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A Study of Play in Preschool Children

—Play of the Oldest Group in the Kindergarten—

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Introduction

Smith and Connolly (1980) thought that differences in the amount of play equipment per child might affect children's play, and they systematically varied the amount of play equipment. In their study, they did not control the age of the children but mixed children from two to five years of age. In Japan, children in kindergarten range from three to five years of age. We studied each year group separately. The research on three-year-old children has been reported (Shinno, 1988), and it became clear that three-year-old children's choice of companion is not affected by the amount of play equipment.

The present study investigates the play of the oldest group in the kindergarten (the five-year-old age group), using an ecological method to examine the relation between the amount of play equipment and gender difference.

Method

1) *Subjects*

The play of children at the kindergarten attached to the Faculty of Education of Nagasaki University was studied. There are two classes of five year-olds in the kindergarten and each contained 15 boys and 16 girls. From each class a group of six boys and six girls was selected for observation. The groups selected were labelled A and B as in Shinno (1988). Each group was observed playing with all of the classmates. The average age in the A group for all subjects was 75 months (between 71 months and 80 months) SD 2.16; for boys, 75 months (between 71 months and 79 months) SD 2.12; and for girls, 75 months (between 72 months and 80 months) SD 2.20. The average age in the B group for all subjects was 75 months (between 70 months

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and 80 months) SD 1.98; for boys, 75 months (between 70 months and 80 months) SD 2.22; and for girls, 75 months (between 71 months and 78 months) SD 1.73.

2) *The place of observation*

The place of observation was the same as for Shinno (1988).

3) *The amount of play equipment*

The type and amount of equipment employed in this observation was as described in the pilot study, Shinno (1986).

4) *Environmental conditions*

The environmental conditions were the same as for Shinno (1988).

5) *Method of observation*

The method of observation employed in this study was the same as for Shinno (1988).

6) *Attendance*

The average attendance of the subjects in A group was 99% (one-toy condition), 99% (two-toy condition) and 100% (three-toy condition), and that in B group was 97% (one-toy condition), 98% (two-toy condition) and 99% (three-toy condition).

7) *The term of observation*

Both groups were observed from 5 December, 1985 to 18 December, 1985.

8) *Method of data analysis*

The data were analysed using the same categories as in Shinno(1988) and each occurrence of each category was recorded.

Results

The results for both groups were analysed according to: 1) the effect of the amount of play equipment and 2) gender difference.

1) The effect of the amount of play equipment

Table 1 shows the results of the analysis of variance in the choice of companion, the choice of activities, 'narrow' behaviour units (78 categories) and 'wide' behaviour units (24 categories). The table shows the number of categories which showed statistically significant variance. The left figure is the sum for the A group, the right

Table 1 The effect of the amount of play equipment:

	(A, B)	Expected by chance (approx.)
Choice of companion (11 categories)	6 (3, 3)	1
Choice of activities (20 categories)	5 (4, 1)	2
Behaviour units (78 categories)	13 (4, 9)	8
Behaviour units (24 categories)	6 (3, 3)	2

one is the sum for the B group.

It was considered that significance at the five per cent level in both A and B groups indicated a definite effect. It was also considered that significance at the five per cent level in one group together with a ten percent level in the other group is suggestive of a definite effect. (These guidelines are followed in the rest of the paper.)

The frequency of occurrence of each category under each variation of the amount play equipment is shown in Tables 2 to 5. Each age group was observed three times under each condition of the amount of play equipment and the occurrences of each analytic category were totalled over the three observation periods.

① The choice of companion

Table 2 shows the choice of companion under each of the three conditions and the statistical significance of the occurrence of each choice in each group.

Table 2 The choice of companion under the three conditions of play equipment

Categories	group		A group				B group			
	condition		1	2	3	E	1	2	3	E
1. Alone			36	34	35		29	30	37	
2. Small parallel			7	5	24	*	4	6	14	(*)
3. Large parallel			21	13	3	*	18	5	4	***
4. Same sex pair			29	28	31		21	31	19	(*)
5. Opposite sex pair			5	3	13	(*)	0	2	0	
6. Subgroup of three			19	21	15		14	26	21	
7. Subgroup of four or more			26	29	23		42	25	28	***
8. Parallel play			28	28	27	*	22	11	18	
9. Group play			79	81	82		77	84	68	
10. Mean subgroup size			3.18	3.30	3.18		4.09	3.07	2.97	***
11. Same sex choice			80.85	88.64	68.86	**	97.13	94.82	95.95	

* 5 %
 ** 1 %
 *** 0.1 %
 (*) 10 %

The total number of categories showing a statistically significant variation over the three sets of conditions over the two groups was five and this figure was above the choice level. Analysing the results of those six categories, the categories 'large parallel subgroup' and 'parallel play' showed significant variation in both A and B groups. The T-test was carried out to compare the three conditions.

