Japan-US comparative study on early maternal influences upon cognitive development: A follow-up study

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This is a comparative study on the follow-up samples of Japan-US cross-cultural project concerning maternal influences upon the cognitive development of children. In order to compare the longitudinal generalizability of our findings from preschool data, several cognitive measures assessed at 11:0 (Japan) or 12:0 (U.S.) were examined in relation to preschool measures and to early maternal variables. The level of performances were moderately stable throughout preschool and school period in both countries. Most of the present measures were highly correlated with socio-economic status (SES) and parental education in Japan, on the contrary, the correlations of demographic variables with child's measures diminished at school-age level in the U.S. The correlational patterns of early maternal factors with child's outcomes were generally maintained nearly same fashion in both countries, but, the relationships were stronger and tended to continue more persistently in Japan than in the U.S. The mechanisms of early environmental and maternal influences upon later child's cognitive development were discussed in relation to socio-cultural background in the two countries.

Key words: maternal influence, cognitive development, Japan-US comparison, follow-up study, socialization.

The relationships between environmental (maternal) factors and the child's cognitive development at preschool period in Japan and the U.S. were investigated¹ over four years from 1972 through 1977. A substantial number of environmental variables, such as verbal environment of home, mother's expectation for child's development, sensitivity and warmth in

mother-child interaction, indirect teaching style, variety of explanations involved in mother's communication with child and

¹ The study was the Japan-U.S. cross-national project, co-directed by H. Azuma and R. D. Hess. Besides the present authors, the group consisted G. Hatano, K. Watanabe, N. Tajima, H. Usui, K. Inagaki and a few graduate students in Japan, P. Dickson, and G. Price in the U.S.

so on, were found to be positively related to the child's cognitive development in both countries. At the same time, several cross-national differences were evident in the reactions of maternal factors with child's early cognitive development (Azuma, Kashiwagi, & Hess, 1981).

Subjects of the above study were again interviewed and tested in 1981 when children were age 11 or 12 to find out if maternal variables were still influential.²

The samples located for the follow-up study were 44 out of 58 Japanese children, and 47 out of 66 U.S. children in the preschool study respectively. The Japanese samples were 11 years old, 5th graders of elementary school, and the U.S. samples were 12 years old, 6th graders of elementary school at the time of the follow-up testing.

Test Item

The WISC-R scores and school achievement rated by the classroom teachers were the cognitive development measures collected in Japan with age 11 subjects.³

The scores of Iowa Tests of Basic Skills (ITBS, Hireounurs, Lindquist, & Hoover, 1978) and school achievements ratings were obtained at age 12 with U.S. subjects. The ITBS was administered individually, and two sub-scale scores on reading and mathematics sub-scale and a combined score of these two were obtained. Achievement ratings on two academic subjects, reading and mathematics, were made for each subject by the teachers in charge of the class of that child in each elementary school. The teachers were asked to rate the child's achievement on 0-100 scale for reading and mathematics.

² Preliminary analysis of the follow-up study only on the Japanese samples were previously reported (Kashiwagi, Azuma, & Miyake, 1982).

³ The detailed description on the procedures and scores for Japanese children were previously described in the 1982's paper (Kashiwagi, Azuma, & Miyake, 1982).

Table 1-a

Means and <i>SD</i> 's of IQ (<i>N</i> =44) Japan		
Verbal IQ	107.96	(17.16)
Non-verbal IQ	108.80	(17.16)
Combined IQ	109.80	(17.84)

School achievement ratings by teacher
(Means, *SD*'s) on six subjects

	Mean	(<i>SD</i>)	Range
Arithmetic	3.61	(0.97)	1-5
Japanese (Language)	3.40	(0.93)	1-5
Social studies	3.52	(0.90)	2-5
Natural science	3.61	(1.01)	1-5
Physical education	3.32	(1.12)	1-5
Art	3.27	(0.73)	2-5

Table 1-b

Means and <i>SD</i> 's of ITBS (<i>N</i> =47) U.S.				
Verbal	29.83	(6.29)	15-41	0-41
Math.	25.12	(7.33)	12-39	0-39
Total	54.95	(12.35)	32-77	0-80

School achievement ratings by teacher
(Means, *SD*'s) on two subjects

	Mean	(<i>SD</i>)	Range
Read	67.87	(17.06)	30-90
Math.	66.80	(18.55)	20-90

Results and Discussions

Cognitive measures obtained from the follow-up study in Japan and the U.S. are presented in Table 1-a and Table 1-b, respectively.

