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ABSTRACT

Part of a larger study of adolescent social-cognitive development and its influence on mother/child interaction, this investigation compared three methods of recording observations of mother/child interaction. It also explored correlations between sociodemographic variables and factor scores that summarized interaction variables. The sample consisted of 128 single adolescent mothers, ages 15 to 20, with a firstborn child from 9 to 27 months of age. Subjects, 93 percent of whom were black, averaged 10.5 years of school. Observations of mother/child interaction occurred in the home during a developmentally appropriate teaching task and a period of free play. Four observers were trained for 12 to 15 hours before the project and received a refresher course two-thirds of the way through the data collection. Interobserver reliability was measured at the midpoint and at the end of the data collection year according to two methods. Scores on two of the observation scales were standardized to make them comparable and to remove the bias of systematic scale preference. The methods for recording behavior (Barnard's Teaching Scale, Schaefer's Attachment Inventory, and Clarke-Stewart's Rating Scale), required different degrees of inference by observers and examined different-sized units of data. Results of factor analyses of the child and maternal data were reported separately for each of the instruments and then comparatively for all three instruments. Few sociodemographic variables were correlated with instrument factors or items. Conclusions discussed the overlapping relationships between the scales and the contribution of each to efforts to describe maternal/child interaction. (CB)

Observations of Adolescent Mothers and Their Toddlers: Issues of Measurement

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INTRODUCTION

Methods for recording mother-child interaction vary in their objectivity from the time sampling of specific minute pieces of behavior to ratings that summarize global characteristics. This study, part of a larger study of adolescent social-cognitive development and its influence on mother-child interaction, compares three methods of recording mother-child interaction observations and explores correlations between mother's age and other socio-demographic variables and factor scores summarizing the interaction variables.

An age-stratified sample of 128 single adolescent mothers aged 15-20 with a first born child aged from 9 to 27 months, was drawn from two urban programs for young parents. The sample of young mothers was 93% black and averaged 10.5 years of school completed. Ratings of social status were based on the education and occupation of the head of household when the young mother was fourteen. Although primiarly low income (Class IV), the heads of household when the young mothers were fourteen had social status rankings at all but the highest level (V to II) on the five level Hollingshead 2-factor index of social class. The average head of household had 10-11 years of high school and had an occupation ranked with semi-skilled workers such as nurses aides or truck drivers.

METHODS

Observations of mother-child interaction occurred in the home during a developmentally appropriate teaching task and a period of free play. The observers were four women, two of each rece. Two were nurses, one a sociology graduate student and the fourth a parent educator working with adolescent

parents in the public schools. All had experience working with teenagers and all but one had had prior home-visiting experience in inner-city neighborhoods.

The methods for recording behavior, Barnard's Teaching Scale (1978), Schaefer's Attachment Inventory (1978) and Clarke-Stewart's Rating Scale (1973) require different degrees of inference by the observers and examine different sized units of behavior. The Clarke-Stewart (C-S) scale includes ratings from 1 to 5 on 14 global dimensions of behavior such as, Tone of Voice or Closeness of Physical Contact. Consequently, it requires broad inferences based on many observed details. The Attachment Inventory's (AI) 100 items also ask for ratings from 1 to 5 that require considerable interpretation of behavior but in smaller increments. For example, it requires rating whether or not the mother ". . . enjoys playful social contact with the child: or ". . . treats the child as an object."

While the C-S and AI ratings summarize all observed interactions the Teaching Scale (TS) is based only on observations of the teaching task. The TS requires a yes or no response on 73 items describing very specific and often quite small units of behavior. For example does the "parent smile or touch child within five seconds after the child smiles or vocalizes?" As this item suggests, many of the items assess contingent responses which Barnard describes as the 'dance' of interaction. The manual and videotapes used in training observers in the use of the Teaching Scale carefully define terms and clarify ambiguities.

Approximately one third of the Attachment Scale and the Teaching Scale items describe the child's behavior either in response to the mother or as initiator of interaction; the remaining items focus on the behavior of the mother. The Clarke-Stewart scale includes only a single child rating which describes activity level while all other items assess the mother's behavior.

Observer Training

Observer training using Barnard's Nursing Child Assessment Satellite Training Project videotapes and videotapes made for the project included nine class hours and from three to six hours in-home practice observations. Observers were paired for training and had to achieve 85% agreement with their partners on three observations with the Teaching Scale and agreement within one scale point on the rating scales. A three hour session two-thirds of the way through the data collection refreshed the observers' knowledge of the measures.

