Measurement of infant reaction to a stranger at 4 months of age

In order to evaluate individual differences in infant reaction to a stranger, a strange situation paradigm was carried out in each infant's home before the observation of mother-infant interaction at 4 months of age. Table 1 indicates summary of the strange situation. Infant sat leaning back in a baby's reclining seat during this procedure.

Infant behavior to a stranger was rated using the revision by the author of sociability assessment scales by Lamb (1982) which were devised in order to assess infant's reaction to an initial encounter with an unfamiliar female adult stranger with particular attention to the components of wariness and affiliation which characterized the baby's responses to the stranger's social bids. The revised rating scores for infant's reaction to a stranger's

TABLE 1

Summary of Strange Situation at 4 Months

Episode	Person Present	Duration(Min.)	Brief Description of Action
1	M, I	2	Mother interacts with infant sitting by him (her).
2	M, I, S	1	Stranger enters and sits by the infant just looking at him (her).
3	M, I, S	1	Stranger calls infant's name and begins interaction (playing peek-a-boo).
4	M, I, S	1	Stranger touches infant's hands or feet.
5	I, S	1	Mother leaves the room. Stranger interacts with the infant.
6	M, I, S	1	Mother comes back and begins to play with the infant.
7	M, I	1	Stranger leaves the room. Mother turns her back without any response to infant initiation.

M=Mother I=Infant S=Stranger

initiation were as follows ;

1. Crying, fussing or other indications of distress.
2. Refusal to join by turning toward mother or another toy, turning away from the stranger, or just looking at stranger.
3. Initially reluctant, then participates.
4. Immediately joins in and participates with stranger.
5. Actively participates in interaction with stranger by smiling.

Interrater agreement ranged from 91% to 94%.

Procedure 3 : Attachment classification according to behavior in the Strange Situation at 12 months of age

The original Ainsworth Strange Situation procedure was used to assess mother-infant attachment relationship at 12 months. The details of this procedure were previously described (Miyake et al, 1983).

Using the original interactional coding system (Ainsworth et al, 1978), two well trained Japanese raters independently assessed strange situation behavior for all subjects. In addition an American rater also independently rated all the subjects. Interrater agreement regarding 6 categories (Proximity-seeking, Contact-maintaining, Resistance, Avoidance, Distance Interaction, and Searching) were sufficiently high. If one point difference was permitted, the percentage agreement ranged from 79% to 98%. Some cases were difficult to classify because their behavior patterns did not fit the original classification standards. Although these cases are open to further discussion, their classification by an American specialist was finally adopted.

Twenty-one subjects out of 29 were classified as B type and 8 were C type. According to the original rating system, subgroups were also determined, that is 17 were B_1 to B_3, 4 were B_4, 4 were C_1, 3 were C_2 and 1 was Pseudo-C which was not included in the original subclassification. In this paper, the subjects were divided into two groups (B_1-B_3 vs B_4 & C). However the data from total B (B_1-B_4) and total C (PC was included) were also analyzed.

RESULTS AND DISCUSSION

1. Comparison of infant's negative affect and behavior and mother's mode of interaction at 4 months and later attachment classification

Infant frequency of negative episodes (IFN), infant mean duration of negative episodes (IMD), infant longest duration of negative episode (ILD), mother's frequency of unresponsiveness of infant negative episodes (MFU), and mother's mean latency to respond to infant negative episodes (MML) were all calculated from the transciption of video tapes. Infant frequency of fussing and crying was transformed into the proportion of total observation units, by using the live coding data.

The mean, and standard deviation or the range for each measure are shown in table 2. No measures revealed any significant differences between B_1-B_3 and B_4 & C by Mann-Whitney U-Test. When B_4 was combined with the B_1-B_3 group, no significant differences between B and C were discovered. The antecedents for future B and future C were not revealed in these measures because there was a wide range in each measure regardless of the attachment classifications.

