Individual Differences of Play-Target Pattern in Toy, Mother and Peer Situation as Consequence of Interaction between Attachment Type and Temperamental Disposition

Shigeru Nakano
Fuji Woman's Junior College
Hiroshi Usui
Hokkaido University of Education
Kazuo Miyake
Hokkaido University

In this report, we analyzed children's individual differences in shifts of pattern of play with three play-targets; toys, the mother and a peer in three situations at age 40 months. We related the play pattern to attachment type classified at 12 months of age and to temperamental disposition toward inhibition measured at 23 and 40 months of age. Children's patterns of play-target shift could be classified into five groups; two attachment-related, one temperament-related group and one attachment-temprament-interaction related group. Although the children who shifted play-target in an adaptive manner in each of three situations had been classified into attachment type B, they were only 1/3 of all B type children. While the children who showed difficulty in separating from the mother had temperamental disposition toward inhibition, they were only 1/3 of all inhibited children. Thus, independent and interactional influences of temperament and attachment on play were discussed.

Key words: adaptive behavior; play-target; attachment type; temperament; interaction

Some researchers have shown that the types of attachment, A, B, and C into which infants are classified using the Strange Situation Procedure (SSP) in the second year of life, have consistent effects through preschool on various domains, including compliance with the mother, task-solving persistence, affiliation with peers, ego-resiliance and independence from teachers in the preschool, (Matas, Arend & Sroufe 1978; Waters, Wippman & Sroufe 1979; Arend, Gove & Sroufe 1979; Londerville & Main 1981; Sroufe, Fox & Pancake 1983). They take the basic position that the attachment classifications

This research was supported by a grant in aid for scientific research (58450012) from the Ministry of Education, Science and Culture (Principal investigator: Kazuo Miyake). The authors would like to thank Donna L. Bradshaw for her invaluable comments on an earlier draft of this article, Yuko Kanaya for data collection and analysis on the peer-play session. Reprint requests should be sent to Shigeru Nakano, Fuji Woman's Junior College, Kita-Ku, Kita 16, Nishi 2, Sapporo, 001, Japan.

are strong and general predictors for adaptive or maladaptive development at later ages. This standpoint is strikingly represented in the statement that it was expected " that quality of attachment in infancy (rather than an index of early peer interaction skills) would predict competence and effectance in the peer group " (Waters et. al., 1979, p. 828). These researchers hypothesize that mothers who are highly sensitive to their infants' expressions provide the child a secure base for exploration of his/her environment and, as a result, promote the child's functioning and adaptation to developmental issues in the following years. In short, these researchers pay much attention to the effects of the mother on child adaptation.

On the other hand, as Thomas and Chess (1970) showed, children have individual differences in temperamental dispositions from early infancy. Miyake, Chen & Campos, (1985) and Campos, Barrett, Lamb, Goldsmith & Stenberg (1983) suggested that attachment type C babies (as classified by the SSP) may be temperamentally difficult babies from long before the attachment relationship is built. Moreover, Lee and Bates (1985) demonstrated a linkage between temperamental behavior features in early infancy and problem behaviors at age 24 months, using a maternal questionnaire. Also, Usui and Miyake (1985) showed a consistency of temperamental dispositions, especially, inhibition to novel objects or persons over the first three years. Therefore, temperamental features also can play a role as a predictor of the future behavior of children.

Thus, it has independently been shown that there are two kinds of factors which can be considered as controlling the adaptive or coping behaviors of children. However, we have found that those two factors are not independent, but have interactional effects. Miyake (1986) showed that almost all temperamentally fearful children with intrusive mothers were classified as attachment type C at age 12 months, whereas fearful children with non-intrusive mothers and non-fearful children, even though they had intrusive mothers, tended to be classified as type B. Nakano, Usui and Miyake (1986) demonstrated that individual differences in approach to a novel object (robot), a strange woman and a strange peer at 23 months were also dependent on the interaction between a temperamental feature (inhibition) and attachment type. The main results were that a) children who approached to none or only one of three novel targets were rated inhibited by their mothers at age 27 months, while b) children who approached two or all three were mainly B types and were rated uninhibited. In short, these results showed a tendency for B-type children's approach to depending on their behavioral inhibition, but for C type children to be unwilling to approach independent of their disposition toward inhibition.