Interobserver Reliability

Interobserver reliability was measured at the midpoint and at the end of the data collection year using two methods. First, in order to conserve funds, all four interviewers independently scored one videotape of a young mother and child. This allowed calculation of the agreement between all six paired combinations of interviewers. Then four randomly selected pairs made joint home observations for a total of 10 paired observations at each reliability check for a grand total of 20. The Clarke-Stewart and Attachment Inventory agreement stayed within one scale point from the training throughout data collection with no difference between the videotapes and the home visits. Observer agreement on the Teaching Scale also failed to decline over time. However, the 80% agreement on the videotapes fell to 70% for the home visits at both data points. The interviewers feel the difference was due to having two different perspectives on the home visit while seeing the videotaped session only from the perspective of the camera.

Standardization of Ratings

The C-S and AI measures require rating behavior on scales which have no absolute meaning, only the relative meaning assigned by the observer. Conse-

quently, observer preference in the use of the full range of the scale potentially reduces the internal reliability of the measure when ratings are made by more than one observer. In this case four observers collected approximately equal proportions of the data. A one-way analysis of variance indicated that the observer accounts for 25-35% of the variance in the C-S and the AI ratings. For example, one observer preferred the more positive end of all scales, another's ratings clustered in the middle range while a third used the whole range of scores. Consequently, it was necessary to standardize the scores to make them comparable and to remove the bias of systematic scale preference. Each observer's ratings were converted to z scores based on the distribution of their item ratings.

ANALYSIS

One goal of the data analysis was the reduction of the 187 interaction variables resulting from the three scales to the smallest possible number of interpretable and internally consistent scales. Initially the data analysis plan called for separate factor analyses of the three instruments and a comparison of their factor structures for equivalence as well as a comparison of the pattern of association of the resulting sets of factor scores with the sociodemographic variables. Inability to obtain clearly differentiated interpretable factors for two of the three scales--the Clarke-Stewart and the Teaching Scale--resulted in the reliance on a priori scales for the Teaching Scale and the individual items for the Clarke-Stewart Scale. The interpretable factor scores of the Attachment Inventory and the scales of the TS and the C-S items were combined in an overall factor analysis for maternal data to determine the extent to which there was similarity in the content of the scores and scales derived from the three instruments. The same process was repeated for the child data from the three instruments. The following section reports the results separately for each of the instruments and then comparatively for all three instruments. Fortunately

minimal missing data[1] allowed replacement of missing items with the missing item's mean value for the whole sample for the teaching scale and with the observer's mean for the standardized ratings. Consequently, all 128 cases could be used in the factor analyses.

Reduction of the Teaching Scale

Barnard's teaching scale is organized into 6 subscales. However, as a preliminary step the individual maternal items were factor analyzed as one group as were the child items. Principal components analyses were first done to suggest the number of factors to retain; once the number of factors was determined, principal axis factor analyses with varimax rotation were performed and regression based factor scores generated.

These analyses did not produce interpretable factors or clear factor structures. Consequently, the items on the six subscales constructed by Barnard were added after eliminating items that reduced the internal reliability of each subscale. Table 1 indicates the number of items retained and the coefficient alphas of the resulting subscales.

Relationships Among the TS Subscales

Table 2 presents the correlations among the scores on the TS subscales. All maternal subscale scores associate positively with each other with one exception . M's response to Distress and M's sensitivity to cues proved unrelated. The child subscale scores on the other hand show only one association with a maternal score while being strongly positively associated with each other ($r = .51$, $p < .001$). The one relationship between the maternal and child factors appears between the Child's Clarity of Cues and Mother's Response to

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[1]

Scale	# of missing values per item
Teaching Scale	0-1
Rating Scales (C-S & AI)	0-3

Distress. The correlation indicates that mothers who are scored as responding more readily have children who present less clear cues.

This paradoxical result may be explained by an artifact in the measure. The instructions for using the distress subscale indicate that if no child distress is observed the observer should check all behavior positively. In addition, when the items that reduced the internal reliability of the Clarity of Cues subscale were dropped, the four items retained all described cues indicating distress. Consequently, the children who did not exhibit distress cues would receive a low Clarity of Cues Score and a high Mother's Response to Distress Score.

Reduction of the Attachment Inventory

A scree plot of the eigenvalues from a principal components analysis of the maternal factors indicated a natural break at four factors. The four factors explained 52% of the variance in the 70 maternal items with little gain in explained variance from five or more factors. Principal axis factor analyses with varimax rotation, specifying four factors, produced the factor pattern displayed in Table 3. The four well differentiated factors were readily interpretable. The first factor, labelled Affectionate Contact, included primarily items describing soothing or affectionate physical contact such as . . . M holds on lap for long periods of time,. . . M soothes by holding or cuddling, or M does not handle unless absolutely necessary. Less strongly related items include . . . M often smiles, . . . M tender and protective toward child.

The second factor called Maternal Rejection, includes items with heavy factor loadings such as . . . M thinks child is unattractive, . . . has many faults, . . . M seems ill at ease in care of the child and seems unresponsive . . . M has little eye-to-eye contact. The third factor, Maternal Insensitivity,

seems to be characterized by lack of sensitivity to the child's experience rather than the rejection of the child itself seen in the second factor. Items with heavy factor loadings include . . . M uses harsh voice,. . . M is rough or abrupt to behavior,. . . M not sensitive to child's experience.

