



HOKKAIDO UNIVERSITY

Title	Are Maternal Emotions Associated with Infant Temperament and Attachment?
Author(s)	KANAYA, Yuko; 金谷, 有子
Description	
Citation	乳幼児発達臨床センター年報, 9, 51-58
Issue Date	1987-03
Doc URL	https://hdl.handle.net/2115/25233
Type	departmental bulletin paper
File Information	9_P51-58.pdf



Are Maternal Emotions Associated with Infant Temperament and Attachment ?

Yuko Kanaya

Kokugakuin Women's Junior College

This research focused on the relationship between maternal emotion and infant temperament. Attachment classification at 12 months was also examined from the perspective of its relation to mother's perception of her emotion as well as that of infant temperament. Twenty-five mothers and their first-born infants were investigated at the age of 16 months. Mothers' primary emotions such as fear, sadness or expectancy measured by the Emotions Profile Index (EPI) were significantly related to infants' intensity of emotional expression or approach-withdrawal dimensions on the Infant Temperament Questionnaire (ITQ). It was suggested that mothers' higher (vs lower) joy and infants' easy (vs difficult or slow-to-warm-up) temperament interacted with each other. In addition, infant's mood was correlated with her(his) emotional behavior during a separation procedure in the home. A relationship between higher maternal fear and negative infant behavior such as crying, fussing and so on was also discovered. As for attachment classification, a significant association with infant's temperamental tendency to be easy vs slow-to-warm-up was evident. Theoretical interpretations for these results were discussed.

Key words: EPI; ITQ; maternal emotion; infant temperament; attachment

Attention has come to be paid to the study of the role of temperament recently. Goldsmith, Bradshaw, and Rieser-Danner (1986) overviewed temperament-attachment studies and discussed how individual differences in the various dimensions of temperament might influence the developing attachment relationship. They stated that "temperamental proneness to distress is imperfectly associated with future type C classification. Maternal perception of temperamental interest, persistence, and pleasure may be associated with classification as type A" (p.28). They concluded that theorizing that appreciates the full complexity of both temperament and attachment is necessary.

Another approach to the issue of whether different temperaments elicit different caregiving was taken by Crockenberg (1986). After she reviewed several studies that

This research was supported by grants from a) The Ministry of Education, Science and Culture (Principal investigator, Kazuo Miyake), and b) The Ministry of Welfare (Research Project on mother-infant interaction: Principal investigator, Noboru Kobayashi).

I am greatly indebted to Professor Kazuo Miyake for supporting this research.

Request for reprint should be sent to Yuko Kanaya, Kokugakuin Women's Junior College, Takikawa, Hokkaido, 073, Japan.

predicted associations of different kinds between infant temperament and maternal caregiving, she pointed out several possible interpretations of those data. The interpretation she preferred was that “differences in temperament do influence caregiving, but that they also depend on characteristics of the caregiver and the caregiving environment” (p. 68). But she said this has not been adequately tested. So she discussed research designs that ensure behavioral independence of infants and maternal behavior.

Thus, the present situation is that a decisive measure and interpretation of the role of temperament in early social relations has not yet been found. Therefore one of the purposes of this study is to reexamine our longitudinal data on infant socioemotional development from the viewpoint of temperament and attachment. Another purpose is to investigate how maternal emotions relate to the infant's temperament. Few studies of temperament, attachment and social interaction have focussed on the role of maternal emotions in infant emotional development except for those of Campos et al. (1981, 1983), Klinnert et al. (1983) and Bradshaw (1986) also dealt with infant emotion and his(her) behavioral regulation by the emotional cues given by another person. In this paper attachment and temperament will be examined from the viewpoint of maternal emotional dimensions.

Method

Subjects

Twenty-five mothers and their first-born infants (14 boys and 11 girls) comprised the sample for this study. The mothers' mean age was 28.0 and the infants' was 16 months. They were participants in our longitudinal study on temperament and attachment from early infancy. The mothers had all received at least a high school education (13.1 years on the average) and they were not employed full-time. Their husbands were engaged in white-collar or professional vocations. As for attachment classifications obtained by the Strange Situation procedure at 12 months, nine were B₁ & B₂, 5 B₃ 2 B₄, 5 PC, C₁ & C₂ and 4 subjects had missing data because of equipment errors.