The stability of cognitive functions throughout preschool and school ages was examined by comparing the correlations between preschool measures and later cognitive measures in two countries (Tables 2-a and Table 2-b).

Seven kinds of preschool scores assessed at different phases in preschool period were chosen and used as preschool cognitive measures for both countries. Six age 11 scores for Japanese children, and five age 12 scores for the U.S. children were correlated with preschool cognitive measures.

The correlations between preschool and age 11-12 measures are generally high in

Table 2-a
Correlations of six cognitive measures at 11:0 and seven cognitive measures at preschool ages
Japan

	WISC-R IQ			Japn.	Arith.	School achievement ratings (Arith., Japn., Soc., Nat.)
	Verbal	Non-verbal	Combined			
CFI: PPVT at 3:8	.52**	.37**	.51**	.29*	.42**	.46**
School related skills at 5:0	.49**	.47**	.55**	.33*	.28*	.38**
School related skills at 6:0	.46**	.28*	.44*	.55**	.47**	.58**
IQ at 6:0	.58**	.60**	.67**	.28*	.35*	.48**
Form cognition skills at 4, 5, 6 (form recognition & reconstruction)	.65**	.66**	.75**	.28*	.47**	.50**
B-game scores at 4:0	.33*	-.04	.18	.38**	.37**	.41**
C-game scores at 4:0	.38**	.47**	.48**	.37**	.25*	.42**

Table 2-b
Correlations of five cognitive measures at 12:0 and seven cognitive measures at preschool ages
U.S.

	Teacher rating		ITBS		
	Read	Math.	Verbal	Math.	Total
CFI: PPVP at 3:8	.27**	.11	.50**	.53**	.57**
School related skills at 5:0	.36**	.27*	.32**	.57**	.50**
School related skills at 6:0	.46**	.35**	.51**	.65**	.65**
IQ at 6:0	.41**	.27**	.65**	.67**	.73**
Form cognition skills at 4, 5, 6 (form recognition & reconstruction)	.24	.23	.46**	.54**	.56**
B-game scores at 4:0	.26*	.10	.31*	.15	.25*
C-game scores at 4:0	.35**	.23	.47**	.31*	.42**

both countries. In Japan, form recognition skills at four to six years show particularly high correlations with IQs and school achievement scores. This tendency is not seen in the U.S.⁴

However, two cognitive scores assessed at age six, school-related skills and IQ, are highly correlated with the age 12 measures in the U.S. In our preschool study, the relationships of non-verbal tasks with other variables were different between two countries, being more central in Japanese samples (Azuma et al., 1981). This suggests that the role of non-verbal skills at early age is supposed to be more important as the bases for later cognitive development in Japan than it is in the U.S.

As were already pointed out, all the preschool cognitive measures did substantially correlated with SES and parental education in both countries. In Japan, all of the cognitive measures at school age again correlate positively with SES and parental education (Table 3-a). And, it is worth noting that father's education, among those demographic factors, shows higher correlation with child's school age performances than mother's education does.

In the U.S., all of the preschool cognitive measures also correlated with SES and parental education as found in Japan. At school age, however, any of the cognitive measures significantly correlate neither with SES and nor with parental education (Table 3-b). In particular, two achievement ratings by teachers do not

⁴ As we have noted, the intelligence test at later age was not administered in the U.S.

