

## ETHOLOGICAL ANALYSIS OF CHILDREN-PARENT INTERACTION IN OUTDOOR PLAY

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Previous studies clarified more affinity toward fathers by boys and toward mothers by girls (FB&MG tendency) in indoor play interactions between infants (a few years old) and parents of Western countries. In the present study, behavioral interactions by Japanese parents and children including infants and elementary school pupils were examined in a naturalistic outdoor park. The results indicated that the FB&MG tendency is also seen in infants of a non-Western country (Japan), in outdoor play interaction, and in older children. The meaning of the FB&MG tendency was discussed based on the results of the present study and the related previous ones.

**Key Words:** children-parent interaction; play; outdoor; gender differences

### INTRODUCTION

Generally, the interaction in play between parents and infants is thought to exert important influence on mental and physical development of the infants (Martin and Caro, 1985; Parke et al., 1988).

Studies which have examined the contents of mother-infant and father-infant interactions in play-like activities have clarified the following: (1) Fathers tend to behave like playmates, and mothers tend to behave like caretakers. For example, when picking up an infant, fathers are more likely to hold the babies simply to play with them, whereas mothers are more likely to hold them for caring purposes (Lamb, 1977). (2) Fathers tend to engage in physical (i.e. rough and tumble type) and unusual play activities like tactile and limb-movement games, whereas mothers tend to do more conventional play activities such as peek-a-boo, pat-a-cake and soft play like toy-mediated play, reading and talking (Lamb, 1977; Clarke-Stewart, 1978, 1980; Yogman, 1981). (3) Boys (a few years old) tend to prefer to play with their fathers, whereas girls tend to prefer to play with their mothers (Spelk et al, 1973; Lynn and Coss, 1974; Lamb, 1977). For example, boys were in proximity to, approached and fussed over by their fathers more than girls; girls, however, were in proximity to and fussed over by their mothers more than boys. Ban and Lewis (1974) found 1-year-old boys looked more at their fathers than at their mothers.

These gender differences including FB&MG tendency are thought to imply some important meaning for the social and biological development of children, but few studies investigating the meaning have been done so far.

In the present study, I examined the play behavior of Japanese families containing children from infants to elementary school pupils in naturalistic outdoor park setting to obtain the following information, which has not been previously reported: (1) How do the parent-infant play interaction occur in a non-Western country? (2) How do the interaction occur in an outdoor environment? (3) What is the interaction between a parent and an older child? This information is thought to be useful for discussing the meaning of the above gender differences.

## METHODS

The study site was an outdoor park (approximately 50m × 300 m) in Kurashiki City (434466 peoples and 299 km<sup>2</sup>) of Okayama Prefecture, Japan, along a river, containing an open soil area, a lawn area, a sand box, eight plastic animals (about 1 m high), and a grass field with some trees on the periphery of the park.

Around noon (10:00 - 13:00) on a holiday, several families came to the park by car to spend time for play, including resting and eating. Each family usually consisted of parent(s) with child(ren) younger than, or at the ages of elementary school, and members of the family appeared to engage freely in their favorite activities

I observed the families from inside of a car parked adjacent to the park with the naked eye or field glasses. First, I recorded the construction of each family, and the sex and age of the members for almost all the families that visited the park. Ages of the children were categorized into three categories: 0-2.9 years old, 3.0-5.9, 6.0-12.9. The error of age estimation in preliminary trials was 13.6% (3 of 22).

The behaviors of family members were examined, with special attention to the content of parent-child interaction, by the following procedure. I decided the order of observations of families by the distance of each family from me, that is, the first target family was one nearest to me, and so on. For several minutes before recording, the family was observed in order to understand the outline of the structure of interactions among the members (who is doing what with whom, etc). Behaviors of all members of the family were recorded on check list every 30 seconds successively for 10 minutes (providing a total of 20 checks). If a family ceased play and left the park before 10 minutes elapsed, the total numbers of the check were fewer than 20. In such a case, check numbers were extrapolated into 20 for the rate of frequency of each behavioral category.

Activities of children were classified into three categories: (1) SA: sport-like activities, with significant and rapid body movement, using some implement; for example, soccer and baseball. (2) NS: non-sport-like activities, without significant and rapid body movement; for example, playing with sand in a sand box and gathering plants (flowers, leaves, and nuts) (3) RT: talking with other family member(s) and/or eating snacks with them, usually sitting on a bench or the lawn. The content of each activity on the check list, such as “baseball-like play” or “mount plastic animal”, was written in addition to the category.

Behaviors of parents were classified, from the viewpoint of interaction with children, into three categories; (1) Participate: participating in play with children, that is, doing the activity similar to children play. (2) Look near: looking at playing children near them (less than ca. 10-m distant) without participating in play, usually moving with the playing children. (3) Stay distant: looking at the playing children at a distance from them (more than ca. 10m distant), for example, sitting on a bench, or staying at a distance from the children (more than ca. 10-m distant) without looking at the playing children. If I could not determine the categories of children's activities and parents' behaviors, and the relation between children and parents, no records were made.