The fourth factor, Interaction/Stimulation, includes items describing a style of interaction that rewards and encourages development. Representative items with heavy factor loadings include . . . M points out things C can do, . . .M stimulates frequently,. . . M reports how smart and good child is and . . .M praises new responses.

The resulting regression based factor scores explained 94-95% of the variance in the corresponding factors. The analysis of the 30 child items in the AI followed the same procedure and the eigenvalues from principal congruents analysis also suggested factor analyzing four factors. The four factors explained 55% of the item variance. Table 3 displays the rotated factor pattern produced by a principal axis factor analysis with varimax rotation of four factors.

Items with heavy factor loadings on the first child factor, labelled Child's Expressive/Responsive Vocalization, include. . . C does not vocalize much to M, . . .vocalizations are weak or hesitant, and . . . social response is weak or slow. The second factor, labelled Responsiveness vs. Withdrawal, includes such heavily loaded items as . . .C tries to withdraw from contact with M, . . . C listens attentively to M, and . . .C is restless and irritable in interaction with M. Factor 3 clearly describes behaviors indicating expressions of warmth and affection and is correspondingly labelled Child's Positive Expressive Interaction. Two items load most heavily on the final factor. . . C spends little time looking at M, and . . . C has little eye-to-eye contact with M. The other three items with factors loadings greater than 35 described the child's

not initiating interaction with the mother. This factor, labelled Detachment, differs from Responsiveness vs. Withdrawal in that the latter describes active withdrawal or irritability during interaction while the Detachment factor simply describes the lack of initiating interaction.

As Table 5 indicates that the maternal and the child factor scores snow high correlations (.86 to .97) with their respective underlying factors. The factor scores derived from the maternal variables also snow acceptable internal reliabilities (α = .66 to .74). The child factor scores show lower internal reliabilities (α = .31 to .66).

Relationships Among the AI Factors

Although it is not possible to identify the causal linkage of the child or maternal behaviors, the relationships between the estmiated mother and the estimated child factors are revealing.

For example, Table 6 shows that a rejecting mother is associated with negative child behavior on all but one of the child factors. That is, the rejecting mother's child is more likely to actively withdraw from interaction, to show less positive emotion in the interactions they have and to be detached or to not seek interaction with the mother. Another maternal factor associated with all but one child factor is Interaction/Stimulation. Child's Detachment is unrelated to Mother's Interaction/Stimulation, while all other child factors indicate more positive behavior as Interaction/Stimulation increases. Maternal Affectionate Contact is positively associated with two child factors, Responsiveness vs. Withdrawal and Positive Expressive Interaction. Finally the Mother's Insensitivity relates only to the Child's Responsiveness vs. Withdrawal and this relationship exhibits the highest correlation among these factors ($r = .47$, $p < .001$).

Looking at the same relationships from the perspective of the child, the Child's Expressive/Responsive Vocalizations are related only to Interaction/Stimulation suggesting that Interaction/Stimulation may encourage the quantity and quality of the child's vocalization or vice versa. Responsiveness vs. Withdrawal on the other hand is positively associated with all four maternal behavior factors. This suggests that an actively withdrawing child may discourage positive behavior in all four maternal behavior dimensions described or that a mother who is insensitive to the child's experience may encourage the child's active withdrawal. The Child's Positive Expressive Interaction shows positive associations with all maternal factors except Maternal Insensitivity. Not surprisingly the strongest association appears with Maternal Affectionate Contact ($r = .43$, $p < .001$). Finally, the Child's Detachment shows an association with only one factor, Maternal Rejection. While a mother's rejecting behavior is negatively associated with the child's behavior on three of the four child behavior dimensions, children who do not initiate contact with their mothers are associated only with rejecting mothers. That is, little affectionate contact from the mother, interactions which are insensitive to the child and low levels of interaction/stimulation do not effect the degree a child avoids initiating interaction with the mother. Yet, the mother's rejecting behavior either causes or results from the child's avoidance of initiating interaction with her.

Clarke-Stewart Rating Scale

Since the C-S measure consisted of so few items no attempt was made to reduce them through factor analysis. Table 7 displays the intercorrelations among the C-S items. The maternal variables show strong relationships with one another. The one child variable, child's activity level, achieved significance with only

three variables: vigor of physical contact, amount of auditory-verbal contact and the amount of eye-to-eye contact.

Factor Analysis of the Three Measures

The second major step in the data reduction plan was a factor analysis to explore for common factors that could integrate the three different measures of mother-child interaction. Again a principal components analysis examined the number of factors to use followed by principal axis factor analysis and varimax rotation with the specified number of factors.

The principal components analysis of the 21 maternal variables (4 AI factors, 4 TS Subscales scores and 13 C-S scales) indicated that four factors would account for 61% of the variance with little gain in explained variance from more factors. The principal axis factor analysis with 4 factors produced well differentiated and interpretable factors.