Thus, these findings suggest that attachment and temperament have effects not in a simple fashion, but in a more complicated one so as to produce various behavior patterns in children. In this report, we will analyze children's adaptive behaviors on the form of duration of toy-play in a toy-play session, of play-with-mother in a mother-play session and of play-with-peer in a peer-play session at age 40 months. We also explore individual differences in the adaptive behavior in relation to the interactional patterns between attachment type and temperamental disposition toward inhibition across the three types of play situations.

Method

Subjects

Forty-seven 40 month-old children drawn from two cohorts, born in either 1980 or 1982, served as subjects of this study. There were 27 boys and 20 girls. Forty-two of them had been classified as to attachment type by the SSP at 12 months (see Miyake et al., 1983 for details of this classification). Thirty-nine of the children had been assessed for temperamental disposition toward inhibition at age 27 and 40 months. This disposition was found to be highly consistent across this period(see Usui & Miyake, 1985 about details of this assessment).

Procedures

At age 40 months, subjects came to our research center with their mothers and engaged in the following three sessions in the laboratory.

a. Toy-play Session: Subjects were asked to play with toys suitable for their age and sex for 10 minutes. Their mothers also were present in the room, sitting in a corner, but they were instructed to keep neutral attitudes toward the activities of their children and not to initiate interaction or direct the child.

b. Mother-play Session: Mothers were asked for 10 minutes to play with their children in a play room furnished with toys.

c. Peer-play Session: Two subjects unfamiliar with each other and their mothers were led into a play room furnished with toys and were given a chance to spend their time freely for 20 minutes. Mothers were given the same instruction as in the toy-play session.

Coding of childrens' adaptive behavior

All of the children's activities were video-taped from the next room with remote-control cameras. Then the duration (in second) of the following activities were coded from video-tape using a data recorder. This coding was done by the coder who did not have any information about the purpose of the assessment or the subjects.

a. With-toy: This code was assigned when children played with a toy or paid attention to any toy(s).

b. With-mother: This code was assigned when children interacted with their mothers, including conversation, body contact and any attention toward them.

c. With-peer: (only used for the Peer-play session) This code was assigned when children interacted with a peer, including conversation, negative interaction and observing.

d. Nothing: This code was assigned when children attended to nothing or to objects other than the above targets.

Coding reliability was calculated as agreement rate between two coders, $(1-((C_1+C_2)/(C_1-C_2)))\times 100$($C_1$: coder$_1$, C_2 : coder$_2$), on 10 subjects selected at random. The results showed sufficiently high reliability ranging from 84.6 to 98.8 percent.

Results and Discussion

General results through the three play session: All durations of the coded activities were divided into two groups; High or Low depending on whether the score were above or below each mean. High scores on with-toy in the toy play session, with-mother in the mother-play session, and with-peer in the peer-play session were considered to indicate adaptive behavior, and the number of highs and lows falling into each attachment and temperament type were compared. Although, B type children seemed to show more adaptive behavior throughout the three sessions than C type children, statistical tests did not show any significant differences between them. The same results were seen concerning the differences between temperamental types.

Classification according to patterns of play-target: All subjects were classified into subgroups according to the similarity in the patternning of their High and Low scores in the three play targets in the toy-play session and the mother-play session. As a result, five subgroups were formed as shown in Table 1. The first group consisted of the children who scored above the mean score on with-toy in the toy-play session, on with-mother in the mother-play session and who played mainly with peer or with toys in the peer-play session. This group can be named Adaptive Shift because the group is characterized as those children who shifted their play-target in accordance with the play-session to be adaptive. Ten of the thirteen children of this group (83.3%), whose attachment type was known, were B type children and only two were C type children (16.7%). This association was nearly significant ($x^2=3.27$, $.10>p>.05$). Other characteristics of the children of this group did not evidence a clear pattern except that over half of them (63.6%) were high on approach to novel targets. Thus the children in this group are considered to have developed coping skill(s) in novel situations like a laboratory.

The second group, named Toy Preference, consisted of children who showed high attention to toys in both toy-play and mother-play situations though this trend was not clear in the peer-play session. Their play target patterns were also characterized by low interaction with the mother. Even in the situation where their mothers were given a chance to interact actively with them, they did not attend to the mother as a play-mate. All members of this group except one child, whose attachment type was unknown, were B type children, similar to the Adaptive Shift group. But, these two groups are different in their behavior toward the mother as mentioned above. Temperamental characteristics did not relate to the play patterns of children in this group.