In both groups, significant variations at the five per cent level between the one-toy condition and the three-toy condition and between the two-toy condition and the three-toy condition were revealed. With an increase of the amount of play equipment, the number of occurrences of 'large subgroup' decreased.

② The choice of play

Table 3 shows the occurrence of each choice of play under the three conditions and the statistically significant variation between the three conditions in each group.

Table 3 Choice of play under the three conditions of play equipment

categories	A group				B group			
	1	2	3	E	1	2	3	E
1. Table play	24	19	19		18	13	14	
2. Wendy house	11	35	22	***	11	14	13	
3. Doll	8	15	34	***	19	33	31	*
4. Plastic tea set	5	19	7	***	8	9	10	
5. Slide	10	10	17		15	14	14	
6. Toy chest	1	1	0		2	2	0	
7. Tricycle	6	10	15		7	9	12	
8. Books	5	1	2	(*)	2	3	3	
9. Wooden blocks	12	8	9		11	16	8	
10. Telephone	0	1	0		1	0	2	
11. Musical instruments	2	1	0		2	1	2	
12. Pram	4	0	1	*	3	3	6	
13. Rough-and-tumble play	20	11	17		11	5	0	
14. Miscellaneous play	14	22	10		8	8	12	
15. Fantasy play	34	22	20		7	8	4	
16. Unusual use of apparatus	0	1	0		2	3	2	
17. Room fitments	15	9	5	(*)	12	11	5	
18. Talking	8	6	6		5	6	6	
19. No activity	14	12	9		21	16	18	
20. Other	8	6	5		5	5	2	

Table 3 shows that statistically significant variation was shown in four categories in the A group and one category in the B group and that the total number of significant categories was five. As this figure was over the chance level (shown in Table 1), the T-test was carried out for the categories common to both groups.

Under 'doll', it became clear that there was a significant variation between the one-toy and three-toy and between the two-toy and three-toy conditions in the A group, and between the one-toy and two-toy conditions and between the one-toy and three-toy conditions in the B group. Thus, play with 'doll' was influenced by the amount of play equipment, because children play with 'doll' where possible.

③ 'Narrow' behaviour units

Table 4 shows the total occurrence of the 78 'narrow' behaviour units and the level of significance under each of the play conditions. As shown in Table 4, there were thirteen significantly varying units. Even though this was over the chance level (shown

Table 4 78 'Narrow' behaviour units

categories	group amount of play equipment		A group				B group			
	1	2	3	E	1	2	3	E		
1. Simple smile	13	11	14		19	16	10			
2. Upper smile	50	48	60		42	31	56	(*)		
3. Open smile	19	21	26		20	14	7			
4. Pucker	4	2	5		6	8	2			
5. Cry/scream	0	0	0		2	2	0			
6. Chuckle	0	0	0		0	1	2			
7. Squeal	18	20	24		13	6	6			
8. Play noise	38	34	17		13	21	5			
9. Talking alone	6	11	11		4	6	11			
10. Talking parallel	4	15	19		25	20	13			
11. Talking to child	202	227	253		210	243	223			
12. Talking from child	143	161	142		127	155	131			
13. Look around	13	16	17		15	11	20			
14. Look in distance	51	36	26	(*)	18	27	40	*		
15. Watch child	9	9	4		11	6	5			
16. Glance at child	96	108	145	(*)	105	113	117			
17. Glance at observer	18	15	26		13	22	19			
18. Look at child	87	74	72		78	55	55			
19. Look at observer	7	7	5		9	3	7			
20. Stare at child	67	96	83	(*)	92	72	66	(*)		
21. Stare at observer	7	8	6		3	6	3			
22. Contact apparatus	61	44	53		40	29	36			
23. Hold hands with child	3	3	1		0	0	0			
24. Physical contact to child	35	37	44		43	32	8	(*)		
25. Physical contact from child	64	44	54		29	28	7			
26. Stand	123	112	119		107	97	76	*		
27. Sit	93	96	105		77	83	91			
28. Kneel	60	58	65		25	46	20	***		
29. Crouch	51	59	51		23	46	49	***		
30. Lie	18	8	11		11	9	5			
31. Walk	100	112	109		100	103	82			
32. Shuffle	15	10	3	(*)	2	5	4			
33. Run	65	43	46		43	21	17	*		
34. Jump/hop	29	50	33		27	39	8			
35. Skip	13	5	5	*	3	8	7			
36. Climb	26	22	34		10	8	24	(*)		
37. Slide	10	8	24	(*)	11	7	11			
38. Crawl	31	18	7	*	7	7	3			