TABLE 2

Infant Negative Episode and Mother's Mode of Interaction

		B_1-B_3	B_4 & C
Infant Frequency of Negative Episode (IFN)	M.	25.6	28.8
	(SD)	(18.6)	(17.6)
Infant Mean Duration of Negative Episode (IMD)	Range	4.6	6.7
	sec.	~35.8	~40.6
Infant Longest Duration of Negative Episode (ILD)	M.	94.4	127.2
	(SD)	(84.3)	(86.2)
Infant Fuss / Cry-Proportion of Total Observation Units (F/C)	M.	16.5	18.4
	(SD)	(11.3)	(12.3)
Mother Frequency of Unresponsiveness to Infant Negative Episode (MFU)	M.	3.6	7.3
	(SD)	(3.8)	(10.1)
Mother Mean Latency to Respond Infant Negative Episode (MML)	Range	1.0	1.3
	sec.	~13.8	~23.4

2. Relation between infant negative episodes and mother's mode of interaction

The interrelations between infant negative episodes and mother's mode of interaction to infant negative episodes within attachment classifications were analyzed (Table 3). As for IFN vs MFU, IMD vs ILD, IMD vs MML, ILD vs MFU, and F/C vs MFU, siginificant positive correlations were found in both attachment groups. High frequencies of infant negative episodes and fuss/cry were positively related to high frequency of mother's unresponsivity. Mother's prompt response was positively related to infant's short duration of negative episodes. With regard to IFN vs ILD, ILD vs MML, MFU vs MML, F/C vs MML, a different tendency was exhibited in each attachment group. With B_1-B_3, infant negative episode was significantly related to his (her) longest duration of negative episode but infant longest duration of negative episode and the proportion of fuss/cry were not significantly related to mother's prompt response. On the other hand the reverse tendency was noted in B_4 & C. Infant's longest duration of negative episode and his (her) proportion of fuss/cry were significantly related to mother's prompt response.

After B_4 was added to B_1-B_3, few differences from the correlations shown in table 3 were found within the B group and C group except for IMD vs MML of C group which showed no significant correlation. In C group infants mean duration of negative episodes and their mother's promptness of response were not significantly related to each other. In other words, their duration of negative affect and behavior are related to various aspects of mother's mode of interaction other than promptness or it is related to their own temperamental disposition.

No significant correlations were found for IFN vs MML, and IMD vs MFI in both groups. These results suggest that mothers usually responded to infant distress, although they varied in responding style. Some mothers were prompt to respond to their infant distress and others were very slow. Seventy-five percent of B_4 mothers were slow

TABLE 3

Correlations among Infant and Mother Measures (4 Months)
Broken down by Later Attachment Classification

			B_1-B_3 (N=17)	B_4 & C (N=12)
IFN	vs	IMD	0.1466	−0.0726
IFN	vs	ILD	0.6160*	0.1708
IFN	vs	MFU	0.5206*	0.5387*
IFN	vs	MML	−0.2240	0.1660
IMD	vs	ILD	0.4571s	0.7999**
IMD	vs	MFU	0.0783	0.2509
IMD	vs	MML	0.5838**	0.7766**
ILD	vs	MFU	0.4855**	0.6124**
ILD	vs	MML	−0.0055**	0.7334**
MFI	vs	MML	0.0267	0.5396s
F/C	vs	MFU	0.5417*	0.6436**
F/C	vs	MML	−0.1802	0.7047**

** $p<0.01$ * $p<0.05$ s $p<0.1$
Each abbreviation is the same one as shown in TABLE 2

responders (9.8−22.4 second delay), while 85.7 percent of C mothers were not slow responders (1.3−6.5 second delay).

On the relationship between the two maternal measures (MFU vs MML), a significant positive correlation was discovered only in B_4 & C. Mothers who showed a higher frequency of unresponsiveness also exhibited a longer lasted period for responding, while B_1-B_3 mothers varied in unresponsiveness and promptness.