While the correlations between the factor scores and the underlying factors ranged from .83 to .90 and the R^2 values indicated that the combined factor scores explained a reasonable proportion of the item variance (from 69-82%), the coefficient alpha reliabilities indicated questionable internal consistency (α = .55, .54, .46 and .18).

When the seven child variables (4 AI factors, 2 TS Subscale scores and 1 C-S scale) were analyzed following the same procedures, the scree plot indicated either two or three factors could be extracted. These explained only 28% and 46% of the variance, respectively. However, neither two nor three factors extracted from a varimax rotation produced clearly differentiated or interpretable factors. In addition, the correlations of the factor scores with their underlying factors fell in the low 70s, and the internal consistencies of the factor based scales were low (.42-.43).

Apparently, the three methods of recording observations of mothers and children do not share the clear underlying factors that would allow summarizing all observed behavior with a small number of internally consistent factor based scales. While this suggests that the measures may describe different dimensions of behavior there may be other explanations. For example, the Clarke-Stewart rating scale items, which are highly correlated with each other may simply not differentiate between discrete behaviors which are already described by the other two measures. The zero order correlations between the different measures provides more information about this.

Relationships Between the Measures

The Clarke-Stewart Scale items are each significantly correlated with all four of the maternal subscales on the Teaching Scale (Table 8). Likewise they show numerous correlations with the maternal and child AI factors although in most cases the C-S scale shows a clearly stronger association with only one of the AI factors (Table 9). The pattern of correlations between the AI factors and the TS subscales suggests that the behavioral dimensions each measure taps are related but are not the same (Table 10).

Relationships with Sociodemographic Variables

The relationships between the mother-child interaction variables and selected demographic variables potentially provide additional information regarding the measures' interrelationships. If they tap similar dimensions they should show similar patterns of association. Table 11 shows that relatively few of the sociodemographic variables achieve significant relationships with any of the mother-child interaction variables and no systematic difference by measure appears. By chance alone one could expect one to two significant relationships at the .05 level per sociodemographic variable yet only the child's age and the the child's sex yield more then two. The child's age

proves significantly correlated with three AI factors and three C-S items. The relationship with the child's sex suggest that girls have more positive scores on C's Responsiveness vs. Withdrawal, exhibit more Positive Expressive Interaction, have mothers who have closer physical contact and who have more vigorous physical contact than do boys.

The low number of significant relationships limits the conclusions that can be drawn. However, the AI factors and the C-S items associated with the child's sex and C's age suggest these measures overlap to some degree while the TS appears to follow a different pattern suggesting it includes different dimensions of behavior.

Table 12 suggests several confounded relationships among the sociodemographic variables although more appear to influence the correlations between the interaction variables and sociodemographic variables. A number are quite predictable such as the association between social status and education, or the high correlation ($r = .60$) between adolescent mother's age and her educational achievement. However, several reveal important characteristics of the sample. For instance, the few white subjects attained significantly fewer years of education ($r = -.25$). In this sample the white subjects were much more likely to have dropped out of school prior to pregnancy. The correlation between the child's age and the mother's age reflects an unanticipated sampling bias. Older mothers have older children. This is a potentially serious confounder although the pattern of correlation on Table 11 show that it has little impact on the relationships explored in this paper.

SUMMARY AND CONCLUSIONS

All three measures strongly overlap. Not surprisingly, the C-S scales show consistently high correlations with the AI factors since the methods differ

primarily in the degree of specificity of their highly subjective items. This similarity is further supported by the two measure's similar patterns of correlations with the sociodemographic variables.

However, the TS items also show numerous significant relationships with both the AI and the C-S scales. While the correlations between the TS scores and the AI factors are fairly substantial only one is greater than .40. In contrast 25 of the correlations between the AI factors and the C-S scales are greater than .40. The C-S scale and the TS scores prove quite interrelated as well, however, with 11 of the relationships achieving a correlation of .40 or above.

It appears that the C-S scale items describe general categories of behavior which are tapped to some degree by each of the other measures. While the C-S scale is quite similar to the AI, the C-S items show considerably stronger relationships with the Teaching Scale than does the AI. The AI and the TS sample and conceptualize behaviors differently even though they are somewhat associated. Despite the relationships between the three measures, the attempt to integrate the AI factors, the TS subscale scores and the Clarke-Stewart Rating Scales did not yield interpretable and internally consistent factor scores. This indicates that the three measures are not associated with a shared set of underlying factors.

The TS and AI describe different but related dimensions of behavior from the same observation and do so in a manner that allows differentiation of types of behavior. Consequently, they are invaluable in studies exploring what influences or results from certain types of behavior. The Clarke-Stewart scales, on the other hand, appear to be influenced by behaviors reflected in both the AI and the TS. While the C-S scales do not allow the differentiation of behaviors necessary to determine the impact of particular types of behavior, they do appear

to bridge behaviors tapped by both of the other methods. The global nature of the C-S scales may allow the inclusion of subtle nuances of behavior which the other measures overlook.