Table 3-a

Correlations between cognitive measures at preschool and 11:0 and SES father's and mother's education Japan

	Preschool			At 11:0			
	CFI: PPVT at 3:8	School readiness at 5:0	IQ at 6:0	Verbal IQ	Non-verbal IQ	Combined IQ	School achievement scores
SES	.36**	.53**	.59**	.49**	.29*	.46**	.67**
Father's education	.40**	.48**	.61**	.56**	.30*	.50**	.63**
Mother's education	.23	.43**	.43**	.33*	.19	.31*	.50**

Table 3-b

Correlations between cognitive measures at preschool and 12:0 and SES father's and mother's education U.S.

	Preschool			At 12:0				
	CFI: PPVT at 3:8	School readiness at 5:0	IQ at 6:0	Teacher rating		ITBS		
				Read	Math.	Verbal	Math.	Total
SES	.46**	.37**	.33**	.03	-.06	.17	.21	.21
Father's education	.46**	.31*	.20*	.08	-.10	.15	.20	.20
Mother's education	.41**	.34**	.24*	-.03	-.02	.15	.11	.14

correlate with any of these demographic variables at all. The scores derived from ITBS only show very low, not significant, positive correlations with SES and parental education.⁵

Comparing two Tables (3-a and 3-b),

⁵ One may doubt reliability and validity of teacher's ratings in the U.S. as the measures of cognitive achievement. As were already shown, the achievement scores by teacher's ratings in the U.S. correlate positively with preschool measures, although the correlations are rather lower than those of ITBS scores and preschool measures (Table 2-b). Teacher's rating scores, on the other hand, correlate highly with all the scores of ITBS (see Table), showing that teacher's ratings are considerably valid and reliable as the school achievement measures.

Correlations of two teacher rating scores and three ITBS scores

		U.S.	
		Teacher ratings	
		read	math.
ITBS	verbal	.49**	.41**
	math.	.47**	.33**
	Tot.	.42**	.53**

a contrasting growth trend is found between two countries in the correlations at preschool period and school age between two countries. In Japan, the correlations of cognitive measures and demographic variables become higher with increasing age. In the U.S., on the contrary, the correlations at early age (3:8 years) are the highest, and later become lower finally diminishing at school age level.

Thus, in Japan SES and parental education are consistently and much more closely related to child's cognitive performances at school age level than they do in the preschool period, but not in the U.S. SES and parental education are obviously linked with most of environmental stimulations and maternal factors toward the child. In fact, 21 out of 84 maternal variables in Japan, 18 out of 84 in the U.S. were respectively found to be significantly correlated with SES (Azuma et al., 1981). The contents of these maternal variables correlated with SES in two countries were not exactly the same, but, overall characteristics of those maternal variables positively cor-

Table 4-a
Correlations between behavioral characteristics at 4:0 and cognitive measures from preschool to school age

	Preschool				At 11:0			Japan (N=44)
	CFI: PPVT at 3:8	School re- lated skills at 5:0 & 6:0	IQ at 6:0	Verbal IQ	Nonverbal IQ	Combined IQ	Japn.	School achieve- ment ratings at 11:0 (4 school subjects)
Impulsivity	-.23	-.35**	-.49**	-.46**	-.38**	-.48**	.40**	-.34*
Originality	.12	-.08	.18	.18	.04	.13	.30*	-.03
Activity	.13	.11	.30*	.33*	.29*	.36**	.27*	.11
Dependency	-.01	-.09	-.26*	-.08	-.10	-.11	-.07	.06
Persistence	.15	.25*	.39**	.39**	.33*	.41**	.47**	.42**
								.51**

Table 4-b

Correlations between behavioral characteristics at 4:0 and cognitive measures from preschool to school age