The third group, Mother Preference, was formed by fourteen children who showed preference for play with their mother in both the toy-play and the mother-play session. Nine of the children excluding three children, on whom we did not have temperamental data, had been classified into inhibited (81.8%) and only two as uninhibited at 23 months of age. In short, almost all of this group members are inhibited children ($x^2=3.27$, $p=.072$). The same trend continued until 40 months of age although it did not reached significant level at this age. The children in this group also tended to avoid approaching to novel targets at 23 month of age. But, in contrast to the above two groups, the attachment type did not have a relationship with the behavior pattern of the children in this group. Thus, *inhibition* as a temperamental disposition is considered as having an independent contribution from attachment type on the ability of children to separate from

TABLE 1

Play-target shift patterns across three play session and effects of temperamental dispositon and attachment classification on them.

AGE		40 M.									7 M.	12 M.	23 M.	27 M.	40 M.
	SESSION	TOY-PLAY			MOTHER-PLAY			PEER-PLAY			RtoS	ATTA	APRH	ECPI	ECPI
GROUP	CASE	NON	TOY	MOM	NON	TOY	MOM	PEER	TOY	MOM	FEAR	CLSS	NOVL	INHB	INHB
	1102	L	H	L	L	L	H	H	H	L	FEAR	PC	L	IN	IN
	1104	L	H	L	L	L	H	H	H	L	NOT	B4	L	/	/
	1106	H	H	L	H	L	H	L	H	H	FEAR	B2	H	/	IN
	1213	L	H	L	L	L	H	L	H	L	FEAR	C2	H	UN	UN
	2103	H	H	L	H	L	H	L	L	L	NOT	B3	L	/	IN
	2107	L	H	L	L	L	H		/		/	B2	/	IN	/
ADAPTIVE SHIFT	2111	H	H	L	L	L	H	L	L	L	NOT	B2	H	/	IN
	2112	H	H	L	H	L	H	H	L	L	NOT	B2	L	UN	UN
	2115	H	H	L	L	L	H	H	L	H	FEAR	B4	H	/	UN
	2118	L	H	L	L	L	H		/		/	/	/	IN	IN
	2201	H	H	L	H	L	H	H	H	L	/	B1	H	UN	UN
	2202	L	H	L	L	L	H	H	H	L	NOT	B1	H	UN	UN
	2203	L	H	L	H	L	H	H	H	L	/	B2	H	UN	UN
total (N=13)		[a]6	13	0	5	0	13	7	7	2	[b]5:4	[c]10:2	[c]7:4	[e]5:3	[e]6:5
	1110	L	H	L	L	H	L	L	L	H	NOT	B2	H	UN	IN
	1113	H	H	L	H	H	L	L	L	H	/	B3	H	UN	UN
	1201	L	H	L	L	H	L	H	H	L	/	B3	/	UN	UN
TOY	1203	L	H	L	L	H	L	H	H	L	/	B3	/	IN	IN
PREFERENCE	1208	L	H	L	L	H	L	L	H	L	NOT	B2	H	UN	UN
	2102	H	H	L	L	H	L	H	L	H	/	B2	/	IN	IN
	2108	L	H	L	L	H	L	L	H	L	FEAR	B2	L	IN	IN
	2119	L	H	L	L	H	L		/		/	/	/	/	/
total (N=8)		2	8	0	1	8	0	3	4	3	2:1	7:0	3:1	4:3	3:4
	1107	L	L	H	L	L	H	L	H	H	NOT	B2	H	IN	/
	1109	H	L	H	H	L	H	L	L	H	FEAR	C1	L	IN	/
	1114	H	L	H	H	L	H		/		/	/	/	/	/
	1206	L	L	H	L	L	H	L	H	L	FEAR	C1	L	IN	IN
	1209	L	L	H	L	L	H	L	H	H	NOT	PC	L	IN	/
	1214	L	L	H	L	L	H	L	H	H	/	B2	H	/	IN
MOTHER	1215	L	L	H	L	L	H	H	H	L	/	B1	/	UN	UN
PREEERENCE	2101	L	L	H	L	L	H	L	L	H	NOT	B3	L	IN	IN
	2104	L	L	H	H	L	H	L	H	L	NOT	B3	L	IN	UN
	2109	L	L	H	L	H	H	H	H	L	NOT	B1	H	UN	IN
	2117	H	L	H	L	L	H	H	H	H	FEAR	B3	L	IN	UN
	2209	L	L	H	L	L	H	H	H	L	/	/	/	IN	IN
	2211	L	L	H	L	L	H	H	H	H	FEAR	C1	L	IN	/
	2212	L	L	H	L	L	H	L	L	L	FEAR	C2	L	/	IN
total (N=14)		3	0	14	3	1	14	5	10	7	5:5	7:5	3:8	2:9	3:6
	1105	H	L	L	H	H	L		/		/	/	/	UN	UN
	1205	H	L	L	H	H	L	H	H	H	/	PC	L	/	/
	1210	L	H	L	H	H	L	L	L	H	/	PC	/	IN	IN
MOTHER	2105	H	L	L	H	H	L	L	H	L	NOT	B3	L	UN	UN
AVOIDANCE	2106	H	H	L	H	H	L	L	L	L	/	C1	/	UN	UN
	2114	L	H	L	H	H	L	L	L	H	FEAR	PC	H	IN	IN
	2207	H	L	L	H	H	L	L	L	H	FEAR	C2	L	IN	IN
	2214	H	H	L	H	H	L	L	L	L	FEAR	C2	L	UN	IN
total (N=8)		6	4	0	8	8	0	1	2	4	1:3	1:6	1:4	4:3	3:4
	1207	L	H	H	H	H	L	H	H	L	/	C1	L	UN	/
INVERTED	1211	L	L	H	H	H	L	L	L	L	FEAR	C2	H	UN	UN
SHIFT	2110	L	L	H	L	H	L	L	H	L	/	B4	H	UN	UN
	2116	L	L	H	H	H	L	L	L	L	/	C1	L	IN	UN
total (N=4)		0	1	4	3	4	0	1	2	0	0:1	1:3	2:2	3:1	3:0

