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ABSTRACT

A longitudinal study of the language development of children of adolescent mothers followed 20 adolescent and 20 older mothers from their children's birth through three years of age. This report is based on data collected from a subsample of 20 mothers. Mother-child interactions in feeding, teaching, and play at eight months and two years were videotaped and transcribed, and the children's utterances were coded for grammatical complexity, discourse variables, and pragmatic variables. The results indicate significant differences between adolescent and older mothers, especially at eight months. At that stage, older mothers were more responsive to their infants and more likely to impute intentionality to their infants' noncommunicative behaviors, an activity linked to rate of acquisition. While the adolescent mothers appeared to enjoy interacting with their infants as evidenced by a high percentage of initiations and equal simultaneous interaction, they reacted to their children more concretely, rarely reading anything into their actions or verbalizations. Parallel trends were found at two years. There did not appear to be any significant difference in the children's general linguistic abilities at two years, but there were differences in standardized test scores at eight months, two years, and three years. (MSE)

The Role of Maternal Input in the Acquisition Process: The Communicative Strategies of Adolescent and Older Mothers with their Language Learning Children*

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Introduction.

Children of adolescent mothers perform more poorly than children of older mothers in school and on standardized tests. They are more likely to be held back in school and have lower reading scores (Oppel and Royston, 1971; Hardy et al., 1978). They have also been found to do more poorly on the Bayley Scales of Infant Development (Field et al., 1984), and the Stanford-Binet, as well as having lower IQ and achievement test scores (Furstenberg, 1976). Given previous research demonstrating a relationship between linguistic ability and performance on school-related tasks, these findings would seem to suggest that children of teenage mothers are less skilled linguistically than children of older mothers. In this longitudinal study, it was hypothesized that the nature of adolescent mothers' input to their language learning children at 8 months and 2 years would differ from older mothers' input in ways which could adversely affect their children's acquisition of language and thus serve as the source of the language delays which children of adolescent mothers appear to have as early as 8 months. The specific hypotheses tested are given on the handout.

insert table 1 about here

Methodology:

As I just mentioned, this is the report of a longitudinal study. Approximately 40 mothers, 20 adolescent and 20 older, were followed from the children's birth through 3 years of age. This report is based on data collected on a subsample of 20 mothers. The demographic information for the sample is presented on your handout.

insert Table 2 about here

*This research was funded by a grant from the National Institute of Mental Health and also by the MacArthur Foundation. The author would also like to acknowledge the additional funds provided by the MacArthur Foundation specifically for the presentation of this paper. This research was conducted with Cynthia Garcia Coll of Women and Infants Hospital of RI. Please do not cite without permission.

The entire sample could not be used because of incomplete data on given dyads.

When the infants were 8 months old, mother and child were videotaped in a laboratory setting in 3 minutes of face-to-face interaction, a teaching situation where the mother taught the child 2 tasks from the Bayley Scales of Infant Development which were considered developmentally too difficult for the child, and 3 minutes of free play with 3 experimenter provided toys. At 2 years, an experimenter went into the home and videotaped 1/2 hour of lunch time interaction, 2 teaching episodes where the mother again tried to teach the child tasks considered developmentally too difficult, and 1/2 hour of free play with a box of experimenter provided toys. Maternal communicative acts at 8 months and maternal **and** child utterances at 2 years were transcribed and coded for grammatical complexity, discourse and pragmatic role as indicated on these transparencies.

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insert Tables 3 and 4 about here

Results:

With maternal age and situation as independent variables, repeated measures ANOVAS were run using each of the variables at each 8 months and 2 years as dependent variables. The results of the ANOVAS indicated that there was no interaction between maternal age and situation at either 8 months or 2 years for the mothers. There were, however, main effects for both situation and maternal age. Because of time constraints, only the differences in maternal input will be discussed.

The significant differences between adolescent and older mothers are summarized on your handout.

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insert Tables 5 about here

The differences are greatest at the 8 month level. Older mothers are more responsive to their infants. In particular, they are more likely to impute intentionality to their infant's noncommunicative behaviors, an activity which has been associated with rate of acquisition in the literature. While the adolescent mothers appear to enjoy interacting with their infants as evidenced by a high percentage of initiations and an equal amount of simultaneous interaction as the older mothers, they react to their infants more concretely, rarely reading anything into their actions or verbalizations. The infants behaviors are taken at face value.

