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AN ANALYSIS OF THE INTERACTIONS OF MOTHERS AND THEIR PRESCHOOL CHILDREN: AN INTERIM REPORT OF LONGITUDINAL STUDY ON MOTHER-CHILD RELATIONSHIPS AND CHILD BEHAVIORAL DEVELOPMENT

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INTRODUCTION

As was stated in the previous report of this longitudinal study (Miyake, et al., 1978(a)) the aim of our research was to replace the past socialization studies demonstrating correlations either between the mother and child variables at a certain single point in time or between maternal variables measured at one time and child variables measured at another. In past studies, maternal behaviors were often regarded as antecedents and child performance as consequents. But with such pre-supposition it is obvious that the research plan used does not permit the analysis of cause-effect relationships between the mother and child. In planning our research, we stressed the need for continuous assessment of the reciprocal relations between the mother and child to determine how the interactions of the two accelerate or hamper the child's socialization over a period of time.

In our previous report mentioned above the overall summary of the tentative findings from the idiographic case study analysis of the longitudinal data on 22 mother-child pairs was presented. Based on the analysis, it was hypothesized that the child's behavior is modified by the mother's behavior and undergoes considerable changes over time and that the mother's behavior is alternatively modified by the child's behavior.

As the sample size of our study was not large, the application of statistical analysis had to be restricted. Nevertheless we tried to investigate both the maternal effect on the child and the child's effect on the mother across time, and to make inferences about the direction of the said influence over a period of time.

METHOD

As a part of the longitudinal project covering the period between the child's infancy and pre-adolescence, each mother and child pair was observed in the play room of our

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laboratory when the child was $3\frac{1}{2}$, $4\frac{1}{2}$, $5\frac{1}{2}$ and $6\frac{1}{4}$ years of age. The situation was relatively unstructured in that mother and child were free to do what they liked. The mother-child interaction was videotaped for 20 minutes and later on verbatim transcripts of the continuous interaction of the two were prepared from the videotape in order to be unitized into communication units and be coded as follows:

statement (S), question (Q), direction (D), proposal (P), response (R),
 explanation (E), acceptance (A), and negation and rejection (N).

Communication units were differentiated in terms of the meaning of the subject's utterances. One utterance (or one sentence) was not necessarily one communication unit, while two discrete utterances which had the same semantic content were counted as one unit. From the set of variables formed from the coding categories stated above, the following variables and composite variables were selected in this report as potentially effective measures of mother-child reciprocal relations.

Maternal variables

(a) Indirectness. Q+P+A

Assumed to reflect maternal tendency to refrain from the direct leading of the child.

(b) Responsiveness. R+E

Assumed to reflect maternal willingness in responding to the child's approach to her.

(c) Directness. D+S

Assumed to reflect maternal tendency to lead the child directly without paying due attention to the child's needs.

(d) Talkativeness. Total number of maternal communication units.

Regarded as the index of maternal involvement in her interaction with the child.

Child variables

(a) Activity. D+P+N

Assumed to reflect child tendency to behave actively and assertively towards the mother.

(b) Responsiveness. R+E

Assumed to reflect child tendency to be willing to respond to maternal approach.

(c) Negation and rejection. N

Assumed to reflect child tendency to behave negatively and rejectively towards the mother.

(d) Talkativeness. Total number of child communication units.

Regarded as the index of child involvement in his/her interaction with the mother.

The details of the method of unitization and coding are explained elsewhere (Miyake et al., 1978(b)).

These variables were measured at four different times in preschool period. This permitted not only inference about the direction of influence in mother-child relations but also an examination of the gradual reversal of cause-effect direction over time. For this purpose cross-lagged (i.e. diagonal) correlations (Campbell, 1963) between the maternal variables and child variables measured four times over a three year period were calculated. Moreover, the cross-age and within-age (i.e. contemporaneous) correlations which do not permit the assignment of causal direction in the mother-child interaction were calculated.

RESULTS

From among many possible combinations of maternal variables and child variables mentioned above, we have selected some which seemed to suggest the necessity of further investigation of the causal direction of the reciprocal influences between the mother and child across time in preschool period.

Maternal 'indirectness' and child 'responsiveness' and 'talkativeness'

The cross-age correlations for maternal 'indirectness' are presented in table 1. Relatively high positive correlations across time suggest the possibility that the maternal 'indirectness' is a stable aspect of maternal behavior towards the child.

TABLE 1

Cross-age Correlations for Maternal 'Indirectness'.