Consequently, each of the three methods contributes to efforts to fully describe maternal-child interaction. The AI and the TS allow differentiating dimensions of behavior in very different ways. The C-S rating scales describe a small number of global dimensions of interaction allowing the processing of a tremendous variety of information at once. Each measure appears to complement the other two and the interrelationships revealed support the validity of the dimensions each describe.

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Table 1

Teaching Scales: Reliability of Subscales[1]

Subscale	α
Sensitivity to Cues (8 of 11 items)[2]	.55
Response to Distress (11 of 11 items)	.82
Social-Emotional Growth Fostering (10 of 11 items)	.49
Cognitive Growth Fostering (17 of 17 items)	.71
Child's Clarity of Cues (4 of 10 items)	.67
Child's Responsiveness to Parent (13 of 13 items)	.71

[1]Subjects with any missing data were excluded from these analyses (n = 126-127).

[2]Indicates the number of items included after elimination of inconsistent items.

Table 2

Pearson Correlations Among the Teaching Scales Subscales (n=128)

	M's Sensitivity to Cues	M's Response to Distress	Social-Emotional Growth Fostering	Cognitive Growth Fostering	C's Clarity of Cues	C's Responsiveness to Parent
DIST	.10					
SOC-EM	.35[c]	.42[c]				
COG	.39[c]	.34[c]	.56[c]			
CUE	.09	-.56[c]	-.09	-.06		
RSP	.08	-.17	.10	.11	.51[c]	1.00

a $p < .05$
b $p < .01$
c $p < .001$

Table 3

Factor Analyses of Maternal Items on the Attachment Inventory
(n = 128)

Attachment Inventory Item	Factor Loadings[1]			
	I	II	III	IV
Mother (M) holds child (C) close	76	17	13	13
M soothes C by cuddling	75	12	26	11
M holds C by choice	72	20	15	22
M holds C to comfort	72	5	17	13
M hugs and kisses C	67	31	2	15
M enjoys physical contact with C	63	29	7	34
M often smiles at C	61	32	9	31
M handles C gently and considerately	58	29	33	22
M tender and protective toward C	56	17	25	40
M touches and strokes C gently	55	15	29	30
M plays little games with C	54	19	16	46
M eager to pat/pickup if C crying	54	6	33	46
M immediately responds to need of C	51	20	24	42
M shows no spontaneous warmth to C	50	35	32	24
M doesn't handle C unless necessary	49	46	23	12
M loving and playful in care of C	48	38	26	47
M quickly responds to C distress	48	21	39	32
M sings, hums or coos to C	45	19	18	30
M derives pleasure from mothering	45	43	15	25
M wishes to meet C every need	45	27	39	12
M speaks to C in soothing tones	45	28	39	25
M handles C skillfully	44	37	22	35
M does not cuddle except if C crying	43	43	15	7

Table 3
(Continued)

Attachment Inventory Items	Factor Loadings			
	I	II	III	IV
M thinks C is unattractive	20	67	19	13
M ill at ease in caring for C	30	65	17	14
M thinks C has many faults	19	64	41	20
M doesn't notice C during session	10	60	21	20
M sometimes seems unresponsive	24	59	28	42
M looks at C without tenderness	28	58	29	17
M seems dull and unemotional	18	55	30	41
M has happy expression when caring C	24	54	30	18
M doesn't seem to enjoy role of mother	23	53	35	17
M thinks C is attractive	21	53	18	10
M seems detached and inwardly absorbed	18	53	25	32
M interested in C behavior	17	52	16	47
M enjoys watching C	37	50	29	36
M treats C as object	18	47	46	13
M flips C without concern for feelings	23	46	43	8
C not kept clean	-3	46	11	30
M does not vocalize to C	18	46	16	23
M afraid of spoiling C with care	22	46	27	10
M thinks everything C does is difficult	7	45	41	21
M has little eye-to-eye contact with C	30	45	12	9
M pays little attention to C	16	44	30	36
M plays with C very little	38	42	21	38
M has little "en face" contact with C	35	41	12	-1
M voice harsh and rough with C	27	21	73	8
M shouts or yells at C	12	12	72	6

Table 3
(Continued)