	Preschool				At 12:0				U.S. (N=47)
	CFI: PPVT at 3:8	School related skills at 5:0 & 6:0	IQ at 6:0	Teacher rating		ITBS			
				Read	Math.	Verbal	Math.		
								Total	
Impulsivity	-.14	-.00	-.03	.20	.18	-.18	.00	-.09	
Originality	.20	.31*	.35**	.35**	.28**	.27*	.44**	.40**	
Activity	.14	.40**	.14	.12	.12	.06	.18	.14	
Dependency	.02	.12	.16	.07	-.02	-.02	.02	.00	
Persistence	.16	.08	.02	-.20	-.18	.18	.06	.13	

related with SES were substantially similar, although there are several exceptions. Most of these maternal variables positively correlated with SES showed at the same time positive correlations with child's cognitive measures, and, maternal variables negatively correlated with SES were negatively related with child's measures in both countries. This seems to be more prevailing of these higher socio-economic status. This phenomena was pronounced in Japan than in the U.S.⁶ It is not surprising that parents of higher SES with thier higher and deeper involvement in intellectual life, have a higher probability of providing intellectual stimulating environment to their children, although we do not believe that SES itself is the cause for child's achievements. The data show that many influential environmental factors are unevenly distributed different SES strata.

In the preschool study, cross-cultural difference was found in the relationships between the cognitive measures and the behavioral characteristics observed in mother-child interaction situations. Impulsivity and persistence were closely related to the cognitive measures in Japanese children, but, these two behavioral dimensions did not show any relations with cognitive measures in the U.S. children. Instead, positive correlations of another dimensions, originality and activity, with preschool cognitive measures were predominantly found in the U.S. children. The correlations of the behavioral characteristics and cognitive measures at 11-12 years are obtained for Japanese and the U.S. samples show that the same cross-cultural differences still exist at school age level (Tables 4-a and 4-b).

Same correlational patterns of impul-

sivity and persistence with cognitive measures at school age are again clearly recognized in Japanese children. In addition, activity, which was correlate only with 6:0 IQ at preschool period, do now positively correlated with most of cognitive measures. This implies that activity displayed at early preschool period constitutes the potential bases for later cognitive development in Japanese children.

In the U.S., on the other hand, originality still shows positive correlation significantly with cognitive measures at school age, while other behavioral characteristics do not show any clear-cut correlations with the cognitive measures at this age level. This suggests that originality may persistently play an important role in developing cognitive skills, and that it is involved in cognitive development as one of the central elements for the U.S. children consistently from early young age through school age.

The different patterns of relationships between behavioral characteristics and cognitive performances in two countries can be understood in terms of cognitive socialization in different cultural background. Obedience and comformity were found to be emphasized as developmental tasks for children by Japanese mothers, while verbal self-assertiveness was stressed by the U.S. mothers. These different developmental expectations in Japan and the U.S. mothers are possibly reflected in their child-rearing practices, and also in school education, resulting in different features of cognitive socialization in each culture.

In Japan, all the correlations between behavioral characteristics displayed at early period and cognitive measures at school age are higher than any of the correlations obtained at preschool period. This suggests more cumulative and longer influences of environmental factors upon child's development in Japan (than in the U.S.). This implies that the impacts of socio-cultural norms are more cumulative-

⁶ Recent survey on parental attitude toward education conducted by the Ministry of Education reveals striking SES differences in the educational situations (settings) of Japanese school children, for instance, educational aspiration for child, "juku" schooling, home tutor, and so on.

Table 5
Categories as to relative size of two correlations: preschool and school age periods