Table 4 (cont.)

categories	group amount of play equipment		A group				B group			
	1	2	3	E	1	2	3	E		
39. Wrestle/tumble	19	7	16		9	2	0	*		
40. Chase/free group run	13	7	4		9	0	1	(*)		
41. Play beat	12	9	3		4	1	1			
42. Point	11	13	16		25	3	27			
43. Show object	6	8	8		3	8	3			
44. Hold out object	2	1	9	*	2	2	2			
45. Give object	5	12	13		10	10	3			
46. Receive object	5	6	13		10	9	8			
47. Pick up object	101	166	180	(*)	105	189	173	***		
48. Put down object	84	120	145	(*)	86	169	141	***		
49. Hold object	57	70	85	(*)	43	55	60	(*)		
50. Carry object	1	2	0		0	4	7			
51. Push object	6	5	4		8	11	7			
52. Pull object	5	4	2		3	2	4			
53. Kick object	24	0	2		6	6	0			
54. Throw object	8	8	18		2	0	1			
55. Hit object	113	50	26		1	0	0			
56. Pedal	1	0	7		6	5	5			
57. Propel	14	26	23		11	16	27			
58. Fine manipulation	30	33	26		27	25	36			
59. Gross manipulation	5	7	7		2	10	10			
60. Physical aggression	29	4	4	***	14	28	0			
61. Dominate	2	2	4		2	0	2			
62. Dispute object	3	2	7		3	2	0			
63. Fail to take object	2	0	4		1	4	2			
64. Submit	4	3	5		3	3	3			
65. Suck	11	4	6		1	6	8			
66. Tongue/lips	2	2	2		0	1	2			
67. Rub eyes	0	0	2		2	2	2			
68. Nose contact	4	8	3	(*)	9	6	8			
69. Ear contact	2	1	1		0	0	2			
70. Hand to face	13	7	3	(*)	6	11	8			
71. Brush hair	5	4	4		3	2	6			
72. Groom	1	0	0		1	0	0			
73. Scratch	6	8	6		7	4	5			
74. Genital contact	2	0	0		0	0	0			
75. Hand fumble	1	0	0		1	0	0			
76. Mouth fumble	7	1	0	(*)	0	3	0	*		
77. Clothes fumble	19	14	20		12	6	10			
78. Hitch	1	0	0		1	1	0			

in Table 1), there were no significantly varying units which were common to both A and B groups, so the T-test was not carried out. The following units showed variation in the two groups which was suggestive of a definite effect (as defined above): 'look distance', 'pick up', 'put down' and 'mouth-fumble'.

However, there was no significant effect of changes in the amount of play equipment for the 'narrow' behaviour units.

④ 'Wide' behaviour units

Table 5 shows the total frequency of the 24 'wide' behaviour units under each of the play conditions and the significance levels. There were six significant variation levels in the A group, and six significant variation levels in the B group. Even though this was over the chance level (shown in Table 1), there were no significantly varying units which were common to both A and B groups, so the T-test was not carried out.

Table 5 24 'Wide' behaviour units

categories	group		A group				B group			
	conditions		1	2	3	X	1	2	3	X
1. Upper smile	50	48	60			42	31	56	(*)	
2. Open smile	19	21	26			20	14	7		
3. Play noise	38	34	17			13	21	5		
4. Talking between children	345	388	395			337	398	354		
5. Look around/distance	64	52	43			33	39	61	*	
6. Watch	9	9	4			11	6	5		
7. Visual contact with child	250	274	300			275	240	238		
8. Contact apparatus	61	44	53			40	29	36		
9. Physical contact between children	102	84	99			72	60	15	***	
10. Walk	100	112	109			100	103	82		
11. Run	65	43	46			43	21	17	*	
12. Climb/slide	36	30	58			32	34	33		
13. Chase/free/group run	13	7	4			9	0	1	(*)	
14. Object exchange	18	27	43	*		25	29	16		
15. Push/pull	11	9	6			11	13	11		
16. Kick/throw/hit	145	58	46			9	6	1		
17. Pedal/propel	15	26	30			16	21	32		
18. Fine manipulation	30	33	26			27	25	36		
19. Gross manipulation	5	7	7			2	10	10		
20. Physical aggression	29	4	4	***		14	28	0		
21. Antagonistic behaviour	40	11	24	***		23	37	7		
22. Suck	11	4	6			1	6	8		
23. Face contact	24	20	13			21	21	26		
24. Auto-manipulation	62	45	41			42	36	43		

It was clear that there was no effect of changes in the amount of play equipment for the 'wide' behaviour units.