Attachment Inventory Items	Factor Loadings			
	I	II	III	IV
M punishes C without reason	24	22	<u>67</u>	0
M handles C roughly and abruptly	15	20	<u>64</u>	8
M talks to C with irritable voice	30	34	<u>64</u>	8
M punishes C when displeased	21	25	<u>62</u>	1
M seems irritated with C behavior	21	43	<u>61</u>	27
M insensitive to C needs and experiences	14	16	<u>59</u>	25
M irritable when C cries	9	41	<u>57</u>	8
M controls rather than adapt to C behavior	4	26	<u>55</u>	25
M seems irritable when caring for C	18	44	<u>45</u>	12
M ignores C discomfort/unhappiness	35	37	<u>42</u>	39
M leaves C alone when C distressed	33	25	<u>33</u>	17
M points out things C can do	31	-8	32	<u>74</u>
M stimulates C frequently	32	20	15	<u>67</u>
M reports how smart and good C is	32	0	42	<u>67</u>
M praises C responses to new events	27	23	9	<u>55</u>
M admires C abilities to learn/do things	28	23	25	<u>55</u>
M enjoys playful interaction with C	50	23	14	<u>51</u>
M plays with C in ways pleasing to C	39	32	25	<u>50</u>
M stimulates C to perform	15	22	-19	<u>49</u>
M tries to get C attention continually	27	21	-14	<u>46</u>
M happy with task of caring for C	25	32	31	<u>44</u>

[1]Values have been multiplied by 100 and rounded to the nearest integer.

Table 4

Factor Analyses of Child Items on the Attachment Inventory
(n = 128)

Attachment Inventory Item	Factor Loadings[1]			
	I	II	III	IV
Child (C) does not vocalize to mother (M)	76	22	22	14
C vocalizations to M are weak	73	0	24	-1
C uses expressive vocalizations with M	71	14	29	18
C social response to M is slow/or weak	65	19	20	19
C appears to enjoy verbal exchanges with M	59	28	49	6
C seems unaware of what M expects	50	33	22	7
C initiates social contact with M	50	23	29	38
C makes few attempts to elicit M response	50	14	24	36
C understands what M is saying	49	48	-3	14
C responds to M with happy vocalizations	47	42	40	17
C doesn't communicate needs to M	29	14	14	7
C's activity level	-43	1	5	-15
C tries to avoid contact with M	12	68	33	22
C listens attentively when M speaks	23	64	16	8
C is restless and irritable with M	17	63	23	12
C ignores M call or command	-1	58	30	31
C is irritable when stimulated by M	4	56	42	17
C pays little attention to M	24	47	33	16
C looks for M for cues when uncertain	7	44	0	1
When distressed C looks for M for comfort	21	42	8	7
If C enjoys something shares with M	24	41	34	30
C enjoys physical contact with M	1	37	3	2
C often smiles at M	38	15	70	29

Table 4
(Continued)

Attachment Inventory Item	Factor Loadings			
	I	II	III	IV
C enjoys playing with M	29	14	<u>69</u>	27
C is easily comforted by M	12	32	<u>66</u>	1
C reacts to M with attention and warmth	25	43	<u>60</u>	18
C smiles or laughs in response to M	44	17	<u>57</u>	16
C is very affectionate with M	26	23	<u>56</u>	25
C spends little time looking at M	27	18	17	<u>70</u>
C has little eye-to-eye contact with M	24	18	30	<u>63</u>
C makes few attempts to interact with M	46	38	13	<u>46</u>

[1]Values have been multiplied by 100 and rounded to the nearest integer.

Table 5

Correlations of the Attachment Inventory Factor Scores with the Respective Factors and Coefficient Alpha Reliability of Factor Scores

Factor Score	r	α
Maternal Factor Scores		
Affectionate Contact	.97	.73
Rejection	.98	.72
Insensitivity	.97	.72
Interaction/Stimulation	.97	.66
Child Factor Scores		
Expressive/Responsive Stimulation	.94	.66
Responsiveness vs. Withdrawal	.91	.59
Positive Expressive Interaction	.91	.48
Detachment	.86	.31

Table 6

Pearson Correlations Among the Maternal and the Child Attachment Inventory Factors (n=128)

Child Attachment Inventory Factors	Maternal Attachment Inventory Factors			
	Affectionate Contact	Rejection[1]	Insensitivity[1]	Interaction/ Stimulation
Expressive/Responsive Vocalization	.09	.08	.00	.32[c]
Responsiveness vs. Withdrawal	.19[a]	.35[c]	.47[c]	.25[b]
Positive Expressive Interaction	.43[c]	.27[b]	.08	.35[c]
Detachment[1]	.12	.36[c]	-.05	-.09

a $p < .05$
b $p < .01$
c $p < .001$

[1] Negatively stated items were scored so that a higher score indicates a more positive assessment. For example, a higher value on the Detachment factor indicates less detachment or a higher value on positive expressive interaction indicates more positive expressive interaction.