At 2 years, trends were found which paralleled the findings at 8 months. Once again, adolescent mothers tended to be less contingent on the children's behaviors and utterances. They were less likely to comment directly on the child's utterances in terms of a request for clarification or an explication and also tended not to comment on a child's actions as frequently as the older mothers. Teenage mothers used fewer teaching utterances and more controling/restricting acts.

Results from multiple stepwise regressions at 8 months indicate that maternal age was the best predictor of the mothers' communicative input as compared to maternal education or SES. Using the same statistical test at 2 years, none of these demographic variables accounted for a significant amount of the variance.

In general, then, there are some differences in the nature of communicative input based on maternal age. Further, these differences are more pronounced at 8 months than at 2 years. Adolescent mothers can be characterized as using a directive/less-responsive style of interaction and older mothers a conversation-eliciting/responsive style. Results from previous studies have shown that there is a relationship between the style of input the older mothers tend to use and an advanced rate of acquisition (Harding, 1983; Barnes et al., 1983; Cross, 1977; McDonald & Pien. 1982). Thus, it is not unreasonable to expect that the children of adolescent mothers are indeed at risk for language delay.

In examining the data collected on the children at 2 years, however, there did not appear to be any significant difference in the general linguistic ability of the children of adolescent mothers as compared to the children of older mothers. There are several possible explanations for this finding. Recall that the greatest differences in the mothers' speech occurred at the 8 month level. The differences in the children's communicative ability which may have resulted from the nature of maternal input at 8 months might have dissipated by 2 years. It is also possible that there were differences at 2 years but the variables reflecting these differences were not included in the study. Finally, it is possible that differences will not be apparent until the children are older. For example, it may be the case that children of adolescent mothers will be less skilled at using complex syntactic structures which would not be expected to appear in the children's speech until at least 3 years of age.

The results as they stand may be interpreted in terms of a communication continuum with most of the adolescent mothers falling at the directive/less-responsive end and the older mothers tending to fall at the conversation-eliciting/responsive end. Marked on the continuum would be a threshold level beyond which children would acquire language at 'normal' rate. It would appear that despite differences in the nature of maternal input, both adolescent and older mothers are providing at least the minimal amount of the right sort of input to insure acquisition at this normal rate.

While there were no differences in the children's general linguistic abilities, there were differences in the children's standardized test scores at 8 months, 2 years, and 3 years. This testing was conducted with Cynthia Garcia Coll from Women & Infants Hospital and Brown University in Providence, RI. The remaining data reported will be on the entire sample rather than the subsample of 20 mother-child dyads reported on above.

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insert Table 6 about here

As indicated on your handout, children of adolescent mothers had significantly lower Language Receptive and Expressive Scale scores on the Mullen Scales of Early Learning at 2 years. Although none of these differences was significant, children of adolescent mothers also tended to perform more poorly on the Bayley Scales of Infant Development at 8 months and 2 years, as well as the

verbal portion of the McCarthy Scales of Children's Abilities and the Rhode Island Test of Language Structure at 3 years.

I would like to present 2 forms of evidence suggesting that the nature of maternal input is related to the children's performance on the standardized tests. Let me begin by stating that reseach has shown that children who are not familiar with the syntactically complex, decontextualized language of the classroom and the associated rules of discourse are more likely to do poorly in school and on standarized tests (Heath, 1983; Feagan, 1982; Torrance & Olson, 1984). Thus, problems with classroom discourse would not only account for poor performance on standardized tests but also with other academic problems children of adolescent mothers experience.

The first form of evidence is drawn from statistical correlations between the nature of maternal input and the children's test scores.

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insert Table 7 about here

As shown in this transparency based on the results of 12 to 31 children, depending on the children's age, mothers who used longer, syntactically more complex utterances and had higher contingency scores in general, were more likely to have children who had higher standardized test scores.

A more ancedotal form of evidence comes from examining the natur of instructional episodes between mother and child during free play at 2 years. The adolescent mother seemed to teach more specific content material using a highly didactic teaching style, did not capitalize on the child's initiations, asked questions which required only one word answers, and didn't integrate the new information back into the flow of the interaction. In fact, the teenage mothers instructional episodes seemed to remain separate from the other forms of interaction during free play. The older mother, on the other hand, appeared to capitalize on the child's focus of attention, teaching 'on the fly'. They appeared more likely to use more complex language and would integrate the new information back into the interaction or relate it to more familiar information.