Procedure

(1) Emotions Profile Index (EPI)

We administered a questionnaire on emotions, the Emotions Profile Index (EPI), to mothers when we visited their homes for a 16 month assessment. The EPI is a forced-choice test which was developed by Plutchik and Kellerman (1974) on the basis of a psychoevolutionary theory of emotion. A Japanese version of the EPI was developed by Matsuyama and Hama (1974). Initially 12 trait terms such as adventurous, affectionate, brooding, cautious, gloomy, impulsive, obedient, quarrelsome, resentful, self-conscious, shy, and sociable were selected through psychometric techniques. They were then paired in all possible combinations, and after redundant combinations were eliminated, sixty-two pairs of trait terms were left. The mothers were asked to indicate which of the two paired words is more personally descriptive; for example, is she more quarrelsome or shy? The choices were scored in terms of primary emotions such as Timid, Aggressive, Gregarious, Depressed, Trustful, Distrustful, Controlled, Discontrolled which were implied by the trait words. The trait language used to describe the primary emotions are

synonymous with the subjective language terms fear, anger, joy, sadness, acceptance, disgust, expectancy and surprise respectively. The total score for each of eight primary emotion dimensions was converted into a percentile score based on data obtained from 500 women. Plutchik reported that each of the eight scales of the EPI had high internal reliability and they had significant correlations with the scales of MMPI and other well-known tests (Plutchik, 1980). According to Matsuyama, who introduced the EPI in Japan (1974), positive correlations were found between related scales on the EPI and those on the MMPI, for example, between the Timid scale and the Social introversion scale, or between the Depressed scale and the Depression scale. Negative correlations were discovered between the Trustful scale and the Social introversion and Depression scales and between the Distrustful and the Hysterical scale.

(2) *Infant Temperament Questionnaire (ITQ)*

The instrument employed to measure infant temperament was the Japanese version of the Carey Infant Temperament Questionnaire (Carey & MacDevitt, 1978; Shoji, 1981). The ITQ has been used for clinical assessment in spite of its psychometric shortcomings. For the present study it was used because of its availability in Japanese. Besides the original 9 categories of activity, rhythmicity, approach-withdrawal, adaptability, intensity of reaction, threshold, mood, distractability, persistence, two categories of spontaneity and responsiveness were added in the Japanese version.

(3) *Infant behavior assessed by a separation procedure at 16 months*

After a 10 minute free play session, infants experienced a 3 minute separation from mother at home in which they were left alone except for the presence of camera person. Their emotional behaviors of crying, fussing, negative vocalization, and withdrawal were coded.

Results

(1) *Eight scales of EPI*

The scores for the eight emotional scales were graded from high (scores over 60 percentile), intermediate (between 59 and 41) and low (under 40). In this sample, they were widely distributed and because of the small sample size, no clear association between the maternal emotions and attachment classification was evident. However on both the Disgust and Expectancy scales, nearly significant differences were found between mothers of B₁ & B₂ and B₃ & B₄ infants, if intermediate and low scores were combined ($\chi^2_s=3.37$, $p<0.1$). The mothers of B₃ & B₄ had higher Disgust scores and lower Expectancy scores, while mothers of B₁ & B₂ showed the opposite pattern.

(2) *Mothers' Emotions Profile*

The percentile scores of a temperamentally easy, B₃ boy's mother and a temperamentally slow-to-warm-up C₂ girl's mother were plotted on a circular diagrams, as illustrated in Figures 1 and 2 respectively. These figures indicate the following: The personality of the former is sociable, extroverted, impulsive or curious, not fearful, not depressive, critical but not hysterical, and tends to express anger, while the latter is

introverted, not sociable or friendly, fearful but not depressive, stubborn or critical but not tends to express anger. The individual structures woven by the eight primary emotions were varied and no profiles were similar on all eight dimensions.