Table 7

Pearson Correlations Among the Clarke-Stewart Rating Scales (n=128)

	C's Activity Level	M's Tone of Voice	M's Expressed Positive Emotion	M's Attitude	Amount of Physical Contact	Closeness of Physical Contact	Vigor of Physical Contact	Auditory-Verbal Contact	Eye Contact	Amount of Social Stimulation	M's Responsiveness to C's Social Stimulation	M's Response to Distress	Effectiveness of M's Behavior	Appropriateness for age and ability of C
ACTIVITY														
TONE	.05													
POS-EMOT	.10	.72[c]												
ATT	.06	.58[c]	.57[c]											
PHYS-C	.03	.43[c]	.50[c]	.33[c]										
CLOSE	-.05	.49[c]	.42[c]	.41[c]	.64[c]									
VIG-C	.22[a]	.45[c]	.56[c]	.41[c]	.59[c]	.56[c]								
AUD-V	.30[c]	.48[c]	.51[c]	.38[c]	.41[c]	.36[c]	.49[c]							
EYE-C	.25[a]	.55[c]	.56[c]	.37[c]	.39[c]	.28[b]	.48[c]	.45[c]						
SOC-STIM	.15	.54[c]	.61[c]	.45[c]	.35[c]	.33[c]	.54[c]	.52[c]	.51[c]					
RES-SOC	.12	.58[c]	.57[c]	.47[b]	.37[c]	.44[c]	.52[c]	.47[c]	.52[c]	.54[c]				
RES-DIS	.04	.30[c]	.17	.20[a]	.17	.30[c]	.29[b]	.14	.21[a]	.18[a]	.32[c]			
EFFECT	-.03	.59[c]	.57[c]	.57[b]	.35[c]	.47[c]	.45[c]	.42[c]	.36[c]	.48[c]	.62[c]	.20[a]		
APPROP	.07	.60[c]	.55[c]	.56[c]	.35[c]	.44[c]	.44[b]	.49[c]	.40[c]	.50[c]	.61[c]	.32[c]	.80[c]	1.00

a $p < .05$
b $p < .01$
c $p < .001$

Table 8

Pearson Correlations Between the Teaching Scale Subscales and the Clarke-Stewart Rating Scales (n=128)

Clarke-Stewart Rating Scales	Teaching Scale Subscales					
	M's Sensitivity to Cues	M's Response to Distress	Social-Emotional Growth Fostering	Cognitive Growth Fostering	C's Clarity of Cues	C's Responsiveness to Parent
C's Activity Level	.02	.02	.00	.17	.01	.15
M's Tone of Voice	.35[c]	.39	.47[c]	.37[c]	.08	.08
M's Expressed Pos. Emo.	.35[c]	.31	.41[c]	.46[c]	.14	.12
M's Attitude	.25[b]	.33	.34[c]	.33[c]	.10	.04
Amount of Physical Contact	.21[a]	.20[a]	.23[b]	.23[b]	.03	.14
Closeness of Physical Contact	.18[a]	.24[b]	.30[c]	.25[b]	.08	.08
Vigor of Physical Contact	.27[b]	.2[b]	.25[b]	.29[c]	.07	.28[b]
Auditory-Verbal Contact	.23[a]	.29[c]	.39[c]	.42[c]	.08	.12
Eye Contact	.34[c]	.29[b]	.42[c]	.34[c]	.07	.20[a]
Amount of Social Stimulation	.27[b]	.25[b]	.34[c]	.38[c]	.08	.14
M's Responsiveness to C's Social Stimulation	.28[b]	.24[b]	.38[c]	.44[c]	.01	.24
M's Response to Distress	.06	.15	.11	.10	.35[c]	.27[b]
Effectiveness of M's Behavior	.22[a]	.45[b]	.43[c]	.45[c]	.20[a]	.06
Appropriateness for Age Ability of C	.28[b]	.37[c]	.41[c]	.49[c]	.10	.08

a $p < .05$
b $p < .01$
c $p < .001$

Table 9

Pearson Correlations Between the Attachment Inventory Factors and the Clarke-Stewart Rating Scale (n=128)

Clarke-Stewart Rating Scales	Attachment Inventory Factors							
	Maternal Factors				Child Factors			
	Affectionate Contact	Rejection	Insensitivity	Interaction/ Stimulation	Expressive/Responsive Vocalization	Responsiveness vs. Withdrawal	Positive Expressive Interaction	Detachment
C's Activity Level	.01	.15	-.11	.08	.44[c]	-.15[a]	.02	.10
M's Tone of Voice	.48[c]	.33[c]	.22[a]	.44[c]	.18[a]	.42[c]	.48[c]	.18[a]
M's Expressed Positive Emotion	.53[c]	.33[c]	.17	.40[c]	.24[b]	.42[c]	.46[c]	.13
M's Attitude	.36[c]	.26[b]	.50[c]	.28[b]	.13	.50[c]	.36[c]	.05
Amount of Physical Contact	.54[c]	.24[b]	.02	.17[a]	.06	.19[a]	.41[c]	.03
Closeness of Physical Contact	.50[c]	.28[b]	.16	.13	.02	.35[c]	.39[c]	.09
Vigor of Physical Contact	.40[c]	.31[c]	.08	.32[c]	.25[b]	.22[a]	.41[c]	.15
Auditory-Verbal Contact	.30[c]	.22[a]	.13	.46[c]	.37[c]	.30[c]	.28[b]	.33
Eye Contact	.43[c]	.32[c]	.11	.24[b]	.27[b]	.22[a]	.39[c]	.38[c]
Amount of Social Stimulation	.30[c]	.25[b]	.18[a]	.50[c]	.28[b]	.30[c]	.29[c]	.14
M's Responsiveness to C's Social Stimulation	.41[c]	.30[c]	.20[a]	.41[c]	.27[b]	.35[c]	.40[c]	.19[a]
M's Response to Distress	.29[c]	.08	.02	.08	.17	.07	.20[a]	.14
Effectiveness of M's Behavior	.34[c]	.42[c]	.37[c]	.46[c]	.23[a]	.63[c]	.39[c]	.10
Appropriateness for Age and Ability of C	.43[c]	.33[c]	.27[b]	.44[c]	.22[a]	.52[c]	.39[c]	.05