Maternal indirectness	T1	T2	T3
T2	.71**		
T3	.65**	.77**	
T4	.78**	.68**	.74**

** p < .01 T1. 3½ years of age of the child
 T2. 4½ years
 T3. 5½ years
 T4. 6¼ years

As presented in table 2, the cross-age correlations for child 'responsiveness' as well as for child 'talkativeness' are also highly positive. This suggests the possibility that by age 3 or 4 the child's behavioral characteristics inferred from these two variables have already become stable aspects of child personality.

TABLE 2

Cross-age Correlations for Child 'Responsiveness' and for Child 'Talkativeness'.

Child responsiveness	T1	T2	T3
T2	.36		
T3	.68**	.64**	
T4	.75**	.49**	.72**

Child talkativeness	T1	T2	T3
T2	.40		
T3	.42*	.72**	
T4	.61**	.26	.50**

* p < .05 ** p < .01

The correlations on the diagonals in figure 1 and figure 2 are the cross-lagged correlations. Figure 1 diagrams the relation between maternal 'indirectness' and child 'responsiveness'. The relation between maternal 'indirectness' and child 'talkativeness' is diagrammed in figure 2. The patterns presented in these two figures are quite similar in that all the cross-lagged correlations except one as well as all the within-age correlations are significantly large. Therefore within the period between T1 and T4 we cannot postulate any causal direction in the relation between the mother and child so far as these variables are concerned.

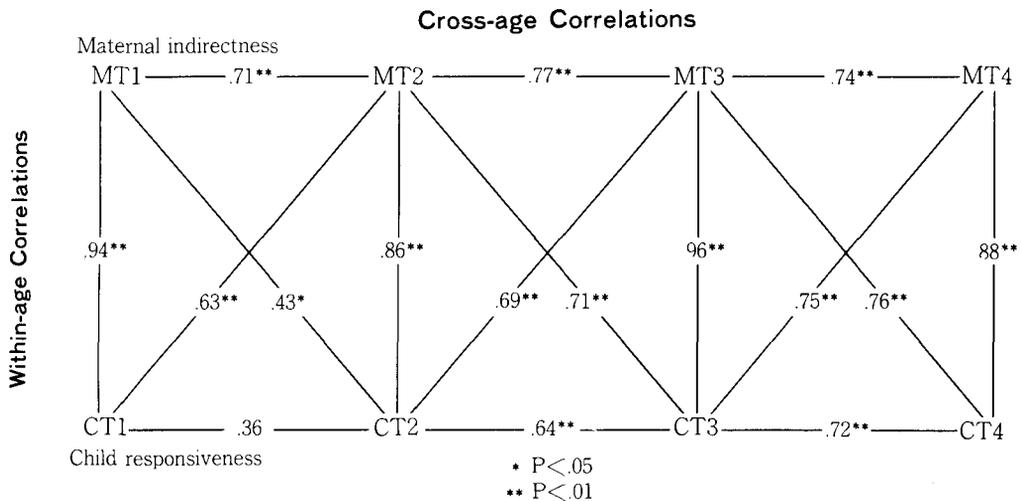


FIGURE 1 Cross-lagged correlation analysis of mother-child interaction data.
(Maternal 'indirectness' and child 'responsiveness')

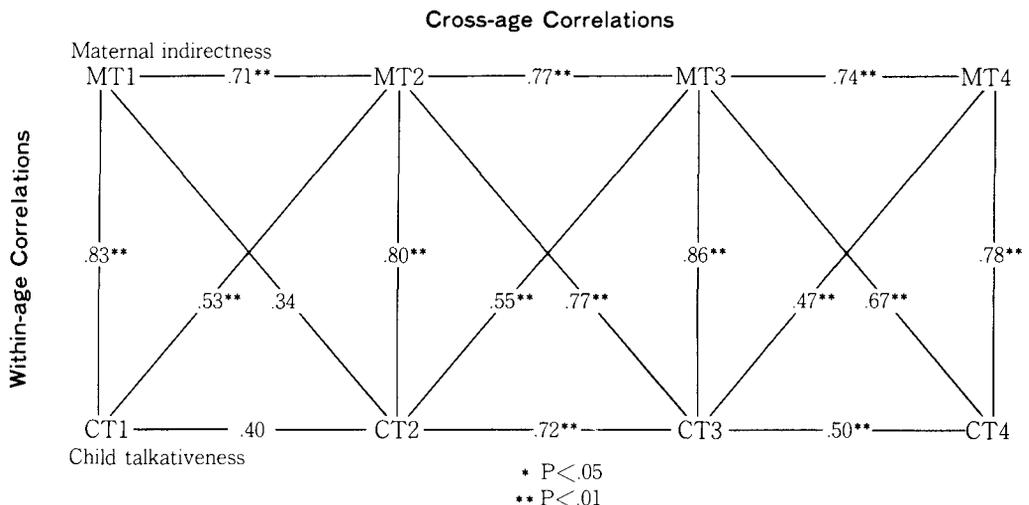


FIGURE 2 Cross-lagged correlation analysis of mother-child interaction data.
(Maternal 'indirectness' and child 'talkativeness')