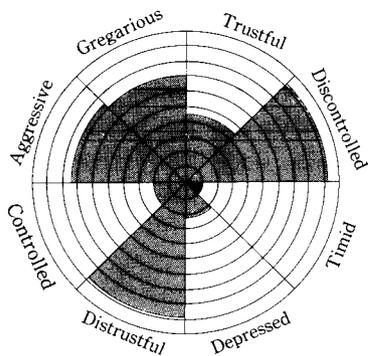


FIG. 1 Emotions profile for a temperamentally easy, B₃ boy's mother

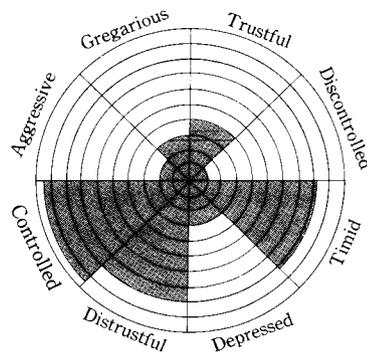


FIG. 2 Emotions profile for a temperamentally slow-to-warm-up, C₂ girl's mother

(3) Infant temperamental differences by ITQ

The distribution of the eleven categories of the ITQ were analyzed with respect to attachment classification. No significant differences were discovered among the attachment groups except that the B and C classifications differed in Spontaneity ($\chi^2_s = 5.45, p < 0.025$). Following Carey et al., we categorized the infants as "easy", "difficult", or "slow-to-warm-up" based on their scores on Rhythmicity, Approach-Withdrawal, Intensity, Mood and Adaptability as shown in Table 1. But few the infants conformed to the standard criteria, so in this study both the original categorization and categorization based on the relative scores on these scales within this sample were employed. According to the latter categorization, eleven out of fourteen B infants were easy (78.6%), while only three were difficult (21.3%), and one was slow-to-warm-up (7.1%). To the contrary, 60% of the C group were slow-to-warm-up, 20% difficult, and 20% easy. Significant differences were found between B and C groups in the number of infants classified as easy vs slow-to-warm-up ($\chi^2_s = 4.00, p < 0.05$).

TABLE 1

Distribution of "easy", "difficult", and "slow-to-warm-up" temperament by attachment classification

	"Easy" N	"Difficult" N	"Slow" N
B ₁ & B ₂	6(66.7%)	3(33.3%)	0(0.0%)
B ₃ & B ₄	5(83.3%)	0(0.0%)	1(16.7%)
PC, C ₁ & C ₂	1(20.0%)	1(20.0%)	3(60.0%)
No classification	1(25.0%)	0(0.0%)	3(75.0%)

Note: PC...Pseudo-C

(4) Infants' emotional behavior during separation

With regard to separation behavior, no significant differences were discovered with

respect to attachment classification because of the small sample size (Table 2). But as shown in Table 3 infants who cried, fussed or vocalized negatively during separation at home tended to be rated on the ITQ as showing more negative mood compared with those who showed no negative expression ($\chi^2_s=3.00$, $p<0.1$).

TABLE 2
Infants' emotional behaviors during separation from mother by attachment classification

	Cry <i>N</i>	Fuss <i>N</i>	Negative Vocalization <i>N</i>	Withdrawal <i>N</i>	No Negative Expression <i>N</i>
B ₁ & B ₂	2(22.2%)	0(0.0%)	3(33.3%)	0(0.0%)	4(44.5%)
B ₃ & B ₄	3(42.9%)	0(0.0%)	0(0.0%)	0(0.0%)	4(57.1%)
PC, C ₁ & C ₂	2(40.0%)	1(20.0%)	0(0.0%)	1(20.0%)	1(20.0%)
No classification	2(50.0%)	1(25.0%)	0(0.0%)	0(0.0%)	1(25.0%)

TABLE 3
Infants' emotional behavior during separation in relation to temperament

	Cry <i>N</i>	Fuss <i>N</i>	Negative Vocalization <i>N</i>	No Negative Expression <i>N</i>
Negative Mood	3(30.0%)	2(20.0%)	3(30.0%)	2(20.0%)
Positive Mood	5(35.7%)	0(0.0%)	0(0.0%)	9(64.3%)

Note: ITQ scales showing no significant association with separation behavior are omitted.

(5) *Relationship between the dimensions of the EPI and the categories of the ITQ*

High mother Fear on the EPI and low infant Approach on the ITQ were significantly associated ($\chi^2_s=4.17$, $p<0.05$). In other words mothers who considered themselves to be fearful had a tendency to rate their infants as shy or reserved. Maternal Acceptance and infant Approach revealed the opposite relation from Fear and Approach ($\chi^2_s=5.53$, $p<0.025$), that is to say, mothers high on Acceptance tended to regard their infants as more sociable or adventurous. Sadness and Intensity were also associated ($\chi^2_s=4.37$, $p<0.05$). The higher the score on Sadness the lower the Intensity rating. Intensity had the same relationship with Expectancy as Sadness ($\chi^2_s=4.29$, $p<0.05$).