Summarizing the results from tables 1 and 2, some relations between infant negative affect/behavior and mother's unresponsiveness and promptness were revealed in both attachment groups. Therefore maternal unresponsiveness and prompt response in early infancy were not the only decisive factors for later attachment assessed in the Strange Situation in Japan (Bell, S. M. & Ainsworth, M. D. S. 1972).

3. Rating for maternal variables at the age of 4 months and later attachment classification

Table 4 indicates the distribution of rating scores for maternal variables at the age of 4 months by attachment classifications. Rating scores were divided into three grades, 1−2.5 (low), 3 (average), 3.5−5 (high). Comparing the two attachment groups, significant differences were found on 5 variables (Structuring, Unintrusive, Involvement, Mirroring, and Positive affect). On 2 variables (Spontaneous and Sensitive), differences between the two attachment groups were a little short of significant level. In general the distribution for B_1 -B_3 inclined toward the higher rating scores, whereas the mothers of B_4 & C had a distribution which tended to lean toward lower scores. However these different tendencies between the B_1 -B_3 and B_4 & C were not exhibited between the total B group and C group. Therefore the differences between B_1-B_3 and B_4 & C were caused by the results of B_4 mothers. Not all the C mothers were rated very low. Judging from these results the "quality" of later mother-infant attachment relationship assessed in the Strange Situation

TABLE 4

Distribution of Rating Scores for Maternal Variables (4 Months) by Later Attachment Classification

Variables	Attachment Classication	Rating Scores			χ^2	p
		1-2.5	3	3.5-5		
Structure	B_1-B_3	1	8	8	6.284	0.05
	B_4 & C	5	5	2		
Spontaneous	B_1-B_3	3	5	9	4.850	0.1
	B_4 & C	6	4	2		
Unintrusive	B_1-B_3	1	7	9	8.227	0.025
	B_4 & C	6	4	2		
Involvement	B_1-B_3	0	5	12	6.720	0.05
	B_4 & C	4	3	5		
Mirroring	B_1-B_3	0	4	13	8.778	0.025
	B_4 & C	5	1	6		
Sensitive	B_1-B_3	1	3	13	6.631	0.1
	B_4 & C	4	3	5		
Positive Affect	B_1-B_3	0	2	15	7.290	0.05
	B_4 & C	4	2	6		

was not determined by simply maternal "sensitivity" in early infancy (Ainsworth et al., 1978). Other aspects of maternal variables such as unintrusiveness, genuine involvement, structuring and mediating environment, mirroring or positive affect have a cumulative effect on infant social-emotional development and indirectly influence infant's strange situation behavior.

4. Comparison of infant variables (4 months) by later attachment classification

To investigate infant's affective and behavioral differences in early infancy, three kinds of data measured in different procedures were analyzed. As for the proportion of Fuss/Cry from live coding data and the rating scores of temperamental disposition (Pleasant/Irritable) from video tapes, no significant differences were found between the two groups. However only negative reactions to a stranger (NR to ST) showed significant differences between B_1-B_3 and B_4 & C. Namely, 13 out of 16 B_1-B_3 infants (81.3%) were evaluated as expressing low NR to ST, whereas 7 out of 11 B4 & C (63.6%) were rated as expressing high NR to ST ($\chi^2=3.872$, df$=1$, $p<0.05$). When B_4 infants were added to B_1 - B_3 group, the same differences were suggested between B and C. That is, 14 out of 19 B infants (73.7%) expressed low NR to ST, 5 out of 8 C infants (62.5%) expressed high NR to ST ($\chi^2=3.694$, df$=1$ $p<0.1$). This result suggests that infant temperamental aspects were not manifested in a mildly stressful or stressless situation like a home environment, but were clearly manifested in the face of strangeness. The infant must cope with strangeness by his (her) own coping method. Some infants would behave as usual and others would withdraw from the strangeness. Infants classified as C at 12 months had a tendency to show negative or indifferent reactions to the stranger and withdrew from her at 4 months, while many B infants were not very agitated by the stranger and showed

positive or sociable reactions. However the finding that some B infants showed negative reactions and some C infants showed positive ones indicate there may be other factors involved which determine later attachment.