Japan	U.S.	Japan	U.S.	Japan	U.S.
<i>Variables of mother's opinions and attitudes</i>		Psychological pressure	(2A) 1B	Structuring	(1) 2A
Variable environment	1 1B	Direct imperative	1 (1)	Press	(1) 2A
Predict for child's future	1A 1B	Suggestion (persuasion)	(2A) 1B	Orienting	1B 1A
Concern intervention	1A 1	Appeal to status	1 1	Control	(1) (1)
Direct teaching by mother	5 1A	Appeal to rule	1B 1B	Sensitivity (composite)	1 4
Emphasis on parental factors	4 1	Personal subjective reason	1 (3B)	Sensitivity	1 1B
Emphasis on natural ability	2A 2A	Rationals	(2A) (2A)	Praise	1 1A
Emphasis on language development	6 (1)	Modeling	(1) (1)	Playfulness	5 1A
Emphasis on letter and number	1 (1)	Question the reason	(1) 2A	Parallel	2A 1A
Emphasis on self-reliance	(2A) 3B	<i>Variables of mother's teaching style</i>		Indirect approach	6 (1)
Emphasis on social development	1A 2A	Maximized variety of orienting	1 3B	Question	(3B) (1)
Mother's responsibility for child education	1 1	Explicit labels	1 1	Confirmative question	5 4
Emphasis on child's intrinsic motivation	1A 1	Explicit dimensions	2A 6	Directive	1A (2A)
Feedback for good behavior	2A 1A	Questioning	(1) 6	Proposition	1 1A
Feedback for bad behavior	2A 1B	Direct command	1B 1B	Acceptance	1B (3B)
<i>Variables of mother's expectation for child's development</i>		Moderate demands	(3B) 1B	Negative response	(1) 1A
School related skills	1B 1B	Request for verbal response	1B 1B	Total number of interaction units	1 (3B)
Compliance	1A 4	Request for nonverbal response	1 1B	<i>Variables of mother's communication style</i>	
Politeness	1A 1	Generated response called for	5 1B	Direct preparation	1A (3B)
Emotional development	(2A) 3B	Lecture	(2A) 6	Structured preparation	1 (3B)
Indispendence	(2A) 3B	Change of floors	(1) 1A	Labeling	(1) (1)
Social development	1 3B	Divertibility by task resistance	(1) 1A	Excluding	3B 6
Verval assertiveness	1 1	Positive affect	2A 6	Technicality	1A 1
General expectation level (mean)	1 1B	Negative affect	1 1	Unique	1 1
<i>Variables of mother's control strategy</i>		To right, elaborated right	(1) (2A)	Repetition	1A 1B
		To not right, negative feedback	(2A) 1	Negation	(1) 1B
		To so-so response, affirmative feedback	(1) 1B	Elaboration	5 (1)
		To not right, recycling	(1) (3B)	Structuring	(1) (3B)
		To right, moving on	1 (2A)	Negation and elaboration	(1) 1B
		<i>Variables of mother-child interaction</i>		Use error as cue	1A 2A
				Non error as cue	6 1
				Repetition	1A 4
				Modification	1A 3B
				New explanation	(3B) 1B
				None	1B 2A

ly and persistently operating upon child's developmental processes through various kinds of educational mediators in Japan than in the U.S.

A number of early maternal factors concerning attitude, opinions and behavior of mothers towards their children were found to be closely connected with child's cogni-

tive performances at preschool period in Japan and the U.S., although some factors showed different, sometimes opposite relations to child's outcomes between two countries. To confirm the relationships of maternal factors with later cognitive development, correlations between 84 maternal variables and several cognitive mea-

asures obtained at 11 or 12 years in the follow-up study were examined, and compared with the previous correlational patterns at preschool period. Three measures assessed at different preschool phases by different tools, namely CFI and PPVT scores at 3:8, school-related skills at 5:0, and IQ at 6:0, were selected as the representatives for early cognitive development, and were compared their correlations with maternal variables with those of four cognitive measures at school age for Japan and five cognitive measures for the U.S., respectively.

The correlations at school age are generally higher than those at preschool period in Japan, on the other hand, in the U.S., the correlations are generally rather low at school age than preschool period. In order to analyse the changes in the correlational patterns from preschool period to school age, 84 maternal variables were classified into the following 11 sub-categories according to direction and the relative size of correlations in preschool and school age in each country (Table 5).⁷

- 1: Maternal variables which show significant correlations with child's measures at both age levels.
- (1): Maternal variables which are correlated with child's measures at both age levels, but not significant.
- 1A: Maternal variables which show low correlations with preschool measures and significantly high correlations with school age measures. (Maternal variables, the correlations of which are higher at school age than at preschool period.)
- 2A: Maternal variables which were not correlated with preschool measures, and significantly correlate only with school age measures.
- (2A): Maternal variables which correlate only with school age measures, al-

though not significant.