With regard to infants' temperamental categories and mothers' emotions, an association was found between temperament and Joy ($\chi^2_s=3.00$, $p<0.1$). Mothers reporting higher Joy tended to think of their infants as easy, but those who had lower Joy score regarded their infants as difficult or slow-to-warm-up.

(6) *Mothers' emotional conflict and infants' temperamental differences*

According to Plutchik, if the scores for two opposite emotions were both higher than average, there might be a conflict between them. Trustful (Acceptance) vs Distrustful (Disgust), Discontrolled (Surprise) vs Controlled (Expectancy), Timid (Fear) vs Aggressive (Anger), Depressed (Sadness) vs Gregarious (Joy) are opposite emotions respectively. As for emotional conflict, fewer mothers of temperamentally easy infants

than mothers of difficult infants had such conflicting ratings (23.1% for easy, 57.1% for slow, and 75.0% for difficult). As the numbers of the subjects were very small, statistically significant differences were not evident.

(7) *Maternal emotional dimensions and infant emotional behavior*

Whether or not maternal emotions have any relation to infant emotional behavior during separation was analyzed. The result was shown in Table 4. Infants' crying, fussing, negative vocalization, and withdrawal were associated with higher maternal scores on Fear. Infants who showed no negative expression during separation had mothers lower on Fear ($\chi^2_s=2.98, p<0.1$).

TABLE 4
Infants' emotional behavior during separation and mothers' emotional dimension

Mother	Infant	
	Some Negative Expression <i>N</i>	No Negative Expression <i>N</i>
Higher Fear	11(73.3%)	4(26.7%)
Lower Fear	3(30.0%)	7(70.0%)

Note : EPI scales showing no significant association with separation behavior are omitted.

Discussions

The mothers' emotional dimensions had no significant relationship with attachment classification. However the infants' temperamental differences were significantly related to the attachment classification : many B babies were rated as easy while many C babies were rated as slow-to-warm-up. Maternal emotional conflicts were related to infant temperament : many mothers of easy infants had no emotional conflict while many mothers of slow-to-warm-up as well as those of difficult infants had emotional conflicts. These results can be interpreted as follows : The attachment classification assessed by the infants' behavior in the Strange Situation may reflect directly the infants' temperament and even though there was no significant relationship between mothers' emotional dimensions and infant attachment classification, it may indirectly reflect the mothers' emotional states by which the infants' temperament were perceived. Kanaya and Miyake reported (1986) that C mothers and infants tended to show "out of tune" patterns because of either mother's inadequacy in interacting with her infant or the infant's negative affect and behavior at 4 months of age. This result might be reconsidered from the viewpoint of mothers' emotional conflicts and infant temperament. The data of 16 months can also be understood from the standpoint of emotional communication, since mother's emotional availability and the expressed emotional state may have an effect on regulating emotional behavior for the infant or infant's negative affect and behavior may influence mother's emotion (Campos et al, 1981; Klinnert et al, 1983). Barrett and Campos (1984) reported that infants showed negative responses to conflicting emotions given by an experimenter.

With regard to the relationship between the EPI and the ITQ, the data partly support the idea that mother's perceptions of infant temperament may reflect her own emotional states. However a genetic explanation should not be disregarded. Both the relation between mothers' higher Fear and infants' lower Approach and higher Acceptance for mothers and higher Approach for infants can be understood from the two points of view stated above. Infants whose mothers reported higher fear may have inherited the same characteristic, since not only did their mothers report them to be fearful, but we observed more negative emotions in their separation behavior. For those whose mothers rated themselves as trustful, that is, not socially introverted, the same interpretation is possible. Another interpretation is that fearful mothers may have a tendency to restrain their infants' behavior and as a result the infants will become inhibited. On the contrary highly trustful mothers like to associate with other persons and therefore their infants can easily accept new situations. The origin of inhibition has not yet been sufficiently investigated. The relationships between lower maternal Sadness and higher infant Intensity and between lower maternal Expectancy and higher infant Intensity might be explained as follows: non-depressed or socially extroverted mothers not only saw their infants as clearly expressing emotions but also expressed their own emotions clearly. Although the origin and interpretation of these associations is not clear, at least we can say that there are some important relationship between mothers' emotions and infants' temperament.