When a family includes multiple children and/or both parents, which parent interacted with which child was also recorded, and data for each child were treated as separate data.

The observations were performed usually from a distance of more than 20 m in order to have no influence on the behavior of the target family. When the observation was finished for one family, the next target family was selected. A few families were examined in a day. In total, behaviors of 311 families were examined.

## RESULTS

*Construction of families visiting the park*

The number of each combination of parent(s) and child(ren) were as follows: F&B; 128, F&G; 75, F&B&G; 62; M&B; 41, M&G; 55, M&B&G; 8, F&M&B; 64, F&M&G; 81, F&M&B&G; 89. (F=father, M=mother, B=boy, G=girl). The number of children of each age category was as follow: 0-2.9 years old; 173, 3.0-5.9 years old; 288, 6.0-12.9 years old; 132.

The following tendencies related to gender differences were seen: (1) Visits by father and child(ren) (265 cases) were much more frequent than those by mother and child(ren) (104cases)( $p < 0.01$  binomial test). (2) Fathers visited the park more often only with boy(s) (128 cases) than only with girl(s) (75 cases) ( $p < 0.05$  binomial test). On the other hand, there was a tendency that mothers visited the park more often only with girl(s) (55 cases) than only with boy(s) (41 cases)( $p = 0.055$  binomial test).

In the present paper, I will report the results of analysis on families consisting of a single parent and child(ren) of single sex.

*Children's activities in various types of family constructions*

*Father / boy(s) construction:* Children were engaged in SA most frequently within this construction (Table 1).

Table 1. Activities of children in each family construction (mean  $\pm$  SD).

Costruction	Activities	Age of children		
		0-2.9	3.0-5.9	6.0-12.0
Father & Boy	SA	13.2 $\pm$ 9.0**	16.1 $\pm$ 7.3**	17.2 $\pm$ 11.2**
	NS	5.1 $\pm$ 5.2*	1.0 $\pm$ 0.7	1.1 $\pm$ 1.6*
Father & Girl	RT	2.4 $\pm$ 2.3	1.9 $\pm$ 2.4	0.1 $\pm$ 0.3
	SA	5.7 $\pm$ 3.6*	6.4 $\pm$ 3.4*	8.2 $\pm$ 7.9**
	NS	11.9 $\pm$ 5.7**	11.9 $\pm$ 6.2**	9.2 $\pm$ 10.2**
Mother & Boy	RT	2.2 $\pm$ 0.9	1.9 $\pm$ 3.1	0.6 $\pm$ 0.8
	SA	4.6 $\pm$ 6.2	9.5 $\pm$ 4.5**	-
	NS	10.4 $\pm$ 5.6**	5.3 $\pm$ 2.7*	-
Mother & Girl	RT	3.8 $\pm$ 0.8	3.8 $\pm$ 3.0	-
	SA	1.3 $\pm$ 0.5	3.7 $\pm$ 2.8	4.6 $\pm$ 5.1
	NS	10.8 $\pm$ 5.6**	11.1 $\pm$ 8.5**	8.2 $\pm$ 3.1**
	RT	7.7 $\pm$ 6.1**	5.8 $\pm$ 2.7*	4.4 $\pm$ 2.9

The number in each activity means the average of check numbers (See text for the details).

\*  $p < 0.05$ , \*\*  $< 0.01$  (Mann-Whitey U-test) for the lowest value in 3 values in each column.

See text for the definition of SA, NS, and RT.

This tendency was seen in children of all the age categories. In SA, children performed soccer-like play and baseball-like play much more often than other activities.

*Father / girl(s) construction:* Children were engaged in NS most frequently (Table 1), and this tendency was seen in children of all the age-categories. In NS, play activities such as “manipulating sand, soil and twigs in the sandbox” and “touching and climbing onto plastic animals” were performed often. The main forms of play during SA were badminton-like play and baseball-like play.

*Mother / boy(s) construction:* The most frequently performed activity by children was different depending on their ages. For 0-2.9-years old children, NS was the most frequent, and in 3.0-5.9-year-

old ones, SA was the most frequent (Table 1). The main forms of play during NS were “touching and climbing onto plastic animals” and “manipulating sand, soil and twigs in the sandbox and on the ground.” The main forms of play during SA were soccer-like play and baseball-like play.

*Mother / girl(s) construction:* NS was the most frequently performed activity for all the age categories, although RT was also performed frequently (Table 1).

The contents of NS were different depending on their ages. The most frequently performed activity was “play in sand box” in 0-2.9- and 3.0-5.9- year- old children, and “take plant” in 6.0-12.0 year-old children.

#### *Parent behavior in various types of family constructions*

*Father / boy(s) construction:* “Participate” was far more common than other behaviors (Table 2), and this tendency was more conspicuous in older children.

Table 2 . Behaviors of parents in each family construction (mean  $\pm$  SD).