Note. RtoS: Reaction to Stranger ATTA CLSS: Attachment Classification APRH NOVL: Approach to Novel Targets ECPI: Early Child Personality Inventory INHB: Inhibited [a]: Number of Highs [b]: Not Fearful vs. Fearfu [c]: B vs. C [d]: High vs. Low [e]: Uninhibited vs. Inhibited

the mothers in novel situations.

The fourth group, Mother Avoidance, was formed by the children who showed low scores on with-mother and relatively high score on both with-toy and on "nothing" in both the toy play and the mother-play session. They also had relatively low scores on with-peer in the peer-play session. In other words, they did not interact much with the mother or a peer, and often stopped playing per se although they showed an increase in play with toys when the mother joined in play. Moreover, except for two children, they were classified into attachment type C. Their temperamental disposition was not related with their play patterns. These results suggest that children belonging to this group had not developed good person interaction and play skills, perhaps, as a consequence of a poor quality attachment relationship with the mother as Sroufe (1985) has argued.

The last group was named Invert Shift because the children classified into this group interacted with the mother in the toy-play session but did not do so when the mother joined into play in the mother-play session. They also showed low interaction with a peer in the peer-play session. Also, their attachment type was C or B_4, and their temperament type was uninhibited. Thus, this group is similar to the Mother Avoidance group in that they had low rates of maternal and peer interaction, and were classified into attachment type C. However, the children in the Invert Shift group are different from the children in the Mother Avoidance group in that they interacted with the mother in the toy-play session and their paly pattern was related to their temperamental disposition. One possible hypothesis to explain play patterns of the children in this group is that their mothers' intrusion caused them to avoid the mothers when the mothers interacted with them.

Conclusion

To summarize results, children's patterns of play-target shift across the three session could be classified into five groups, Adaptive Shift, Toy Preference, Mother Avoidance and Invert Shift. Among these groups, Adaptive shift, Toy Preference and Mother Avoidance were attachment-related groups, Mother Preference was a temperament-related group and Invert Shift was related to an interaction between attachment and temperament. Among the three attachment-related groups, Adaptive Shift and Toy Preference consisted of B type children, and Mother Avoidance was made up of C types. Thus, it is suggested that adaptive behavior in the three play sessions in this study is a consequence of a secure attachment relationship to the mother which had already been formed before one-and-a-half years.