Maternal 'directness' and child 'negation and rejection'

As seen in figure 3, the cross-lagged correlation between maternal 'directness' at T1 and child 'negation and rejection' at T2 is significant ($r = .66, p < .01$). Combined with the lack of a significant relation between child 'negation and rejection' at T1 and maternal 'directness' at T2, this significant correlation supports the hypothesis that the degree of maternal 'directness' at T1 influences the degree of the subsequent child's 'negation and rejection' at T2. The probability that the difference between these two cross-lagged correlations occurred by chance is low ($t = 2.0, p < .05$). However, certain rival hypothesis are seemingly consistent with this difference and should be examined as Clark-Stewart (1973) did in her analysis of longitudinal data on mother-infant interaction.

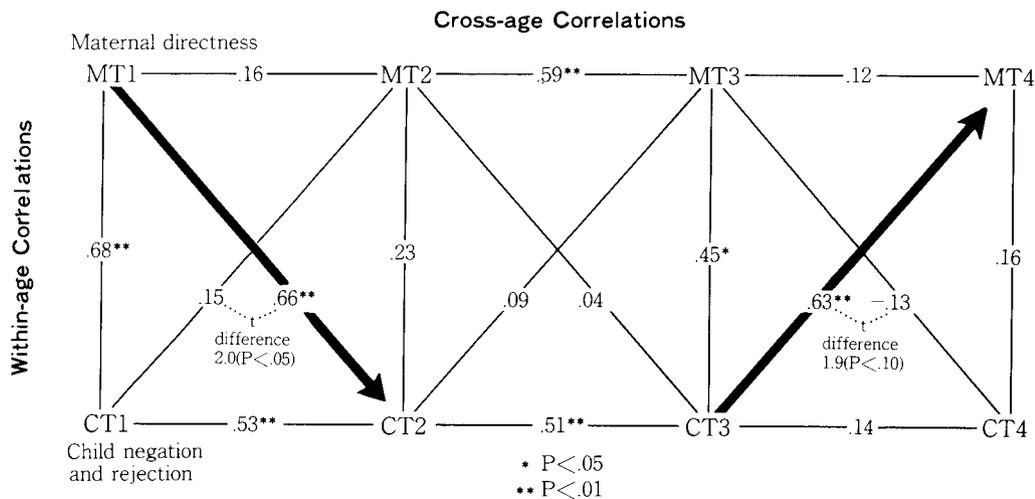


FIGURE 3 Cross-lagged correlation analysis of mother-child interaction data. (Maternal 'directness' and child 'negation and rejection')

One alternative hypothesis is that maternal 'directness' at T1 affects concurrent child 'negation and rejection', and this leads to the subsequent child's 'negation and rejection' at T2. This interpretation cannot be rejected, because the correlations between MT1 and CT1 as well as between CT1 and CT2 are both significant.

Another alternative hypothesis is that the initial child's 'negation and rejection' (CT1) causes both contemporaneous maternal 'directness' (MT1) and the subsequent child's 'negation and rejection' (CT2). The question to be examined is whether the relation between early maternal 'directness' (MT1) and the later child's 'negation and rejection' (CT2) can be explained as dependent on early child 'negation and rejection' (CT1). Since the correlation between maternal 'directness' and child 'negation and rejection' at T1 is significant, this hypothesis cannot be rejected either. Moreover, it is not to be rejected as the partial correlation between early maternal 'directness' (MT1) and later child 'negation and rejection' (CT2), partialling out early child 'negation and rejection' (CT1) is not significant ($r = .32$).

Now let us turn our attention to the cross-lagged correlations between MT3 and CT4 and between CT3 and MT4. The difference between these two correlations is not signifi-

cant ($p < .10$). However, the correlation between CT3 and MT4 is significantly large. Moreover, the partial correlation between CT3 and MT4, controlling for MT3 is also significant ($r = .71$, $p < .01$), while the partial correlation between MT3 and CT4, controlling for CT3 is very small.