Costruction	Behaviors	Age of children		
		0-2.9	3.0-5.9	6.0-12.0
Father & Boy	Participate	10.4 $\pm$ 6.3**	13.7 $\pm$ 5.1**	15.1 $\pm$ 11.3**
	Look near	6.0 $\pm$ 3.8*	2.1 $\pm$ 0.9	0.8 $\pm$ 0.5
	Stay distant	1.8 $\pm$ 3.0	2.8 $\pm$ 1.8	2.9 $\pm$ 1.5*
Father & Girl	Participate	4.9 $\pm$ 3.4**	6.4 $\pm$ 2.9	8.0 $\pm$ 4.6*
	Look near	11.8 $\pm$ 8.8**	9.2 $\pm$ 4.6*	5.5 $\pm$ 1.7
	Stay distant	0.9 $\pm$ 0.5	3.6 $\pm$ 1.4	4.3 $\pm$ 2.3
Mother & Boy	Participate	3.9 $\pm$ 4.2**	4.4 $\pm$ 2.5*	-
	Look near	12.7 $\pm$ 9.8**	12.2 $\pm$ 7.1**	-
	Stay distant	0.3 $\pm$ 0.6	1.0 $\pm$ 0.6	-
Mother & Girl	Participate	4.4 $\pm$ 3.5**	6.9 $\pm$ 6.4*	7.9 $\pm$ 8.2
	Look near	14.1 $\pm$ 3.1**	9.3 $\pm$ 6.0*	6.6 $\pm$ 0.9
	Stay distant	0.4 $\pm$ 0.7	3.0 $\pm$ 2.2	5.1 $\pm$ 3.2

\*  $p < 0.05$ , \*\*  $p < 0.01$  (Mann-Whitey U-test) for the lowest value in 3 values in each column.

See text for the definition of parents behaviors.

*Father / girl(s) construction:* The most frequently performed behavior was different depending on each child’s age: it was “Look near” for the 0-2.9- and 3.0-5.9- year-old children, and “Participate” for children six or older (Table 2).

*Mother / boy(s) construction:* The most frequently performed behavior was “Look near” (Table 2).

*Mother / girl(s) construction:* The most frequently performed behavior was “Look near,” although “Participate” was more frequent than in mother and boy(s) construction (Table 2).

## DISCUSSION

The present data on 0-2.9-year-old children indicate that the characteristics of the infant-parent play interaction found in Japanese families are basically same as those in Western countries, that is, (1) play as a “play mate” by fathers and one as a “caretaker” by mothers, respectively; (2) “rough” play by fathers and boys and “soft” play by mothers and girls, and (3) boys’ and girls’ preference for fathers and mothers, respectively, in play.

In outdoor play by Japanese families, 0-2.9-year-old boys tended to play more with their father,

and 0-2.9-year-old girls tended to do more with their mother, and the content of play by boys and fathers was, in most cases, SA ("rough play"-like activity), and that by mothers and girls was, in most cases, NS ("soft play"-like activities). Furthermore, if "Participate" play and "Look near" children are regarded as "play mate" behavior and "caretaker" behavior respectively, the results show that fathers tend to behave like "play mate" ("Participate" play with children) and mothers tend to behave like "caretakers" ("Look near" children).

It is important that the above tendency was also seen (more conspicuously in some cases) in the interaction between parents and children older than 2.9 years old, partly because it implies the possibility that the gender difference may have or had some clear function in human society.

There is a possibility that the common tendency in boy-father and girl-mother interactions in Western countries and Japan is because of westernization of lifestyle by Japanese after 1950s. It means that the common tendency may be a product caused by the westernized lifestyle. However, the same tendency, that is, the closer relationship between fathers and boys, and mothers and girls in daily life is reported in many cultures, for example, in leisure activities by American people (Adams and Lockard, 1982) and in hunting-gathering activities in primitive societies of Siberia and Africa (Stebnitsky, 1930; Bogoraz-Tan, 1934; Novitsky, 1941; Zuev, 1947; Rainsou-Pravdin, 1949; Rubtsoba, 1954; Munroe and Munroe, 1971; Ember, 1973; Kamei, 2001), which suggest that the gender difference in children-parent interaction is human universal phenomenon independent of culture types.

It is certain that one of the functions of play by young members of mammalian species, including humans is to develop proficiency of techniques for practical actions and behaviors such as running, jumping, carrying, hunting, and fighting (Biben, 1998; Sivi, 1998). On the other hand, many researchers surmise that the life style to which humans have evolutionally adapted is the male-hunting and female-gathering life (Kimura, 1999; Heerwagen and Orians, 1993).

SA play including running and throwing, which was most frequently performed by the boy-father combination may have adaptive function of proficiency of hunting-related techniques for boys, and NS play including manipulating sand and gathering plants, which was performed by the girl-mother combination may have the function of developing proficiency at the gathering and housework-related techniques of girls. It may be necessary to take this aspect into consideration to resolve the problems which the division of labor between the sexes produce in modern societies.

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