a $p < .05$
b $p < .01$
c $p < .001$

Table 10

Pearson Correlations Between the Attachment Inventory Factors and the Teaching Scale Subscales (n=128)

Teaching Scale Subscales	Attachment Inventory Factors							
	Maternal Factors				Child Factors			
	Affectionate Contact	Rejection	Insensitivity	Interaction/Stimulation	Expressive/Responsive Vocalization	Responsiveness vs. Withdrawal	Positive Expressive Interaction	Detachment
M's Sensitivity to Cues	.27[b]	.02	.13	.20[a]	.02	.03	.30[c]	.08
M's Response to Distress	.22[a]	.15	.45[c]	.21[a]	.04	.33[c]	.22[a]	.09
Social-Emotional Growth Fostering	.34[c]	.22[a]	.30[c]	.28[b]	.07	.30[c]	.36[c]	.16
Cognitive Growth Fostering	.34[c]	.16	.24[b]	.40[c]	.22[a]	.35[c]	.23[b]	.03
C's Clarity to Cues	.03	.12	.36[c]	.02	.21[a]	.28[b]	.03	.01
C's Responsiveness to Parent	.20[a]	.04	.27[b]	.15	.37[c]	.12	.15	.20[a]

a $p < .05$
b $p < .01$
c $p < .001$

Table 11

Significant[1] Correlations Between Selected Sociodemographic Variables and the Measures of Mother-Child Interaction (n=128)

Sociodemographic Variables	Attachment Inventory	Teaching Scale	Clarke-Stewart Rating Scale
Social Status	0	C's Clarity of Cues (r=.19)[2]	0
M's Age	0	Cognitive Growth Fostering (r=.19)	M's Response to C's Social Stimulation (r=.19)
C's Age	Interaction/Stimulation (r=.18) C's Expressive/Responsive Vocalization (r=.27) C's Positive Expressive Interaction (r=.20)	0	Closeness of Physical Contact (r=.20) Auditory-Verbal Contact (r=.19) C's Activity Level (r=.22)
C's Sex (1=male, 2=female)	C's Responsiveness vs. Withdrawal (r=.19) C's Positive Expressive Interaction (r=.18)	0	Closness of Physical Contact (r=.23) Vigor of Physical Contact (r=.18)
Race (1=black, 2=white)	0	Social Emotional Growth Fostering (r=.21) Cognitive Growth Fostering (r=.23)	0
M's Education	0	0	M's Response to C's Social Stimulation (r=.24)
Peabody Picture Vocabulary Test	0	Cognitive Growth Fostering (r=.20)	Auditory-Verbal Contact (r=.23)

[1] $p < .05$ (When calculating correlations between the 28 interaction variables and any other variable, one to two significant correlations at the .05 level would be expected to occur by chance alone.)

[2] This indicates that lower social status is associated with less clarity of C's cues. However, due to elimination of items that reduced internal reliability the Clarity of Cues subscale includes largely items indicating cues of distress. Consequently, this may indicate that displays of distress increase as social status decreases.

Table 12

Pearson Correlations Among Selected Sociodemographic Variables (n=128[1])

	Social Status	M's Age	C's Age	C's Sex	M's Race[2]	M's Education	PPVT[3]
Social Status	1.00						
M's Age	-.03	1.00					
C's Age	.12	.45[c]	1.00				
C's Sex	-.05	.06	-.10	1.00			
M's Race	.04	.17	.09	.04	1.00		
M's Education	.23[a]	.60[c]	.24[b]	-.05	-.25[b]	1.00	
PPVT	-.09	.20[a]	.07	-.07	.16	.22[a]	1.00

a $<.05$
b $<.01$
c $<.001$

[1]Educational level was missing for two subjects

[2]Race: black = 1, white = 2

[3]PPVT = raw (not age-adjusted) score on the Peabody Picture Vocabulary Test (Revised).