- 1B: Maternal variables which show similar correlational patterns at both periods, but higher at preschool period than school age.
- 3B: Maternal variables which significantly correlate only with preschool measures.
- (3B): Maternal variables which correlate only with preschool measures, but not significant.
- 4: Maternal variables which show opposite correlational patterns at two periods.
- 5: Maternal variables which show inconsistent correlational patterns at preschool period and/or school age level.
- 6: Maternal variables which are not correlated with both preschool and school age measures.

Based on the classification into these sub-categories, following analysis are examined in order to observe the changes of correlational patterns during two periods in each country and cross-national differences in the changes of the correlational patterns between two countries.

Three different types in terms of changes in correlational patterns through preschool period and school age were reorganized from 11 sub-categories:

- Type 1: Maternal variables that consistently show same correlational patterns with cognitive measures at both age periods.—consistent correlations throughout preschool and school age—(sub-category 1+(1)+6)
- Type 2: Maternal variables that correlate more highly with school age measures than with preschool measures and those which correlate only with school age measures.—correlations dominantly and/or only at school age—(1A+2A+(2A))
- Type 3: Maternal variables that correlate more highly with preschool

⁷ Requests for the detailed data of correlations should be sent to author, K. Kashiwagi.

Table 6
Classification of maternal variables according to the correlational patterns at two age levels

Domain of maternal variable	Type 1 (=) Consistant correlations through two age levels		Type 2 (<) Correlations only at school age and higher at school age		Type 3 (>) Correlations only at preschool period and higher at preschool age	
	Japan	U.S.	Japan	U.S.	Japan	U.S.
Opinions and attitude	4	6	8	4	0	4
DEQ	3	2	4	0	1	5
Control strategy	5	3	3	2	1	4
Teaching style	11	7	4	4	3	8
M-C interaction	9	3	2	9	3	3
Communication style	7	6	5	2	4	8
Total	39	27	26	21	12	32

measures than with school age measures, and those which correlate only with preschool measures.—correlations dominantly or/and only at preschool period —(1B+3B+(3B))

Table 6 represents number of maternal variables falling into the above three types in each country.

Apparently, the number of correlations consistent through preschool and later age levels are much greater in Japan than in the U.S. In addition, maternal variables that correlate higher at school age and correlate only with school age measures are also found more in Japan. On the other hand, maternal variables that correlate only at preschool period and more correlate higher with preschool measures are much more recognized in the U.S. In other words, maternal variables which diminish or lose meaningful correlations with child's measures in school age level are rare in Japan.

There are only few variables that significantly correlate with preschool measures but do not show any correlations with school age measures in both countries. Out of 84 maternal variables, only four variables in Japan, five variables in the U.S. completely lose their meaningful correlations with child's measures at school age period.

Thus, the correlational patterns of the

maternal factors with child's cognitive outcomes are generally maintained nearly same fashion in both countries, however, the relationships are stronger and tend to continue more persistently in Japan than in the U.S.

As described before, all of maternal variables were assessed when the children were four to five years old. Therefore, the present findings show that considerable amount of early maternal factors are closely related not only to early child's performances, but also to later cognitive development. Besides, it is worth noticing that such long-term relationships of maternal factors with later cognitive achievements are predominantly found in Japan.

How are the present findings to be explained? First, we need to take note of the differences in procedures employed in two countries. For one thing, follow-up assessments were conducted at slightly different period in Japan and the U.S. In Japan, children were 11 years old, and in the U.S., children were 12 years old samples. Also differences in curriculum and other school settings made it necessary to use different tools as the cognitive measures at school age level. We do not find, however, any logical basis to suppose that these conditions will account for the findings we present here.