As presented in table 3, except for the one between T2 and T3, cross-age correlations for maternal 'directness' are not significant. This suggests that when the developing child's degree of 'negation and rejection' remains relatively stable as in table 4, the degree of maternal 'directness' tends to fluctuate considerably.

TABLE 3

Cross-age Correlations for Maternal 'Directness'.

Maternal directness	T1	T2	T3
T2	.16		
T3	.01	.59*	
T4	.13	-.45	.12

* $p < .05$

TABLE 4

Cross-age Correlations for Child 'Negation and Rejection'

Child negation and rejection	T1	T2	T3
T2	.53*		
T3	.39	.51**	
T4	.61**	.30	.14

* $p < .05$ ** $p < .01$

As presented in figure 3, at T1 and T2 the cross-lagged correlations suggest that maternal 'directness' is causing an increase in child 'negation and rejection'. At T2 and T3, however, the cross-lagged correlations are close to zero. Finally at T3 and T4, the cross-lagged correlation imply the opposite; that child 'negation and rejection' is causing maternal 'directness'. The possibility of a causal role reversal in mother-child relation in the preschool period can be postulated from these findings. This may be worth following up in future study.

Maternal 'responsiveness' and child 'activity'

In figure 4, the pattern of correlations between maternal 'responsiveness' and child 'activity' across time is presented. This pattern resembles the one diagramed in figure 3. At T1 and T2 the cross-lagged correlations suggest that maternal 'responsiveness' is causing child 'activity'. The difference between the two cross-lagged correlations at T2 and T3 is not statistically significant. Moreover, they are both small. At T3 and T4, however, the cross-lagged correlations seem to imply the opposite; that child 'negation and rejection' seems to be causing maternal responsiveness. Here as well, the statistical difference is not significant.

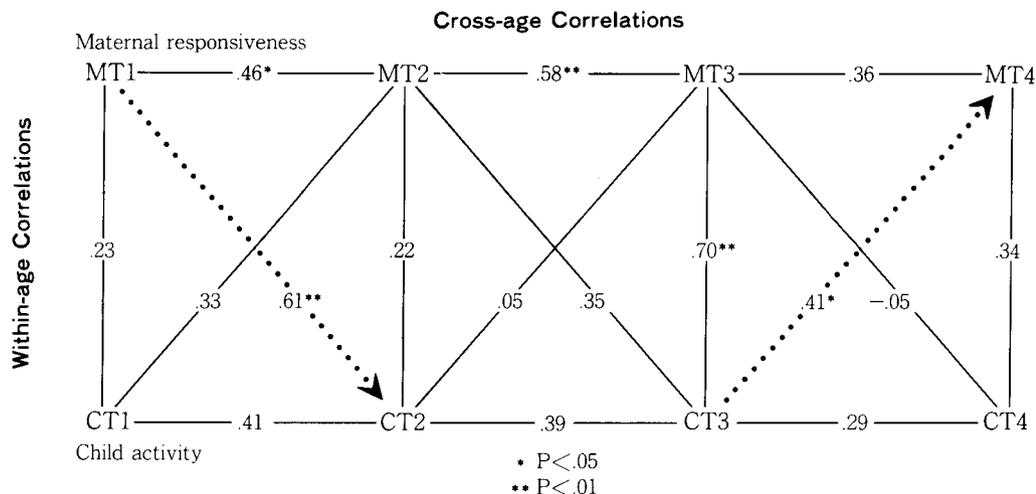


FIGURE 4 Cross-lagged correlation analysis of mother-child interaction data. (Maternal 'responsiveness' and child 'activity')

As is the case of the relation between maternal 'directness' and child 'negation and rejection', possible reversal of causal direction may be postulated between maternal 'responsiveness' and child 'activity'. This seems to be worth exploring further in future research when a larger sample is available.

The cross-age correlations for child 'activity' presented in table 5 seem to suggest that this aspect of child behavior tends to fluctuate in the preschool period, while maternal 'responsiveness' remains relatively stable as in table 6

TABLE 5

Cross-age Correlations for Child 'Activity'.

Child activity	T1	T2	T3
T2	.41		
T3	.33	.39	
T4	.31	.68**	.29

** p < .01

TABLE 6

Cross-age Correlations for Maternal 'Responsiveness'.

Maternal responsiveness	T1	T2	T3
T2	.46*		
T3	.27	.58**	
T4	.49*	-.05	.36

* p < .05 ** p < .01

Maternal 'talkativeness' and child 'negation and rejection'

Figure 5 presents the pattern of correlations between maternal 'talkativeness' and child 'negation and rejection' over a period of time.