Though B type children tended to fall into the Adaptive Shift group, this was true for only about one-third (38.5%) of B type children. Most of the rest of them belonged to the Toy Preference group and the Mother Avoidance group. Comparing the Toy Preference group with the Adaptive Shift group, the former played with toys as much as the children in the Adaptive Shift group in the toy-play session, but they differ from the children in the Adaptive Shift group in that they did not interact highly with the mother in the mother-play session. Thus the children in these two groups may have good toy play skills, but the Toy Preference group children may have poorer person-to-person interaction skills than the Adaptive Shift children. Next, comparing the children in the Mother Preference group with the children in the Adaptive Shift group, the former

interacted with the mother as much as the children in the Adaptive Shift group in the mother-play session, but they differ from the children in the Adaptive Shift group in that they did not play highly with toys in the toy-play session. Moreover, six of seven children in the Adaptive Shift group and four of five children in the Mother Preference group who showed high interaction with a peer in the peer-play session were B type children. That is, they had Highs on both mother and peer interaction. And they make up 70.6% of all children who showed high peer interaction. Thus, it is considered that preference for peer interaction relates to preference for mother interaction. In other words, both group of children may have good person-to-person interaction skills but the Mother Preference group children may have poorer toy play skill than the Adaptive Shift group children. Those results suggest that some attachement type B children may develop situation-specific play skills, while other children develop more global skills.

The Mother Preference group most strongly related to behavioral inhibition. Children in this group focused on the mother as their playmate. This may be because they perceived the play situations as more novel than other group children. However, they were not so inhibited that they did nothing to do under the tension of a novel setting. Also, as mentioned above, attachment type B children classified into this group could interact with a peer and ten of fourteen children in this group showed high toy play in the peer play session. Moreover, only half of the all inhibited children belong to this group. These results suggest that behavioral inhibition as a temperamental disposition may not affect play skills, especially with the mother and a peer, but affect separation from the mother. Considering the fact that Nakano et al. (1986) demonstrated that in children's tendency to approach a novel target related behavioral inhibition more strongly than attachment type, the effect of temperamental disposition toward inhibition would become apparent only in situations more stressful situation than a play situation.

Finally, it can be suggested from comparison between the Mother Avoidance and the Invert Shift group that the attachment relationship and temperamental disposition have different roles in children's play behavior. Both groups are formed mainly of attachment type C children who did not show high scores on maternal interaction in the mother-play session. But there are differences between the two groups in that the Invert Shift group did not stop playing as much as the Mother Avoidance group and made close contact with the mother when the mother could not actively interact with them. These behavioral tendency of children in the Invert Shift group would reflect in their temperamental disposition toward noninhibition. In other words, they could be active more than the children in the Mother Avoidance group.

References

Arend, R., Gove, F. L., & Sroufe, L. A. (1979). Continuity of individual adaptation from infancy to kindergarten: A predictive study ego-resiliency and curiosity in prechoolers. *Child Development*, **50**, 950-956.

Campos, J. J., Barrett, K., Lamb, M., Goldsmith, H. H., & Stenberg, C. Socioemotional development. (1984). In M. M. Haith & J. J. Campos (Eds.), P. H. Mussen (Series Ed.), *Handbook of child psychology: Vol. 2. Infancy and developmental psychology*. Wiley.

Lee, C. L. & Bates, J. E. (1985). Mother-child interaction at age two years and perceived difficult temperament. *Child Development*, **56**, 1314-1325.

Londerville, S. & Main, M. (1981). Security of attachment, compliance, and maternal training methods in the second year of life. *Developmental Psychology*, **17**, 289-299.

Miyake, K., Chen, S., & Campos, J. J. (1985). Infant temperament, mother's mode of interaction, and attachment in Japan. In I. Bretherton & E. Waters(Eds.) Growing points in attachment theory and research. *Monograhps of the Society for Research in Child Development*, **50**, 276-297.

Nakano, S., Usui, H., & Miyake, K. (1984). Individual differences in responses to unfamiliar objects at twenty-three months of age. *Annual Report, 1984-85*, Research and Clinical Center for Child Development, Faculty of Education, Hokkaido University, **6**, 59-70.

Sroufe, L. A., Fox, N. E., & Pancake, V. R. (1983). Attachment and dependency in developmental perspective. *Child Development*, **54**, 1615-1627.

Sroufe, L. A. (1985). Attachment classification from the perspective of infant-caregiver relationship and infant temperament. *Child Development*, **56**, 1-14.

Thomas, A., Chess, S. & Birch, H. G, (1970). The origin of personality. *Scientific American*, **223**, 102-109.

Usui, H. & Miyake, K. (1984). Infant temperament: It's relationship with attachment classification and longitudinal data analysis. *Annual Report, 1983-84*, Research and Clinical Center for Child Development, Faculty of Education, Hokkaido University, **6**, 37-48.

Waters, E., Wippman, J., & Sroufe, L. A. (1979). Attachment, positive affect, and competence in the peer group: Two studies in construct validation. *Child Development*, **50**, 821-829.