To understand the present results, three explanations are possible. One is "re-

mote" influence of early maternal factors upon later cognitive development; some environmental and maternal factors in early period were highly influential upon child's cognitive achievements at that time. Since the level of performance at the time of entrance to school substantially influences later adjustment and achievement, early maternal influence will operate upon later performance through contributing to the entering performance. Secondly, the child may internalize the motivation and work ethic of parents even in the earlier years, which will obviously affect subsequent learning. Thirdly, mother's opinions and teaching style may continue to influence the child after he/she enters the school, in a cumulative fashion. Our preschool study identified several characteristics of mother's teaching style including variety of orientations, indirect and inductive approach and affirmative feedback as central components to facilitate child's preschool cognitive skills. It is conceivable that they will also contribute to later learning, assuming that maternal styles are stable through years.

Our data seem to indicate that cumulative and continuous effects of maternal factors are reflected in the trend of higher correlations with later cognitive measures found in Japan. As we have already pointed out, higher correlations of maternal variables with later cognitive measures were unusually higher than those with preschool measures. This was not the case of the U.S. The detailed content analysis (examinations) of maternal variables showing different correlational patterns at two age levels give us some support for the above interpretations.

Each of 84 maternal variables was compared between Japanese and the U.S. as to the type of the correlational changes during two periods. Table 7 summarizes the results. Maternal variables showing same types in both countries, either consistent, increasing or decreasing correlations, are 24 out of 84 variables, on the

Table 7
Comparison of type of the correlational changes in Japan and the U.S.
(Number of maternal variables)

U.S.	Japan		
	1, (1)	1A, 2A, (2A)	1B, 3B, (3B)
1, (1)	11	4	2
1A, 2A, (2A)	11	6	
1B, 3B, (3B)		26	7

other hand, 43 maternal variables belong to different types between two countries in the correlational changes from preschool to school age. And, 26 out of the 43 variables show equal or higher correlations with later school performances.

In the U.S., there are only two variables that correlate equally or higher with later school performance than with preschool performance. Besides, in Japan, many maternal variables that significantly correlated with SES, for instance, "Verbal environment", "Predict for child's future", "General developmental expectation level", "Maximized variety of orientation", "Maternal sensitivity" and so on, still remain the same correlational patterns with school performance, and most of these correlations are higher than those at preschool period. There are general family environment which will relatively be stable over years. This suggest that cumulative and long term functioning of maternal influence operates in Japan.

Another possibility can be assumed to explain the trend of higher correlations at school age in Japan. Academic aspirations for higher education in parents and their children are closely related to SES in Japan (Ministry of Education, 1983). In our preschool study, mother's prediction for child's academic achievements and general developmental expectation level were also recognized to be significantly correlated positively with SES, especially in Japanese samples. Besides, close relationships between academic aspiration and achievements were reported in many pre-

vious researches (for instance, Hatano, 1962, 1963). Possibly, in our samples, higher aspiration may work as the base of learning (mastery) motivation to promote child's academic achievements further throughout preschool to school age. And, as we have described before, SES and parental education were significantly related with school age achievements only in Japan (Tables 3-a, 3-b). This close relationships between SES and child's cognitive measures at school age may be largely mediated by the advantageous educational environment provided by the mothers with high SES and education.

References

- Azuma, H., Kashiwagi, K., & Hess, R. D. 1981 *Maternal attitudes, behaviors and child's cognitive development—Cross-national survey between Japan and the U.S.* University of Tokyo Press. (In Japanese)
- Hatano, G. 1962 The influence of socioeconomic factors upon under-achievement. Paper presented at the 26th Annual Convention of the Japanese Psychological Association. (In Japanese)
- Hatano, G. 1963 The influence of socio-economic factors upon under-achievement. Paper presented at the 27th Annual Convention of the Japanese Psychological Association. (In Japanese)
- Hierouynurs, A. N., Lindquist, E. F., & Hoover, H. D. 1978 *The Iowa Tests of Basic Skills*. Boston: Houghton Mifflin.
- Kashiwagi, K., Azuma, H., & Miyake, K. 1982 Early maternal influences upon later cognitive development among Japanese children: A follow-up study. *Japanese Psychological Research*, **24**, 90-100.
- Ministry of Education 1983 *The opinion survey on education*. The Prime Minister's office.
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