5. "Meshing" between mother and infant

Figures 1 and 2 illustrate "meshing" between mother and infant. The asterisk "※" represents the positive results and the slash "／" represents the negative results for maternal and infant variables. One pair from B_1-B_3 group and one from B_4 & C were

(MOTHER) (B_1-B_3)	1 0 2	1 1 7	2 0 2	1 1 3	1 0 7	1 0 4	2 0 1	2 0 5	1 2 0	1 0 8	1 0 9	2 0 8	2 0 3	1 2 1	1 1 1	1 0 5
Structure	／	／	／	／	／	＊	＊	＊	／	／	＊	＊	＊	＊	＊	＊
Spontaneous	／	／	／	／	／	＊	／	／	＊	＊	＊	＊	＊	＊	＊	＊
Unintrusive	／	／	＊	＊	＊	／	／	／	＊	／	／	＊	＊	＊	＊	＊
Involvement	／	／	＊	＊	＊	＊	／	＊	／	＊	＊	＊	＊	＊	＊	＊
Mirroring	／	／	＊	／	＊	＊	＊	／	＊	＊	＊	＊	＊	＊	＊	＊
Sensitive	／	／	＊	＊	＊	＊	＊	＊	／	＊	＊	＊	＊	＊	＊	＊
Positive affect	／	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊
(INFANT) (B_1-B_3)																
Fuss / Cry	＊	／	／	＊	＊	＊	＊	＊	＊	＊	＊	／	＊	＊	＊	＊
Pleasant	＊	＊	／	＊	＊	＊	＊	＊	＊	＊	＊	＊	／	＊	＊	＊
Irritable	＊	＊	／	＊	＊	＊	＊	＊	＊	＊	＊	／	＊	＊	＊	＊
NR to ST	＊	＊	＊	／	／	／	＊	＊	＊	＊	＊	＊	＊	＊	＊	＊

FIGURE 1 Illustration of "Meshing" between Mother and Infant. "＊" represents higher rating scores (4,5),"／" represents lower ones (3,2,1) for all the maternal variables and for three infant variables (Pleasant,Irrtable, and NR to ST).
"＊" represents lower Fuss ／Cry, "／" represents higher Fuss／Cry. The vertical numbers of 3 figures indicate the IdentificationNumbers for the subjects.

(MOTHER) (B_4 & C)	2 1 1	2 0 6	1 0 6	B_4 2 0 4	2 1 4	2 1 2	1 1 5	B_4 1 1 0	B_4 1 1 6	# 2 0 7	# 1 1 4
Structure	＊	／	／	／	／	／	／	／	＊	／	／
Spontaneous	／	／	／	／	／	／	／	／	／	／	＊
Unintrusive	／	＊	／	／	／	／	／	／	＊	／	／
Involvement	＊	／	／	／	／	／	／	＊	＊	＊	＊
Mirroring	＊	／	／	／	／	／	＊	＊	＊	＊	＊
Sensitive	＊	＊	／	／	／	／	／	＊	＊	＊	＊
Positive affect	＊	／	／	／	＊	／	／	＊	＊	＊	＊
(INFANT) (B_4 & C)											
Fuss ／ Cry	／	／	／	／	＊	＊	／	＊	＊	＊	＊
Pleasant	／	／	／	＊	＊	＊	＊	＊	＊	＊	＊
Irritable	／	／	／	／	＊	＊	＊	＊	＊	＊	＊
NR to ST	／	／	／	／	＊	／	＊	／	／	＊	＊

FIGURE 2 Illustration of "Meshing" between Mother and Infant. "＊" represents higher rating scores (4,5),"／" represents lower ones (3,2,1) for all the maternal variables and for three infant variables (Pleasant, Irritable, and NR to ST).
"＊" represents lower Fuss ／ Cry, "／" represents higher Fuss ／Cry. The vertical numbers of 3 figures indicate the Identification Numbers for the subjects. "＃" indicates difficult cases to classify.

omitted because of the infants' missing data.