As mentioned above infants' negative emotional behavior during separation reflects not only their negative mood but also mothers' higher fear. The former result suggests that temperamental characteristics such as mood could be rated properly by mothers. Moreover from the latter result we can say this: if mother is fearful, the infant is also timid or shows negative mood in a novel situation. This can be interpreted well from social referencing (Campos et al, 1983). A mother who often shows fear may transmit such emotional cues to her infant.

Some noteworthy correlations between maternal emotion and infant temperament were observed but there is still room for further study concerning the influence of mother's emotional structure or personality on infant emotional development.

References

- Barrett, K. C., and Campos, J. J. (1984). Use of conflicting emotions. Paper presented at the fourth international conference on infant studies. New York.
- Bradshaw, D. (1986). Immediate and prolonged effectiveness of negative emotion expressions in inhibiting infants' actions. Unpublished dissertation presented to the University of Denver.
- Buss, A. H., and Plomin, R. (1984). *Temperament: Early developing personality trait*. Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Campos, J. J., Barrett, K. C., Lamb, M. E., Goldsmith, H. H., and Stenberg, C. (1983). Socioemotional development. In M. M. Haith, and J. J. Campos (Eds.), *Handbook of child psychology. Vol. 2, Infancy and developmental psychology*. New York: Wiley.
- Campos, J. J. and Stenberg, C. (1981). Perception, appraisal and emotion: The onset of social referencing. In M. Lamb, and L. Sherrod (Eds.), *Infant social cognition*. Hillsdale, N. J.: Lawrence Erlbaum Associates.
- Carey, W. B., and MacDevitt, S. C. (1978). Revision of infant temperament questionnaire. *Pediatrics*,

61, 735-739.

- Crockenberg, S. B. (1986). Are temperamental differences in babies associated with predictable differences in care-giving? In J. V. Lerner, and R. M. Lerner (Eds.), *Temperament and social interaction in infant and children. New directions for child development, no. 3*. San Francisco: Jossey-Bass.
- Goldsmith, H. H., Bradshaw, D.L., and Risser-Danner, L. A. (1986). Temperament as a potential developmental influence on attachment. In J. V. Lerner, and R. M. Lerner (Eds.), *Temperament and social interaction in infant and children. New directions for child development, no. 3*. San Francisco: Jossey-Bass.
- Kanaya, Y., and Miyake, K. (1986). The relation between mother-infant interactional characteristics in early infancy and later attachment as assessed in the strange situation. *Annual Report, 1984-1985*, Research and Clinical Center for Child Development, Faculty of Education, Hokkaido University, 8, 31-42.
- Klennert, M. D., Campos, J. J., Sorce, J. F., Emde, R. F., and Svejda, M. (1983). Emotions as behavior regulators: social referencing in infancy. In R. Plutchik, and H. Kellerman (Eds.), *Emotion theory, research and experience. Vol. 2: Emotion on early development*. New York: Academic Press.
- Matsuyama, Y., and Hama, H. (1974). *Emotional Psychology: Theory and Psychopathology*. Tokyo: Seishinn Shobo (In Japanese).
- Plomin, R., and Dunn, J. (1986). *The study of temperament: Changes, continuities and challenges*. Hillsdale, N. J.: Lawrence Erlbaum Associates.
- Plutchik, R. (1980). *Emotion: A psychoevolutionary synthesis*. New York: Harper & Row.
- Plutchik, R., and Keilerman, H. (1974). *Emotions Profile Index manual*. Los Angeles: Western Psychological Service.
- Plutchik, R., Kellerman, H., and Conte, H. R. (1979). A structural theory of ego defence. In C. E. Izard (Ed.), *Emotions, personality, and psychopathology*. New York: Plenum.
- Shoji, J., and Maekawa, K. (1981). Infant temperament: Its significance and the method of assessment, *Japanese Journal of Pediatrics*, 44, 1225-1232 (In Japanese).