2) Gender differences

Table 6 shows the number of significantly varying categories in the choice of companion, choice of activities, as well as the levels expected by chance. In this table, X indicates an effect of gender, while EX indicates an effect of the interaction of gender and the amount of play equipment.

Table 6 The effect of gender

	X (A, B)	EX (A, B)	chance level
Choice of companion (11 categories)	12 (6, 6)	6 (2, 4)	1
Choice of activities (19 categories)	16 (6, 10)	8 (3, 5)	2
Behaviour units (78 categories)	34 (9, 25)	10 (7, 3)	8
Behaviour units (24 categories)	19 (8, 11)	6 (4, 2)	2

① The choice of companion

1. Gender effect

Table 7 shows the occurrence of those categories related to choice of companion which showed a variation over the five per cent level, when analysed for the effect of gender.

Table 7 Gender difference in the choice of companion

categories	group		gender			
	A group			B group		
	boys	girls	X	boys	girls	X
1. Alone	79	26	***	66	30	***
3. Large parallel	6	31	***	8	19	*
7. Subgroup of four or more	29	49	*	40	55	***
8. Parallel play	22	61	***	16	31	**
10. Mean subgroup	283	349	*	302	336	*

It was clear that there were gender differences in the categories of 'alone', 'large parallel subgroup', 'subgroup of four or more', 'parallel play' and 'mean subgroup size' in both groups.

2. The interaction of gender and the amount of play equipment

Table 8 Interaction of gender difference and the amount of play equipment in the choice of companion

group amount of play equipment categories	A group				B group			
	1	2	3	EX	1	2	3	EX
3. Large parallel	(3,18)	(1,12)	(2,1)	*	(3,15)	(3,2)	(2,2)	***
8. Parallel play	(7,12)	(5,23)	(10,17)	*	(3,19)	(6,5)	(7,11)	**

Table 8 shows the occurrences of those categories related to choice of companion which showed a variation over the five per cent level, when analysed for the effect of toy condition.

It was clear that there was a gender difference in the categories of 'large parallel subgroup' and 'parallel play' The occurrence of 'large parallel subgroup' and 'parallel play' did not change with changes of toy condition among boys, but among girls, the occurrence of both decreased with an increase in the amount of play equipment.

② The choice of play

1. Effect of gender

Table 9 shows the occurrence of those categories related to choice of play which showed a variation over the five per cent level when analysed for the effect of gender.

Table 9 Gender difference in the choice of play

group gender categories	A group			B group		
	boys	girls	X	boys	girls	X
1. Table play	12	50	***	14	31	*
3. Doll	16	41	***	9	74	***
4. Plastic tea set	10	21	**	9	18	*
7. Tricycle	29	2	***	28	0	***

It was clear that boys chose 'tricycle' more than girls, while girls chose 'table play', 'doll' and 'plastic tea set' more than boys.

2. The interaction of gender and the amount of play equipment

Table 10 shows the occurrence of those categories related to the choice of play which showed a variation over the five per cent level, when analysed for the effect of toy condition.

It was clear that the occurrence of 'doll' increased in number among girls with an increase in the amount of play equipment although there was us change among boys.

Table 10 Interaction of gender difference and the amount of play equipment in the choice of play

group amount of play equipment categories	A group				B group			
	1	2	3	EX	1	2	3	EX
1. Table play	(2, 22)	(6, 13)	(4, 15)		(1, 17)	(8, 5)	(5, 9)	*
3. Doll	(0, 8)	(0, 15)	(16, 18)	*	(3, 16)	(4, 29)	(2, 29)	*
17. Room fittings	(5, 10)	(8, 1)	(3, 2)	*	(6, 6)	(0, 11)	(1, 4)	

③ 'Narrow' behaviour units

1. Gender effect

Table 11 shows the occurrence of those 'narrow' behaviour units which showed a variation over the five per cent level, when analysed for the effect of gender.

Table 11 78 'Narrow' behaviour units and gender

group gender categories	A group			B group		
	boys	girls	X	boys	girls	X
8. Play noise	71	18	***	35	4	*
33. Run	102	52	***	58	23	*
38. Crawl	41	15	*	14	3	*
57. Propel	57	6	***	54	0	***
59. Gross manipulation	18	1	***	21	1	***
60. Physical aggression	29	8	*	41	1	*

It was clear that the units 'play noise', 'run', 'crawl', 'propel', 'gross manipulation' and 'physical aggression' occurred more among boys than girls.