Comparing the numbers of "※" between B_1-B_3 and B_4 & C, 5 out of 16 B_1-B_3 mothers had seven (31.25%), whereas none of B_4 & C mothers got seven (0%). Two of B_1-B_3 had six (12.5%), 3 had five (18.75%), 4 had four (25%), while 1 of B_4 & C had six (9.1%), 2 had five (18.2%), 2 had four (18.2%). With regard to few positive results, one of B_1-B_3 had only one "※" (6.25%), one had no "※" but had seven "／" (6.25%), whereas one of B_4 & C had two (9.1%), 2 had only one "※" (18.2%), and 3 had no "※" but seven "／" (27.2%).

Nine out of 16 B_1-B_3 infants got four "※" (56.25%), whereas 3 out out of 11 B_4 & C infants had four "※" (27.2%). Five of B_1 -B_3 had three (31.25%), one had two (6.52%), and one had only one (6.52%). Four of B4 & C got three "※" (36.4%), one had only one (9.1%) and three had no "※" (27.3%).

From these results, the differences between B_1-B_3 and B_4 & C in general were characterized by the arrangements of "※" and "／". In other words B_1-B_3 mothers and infants on the whole formed more "※" patterns, but B_4 & C mothers and infants on the whole formed less "※" patterns. The differences in the results of the two attachment groups can be understood clearly by the contrasting arrangements of each pair. How to mesh with each other or how to compensate for each other can be indicated by the figures. From figure 1, we can see there are (1) good "meshing" pairs (Nos. 105, 111, 121), (2) "meshing" somehow by compensating mother's inadequacy on the part of infant (Nos. 102, 117), (3) moderate "meshing" by covering up for each other (the other numbers). Compared with figure 1, figure 2 indicates (1) "out of tune" pattern because of low keyed or negative affect and behavior of the two (Nos. 106, 206), (2) "out of tune" by infant's temperamental factors (No. 211), (3) somehow "out of tune" by maternal factors (Nos. 214, 212, 115), (4) "meshing" somehow by compensating the partner's inadequacy with each other (Nos. 110, 116, 207, 114).

The reasons why the same moderate "meshing" types were classified as different "quality" of attachment is that one which was called "secure" and the other "insecure", may be open to further discussion. One possible interpretation can be derived from the results of infant negative reactions to a stranger. Even if the mother and infant dyad harmonized or meshed with each other in a usual situation like home environment, infant's affect and behavior may change and be extremely limited in a strange situation. If the stress given by the strange situation is beyond their permissible limits, they tend to have some type of emotional disturbance. As a consequence they cannot cope with the situation by employing the usual modes of interaction. These reponse styles to strangeness can be regarded as their temperamental disposition.

CONCLUSIONS

Regarding the origins of individual differences in attachment, Ainsworth et al (1978) argued that in the first quarter of the first year mothers of infants later classified as insecurely attached were significantly more unresponsive to crying and displayed a lower proportion of affection and tender holding during pickups than did mothers of securely attached infants. But the examination of 29 subjects in this study could not confirm her findings.

Recently Belsky et al (1984) pointed out that "it would be inappropriate to conclude

that more maternal involvement and interaction with the infant is synonymous with sensitive care" (p. 719). They discussed their results in terms of "mother's relatively greater influence in determining individual differences in attachment, with overstimulation leading to avoidance, understimulation leading to resitance, and inermediate levels of stimulation leading to security" (p. 718).

In our sample, it is true that the level of maternal stimulation of C babies was found to be the lowest and that of the B babies was intermediate or high. However it may not be appropriate to conclude that the mother's stimulation is the only factor influencing the infant's behavior in the Strange Situation. For according to our finding temperamental disposition may also determine the result of his (her) behavior in the Strange Situation.

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