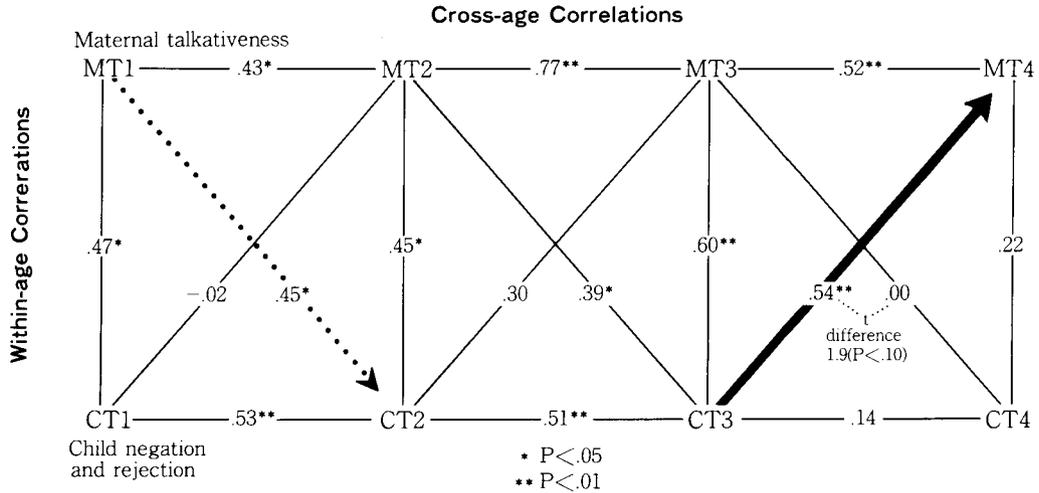


FIGURE 5 Cross-lagged correlation analysis of mother-child interaction data. (Maternal 'talkativeness' and child 'negation and rejection')

At T3 and T4 the cross-lagged correlations suggest that child 'negation and rejection' is causing maternal 'talkativeness', though the difference between the two cross-lagged correlations is not significant ($t=1.9$, $p<.10$).

On the other hand, at T1 and T2 the cross-lagged correlations imply the opposite; that maternal 'talkativeness' seems to cause child 'negation and rejection', though the difference between the two correlations is not significant in this instance either.

This finding could be interpreted to mean that during the early preschool years maternal involvement in her interaction with the child as inferred from her 'talkativeness' causes the subsequent child 'negation and rejection'. At the later stage the child's 'negation and rejection' tends not to be caused by, but to cause the maternal concern about her interaction with the child.

GENERAL DISCUSSION

The analysis of our longitudinal data suggests that the mother-child relations are reciprocal in nature and that over time both the mother and child affect each other's behavior alternatively. In other words, the existence of a causal role reversal in the mother-child relation may be postulated.

Bell (1977) asserts that the outcome of the effort to isolate effects will often be very ambiguous and that interpretations of cross-lagged correlations will be difficult if there is a change in the nature of the parent or child measures between the two periods or a change in the reliability of their assessment. Either condition could very well occur in such studies attempting to cover several years of growth as rapid as that of preschoolers.

According to Bell, more defensible results may be obtained in a short-term study as

in Clark-Stewart's cross-lagged correlational analysis of mutual influences between mother and infant during the period of 11 to 17 months of age (Clark-Stewart 1973).

We would be somewhat hesitant to say that the nature of our mother-child interaction measures taken at four different times during a three year period preceding the child's entrance into school are exactly similar to each other and that the reliability of each assessment is significantly high. We, however, may safely say that most mother and child pairs behaved quite at ease and seemed to acclimate themselves to the situation each time they were introduced to the same play room of our laboratory. On the other hand, we have to admit that our attempt to sort out mother-and child-effects in our longitudinal study remains tentative. None the less, we believe that it is well to have a try at it, because such a try will give us some clue to further understanding of the nature of mother-child reciprocal relations.

Of course statistical analysis of correlations across time does not permit as high a degree of confidence in a causal relation as does experimental manipulation. Moreover, it is extremely difficult to tease out determinants of child behavior as well as maternal behavior in a longitudinal observational study. It is without saying that we must be very careful in discussing the nature of mother-child interaction and the determinants of child behavior.

Nevertheless, as a result of our research, it is now apparent that if the child's development is to be understood properly, it will be through continuous assessment of the reciprocal interactions of the mother and child to determine how these interactions facilitate or obstructs adaptive integration of child personality as the mother and child make the journey of life together.

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