2. The interaction between gender and the amount of play equipment

Table 12 shows the occurrence of 'narrow behaviour units' which showed a variation over the five per cent level, when analysed for the effect of toy condition.

For the A group there were five units, 'lie', 'run', 'skip', 'crawl' and 'nose contact'. On the other hand, there were three units in the B group which showed a variation over the five per cent level, when analysed for the effect of toy condition: 'look at child', 'stare at child' and 'contact apparatus'. The sum of the units which showed a variation over the five per cent level in both groups was not over the chance level. So, the trust effect was not shown

Table 12 78 'Narrow' behaviour units under three conditions

group categories	A group	B group
18. Look at child		*
20. Stare at child		*
22. Contact apparatus	(*)	*
30. Lie	*	
33. Run	*	(*)
35. Skip	**	
38. Crawl	**	
68. Nose contact	*	

between gender and toy condition.

④ 'Wide' behaviour units

1. Gender effect

Table 13 shows the 'wide' behaviour units which showed a variation over the five per cent level, when analysed for the effect of gender.

Table 13 24 'Wide' behaviour units and gender

categories	group		A group			B group		
	boys	girls	boys	girls	X	boys	girls	X
17. Pedal/Propel	65	6	***	70	0	***		
21. Antagonistic behaviour	50	25	**	58	9	*		

It was clear that there were significant differences in the occurrence of the units 'pedal/propel' and 'antagonistic behaviour' which were shown more among boys than girls.

2. The interaction between gender and the amount of play equipment

Table 14 shows the occurrence of those 'wide' behaviour units which showed a variation over the five percent level, when analysed for the effect of toy condition.

It was clear that significant interaction was shown for four units; 'talking between children', 'run', 'kick/hit' and 'agonistic behaviour' for the A group. For the B group, there were two units showing significant interaction, 'visual contact child' and 'contact apparatus'. The sum of the number of units showing

Table 14 24 'Wide' behaviour units under three conditions

categories	group	A group	B group
4. Talking between children		*	
7. Visual contact with child			***
8. Contact apparatus		(*)	*
11. Run		*	
16. Kick/throw/hit		*	
21. Antagonistic behaviour		*	(*)

ing significant interaction was six. However, there were no significant units common to both A and B groups, so, it can be concluded that there was no significant interaction between gender difference and the amount of play equipment.

Consideration

The present study was performed to investigate the behaviour of the oldest age group of the kindergarten in relation to the amount of play equipment and to examine gender difference under three toy conditions.

As for the choice of companion, the category 'large parallel play' showed significant variation for both A and B groups over the three sets of conditions. In both groups, with an increase of the amount of play equipment, the number of occurrences of 'large subgroup' decreased. Children tended to play in a smaller group with an increase in the amount of play equipment.

It was clear that boys tended to play 'alone', while girls tended to play in 'large parallel group', 'subgroup of four or more' or 'parallel play'. Both groups showed an interaction for the categories of 'large parallel' subgroup and 'parallel play', between gender and the amount of play equipment. Girls consistently played in smaller groups with an increase of the amount of play equipment, and also they more often showed 'parallel play' with an increase in the amount of play equipment.

Smith (1977) showed that the oldest age group (four-and-a-half-years-old and over), played in groups consisting of four or five children, while pair play decreased compared with younger groups under all toy conditions. However, in the present study, the group size of five-year-old children changed with the amount of play equipment, especially for girls.

As for the choice of play, 'doll' was influenced by the amount of play equipment. With an increase in the number of dolls, 'play with doll' was observed more often. Children always choose to play with a doll if a free doll is available.

Boys chose tricycle significantly more than girls, while girls chose 'table play', 'doll play' and 'tea set' significantly more than boys.

Tanaka et al. (1983) came to the conclusion that gender differences increase with age, after the observation of the effect of gender difference on the choice of play. Our results coincide with Tanaka's.

Abstract

The play of the oldest group in the kindergarten was observed with changes in the amount of play equipment. The observation results were analysed by choice of companion, choice of play, 78 'narrow' behaviour units and 24 'wide' behaviour units. The effects of the amount of play equipment and gender differences on these four sets of categories were examined.

1. It became clear that boys tended to play 'alone', while girls tended to play in 'large parallel group' or 'subgroup of four or more' or 'parallel play'. The group size changed with the amount of play equipment, decreasing with an increase in the amount of play equipment.

2. Gender difference in the choice of play was shown. Boys played with 'tricycle' more than girls, while girls played with 'doll', 'table play' and 'plastic tea set' more than boys.

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