In summary, there are differences in those aspects of maternal input which are believed to affect the acquisition process. The adolescent mother's input, however, is not so impoverished as to inhibit the acquisition of general linguistic skills. The findings would seem to suggest, however, that the adolescent mother's instructional strategies do not adequately prepare their children for successful participation in classroom discourse as well as in standardized testing situations. The results of this study suggest that the role of caregivers' input might be broader than originally suspected. Not only does the nature of input affect the acquisition of general lingistic abilities, but also appears to relate to children's acquisition of situation-specific forms of language.

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Table 1
Hypotheses:

1. 'Adolescent mothers' input would contain fewer of the elements associated with a rapid rate of acquisition:
    a. more complex,
    b. less responsive in terms of contingency scores, requests for clarification, expansions, and acknowledgements,
    c. more controlling/restricting, less teaching,
    d. fewer utterances overall,
    e. shorter turns.

2. Children of adolescent mothers would be less linguistically skilled than children of older mothers:
    a. less complex,
    b. lower contingency scores,
    c. fewer requests for information and instruction,
    d. fewer utterances,
    e. shorter turns.

3. Because differences in both the mothers' and the children's language might be situation specific, communicative interaction was sampled in 3 situations at each age level. It is hypothesized that differences will be the greatest in a teaching situation for both mother and child.

Table 2
Subjects:

20 primiparous, Caucasian mothers with full term, healthy infants.

Demographic Information

	Adolescent	**Older**
Age	mean=16.5 (range 14-17)	mean=24.5 (range 21-29)
Education (1=JrHigh, 2=HS, 3=HS+)	mean=1.6, s.d..=.5	mean=2.4, s.d.=.5
Socioeconomic Status (Hollingshead Index)	mean=26.1, s.d.=11.65	mean=30.8, s.d.=3.57

Table 3. Maternal Variables for the 8 Month Analysis

Grammatical Complexity	Discourse
Mean Length of Utterance	Initiate
Mean Length of 5 Longest Utterances	Continue Turn
Number of Main Verbs	Null
	Respond
Length of Turn	Simultaneous Interaction
Number of Utterances	Overall Contingency
	Contingency: Responds to Action

Table 4. Maternal Variables for the 2 Year Analysis

Grammatical Complexity	Discourse Variables
Mean Length of Utterance	Initiation
Number of Main Verbs	Respond to Action
	Respond to Expressive
Pragmatic Variables	Respond to Collaborative
	Respond to Report
Clarification	Respond to Learning
Explication	Respond to Desire
Confirm/Acknowledge	Respond to Request for
Accomodate	Information
Report	Respond
Collaborative	Continue Turn
Control/Restrict	Null
Request for Information	Overall Contingency
Teach	Contingency: Responds to Action
Routine Score	Contingency: Responds to Utterance
Length of Turn	Number of Utterances

Child Variables for the 2 Year Analysis

Grammatical Complexity	Pragmatic Variables
Mean Length of Utterance	Expressive
Number of Main Verbs	Desire
	Request for Information
Discourse Variables	Collaborative
	Learning Implementing
Initiation	Report
Respond	Routine Score
Continue Turn	
Null	Number of Utterances
Overall Contingency	Length of Turn

Table 5

Results: Results from repeated measures ANOVAS at each age level. No interactions between age and situation for any maternal variable at either 8 months or 2 years. Main effects for age and situation were found. These differences at 8 months and 2 years are presented below.

1. Situation. In general, mothers' and children's speech (children's speech at 2 years only) is consistent with what might be expected given the discourse rules and the general situational constraints on interaction in a given situation.

2. Differences between adolescent and older mothers at 8 months.
Summary of significant differences:

a. Mean length of 5 longest utterances (Ad < older, $p<.05$)
b. Initiations (Ad>older, $p<.001$)
c. Contingency (Ad<older, $p<.001$)
d. Number of Utterances (Ad<older, $p<.05$)

3. Differences between adolescent and older mothers at 2 years. Summary of significant differences and important trends:

a. Confirm/Acknowledge (Ad<older, $p<.05$)
b. Teach (Ad<older, $p<.01$)
c. Trend Contingency (Ad<older)
d. Trend Contingency, Respond to Action (Ad<older)
e. Trend Control/Restrict (Ad>older)
f. Trend Respond to Utterances (Ad<older)
g. Trend Number of Utterances (Ad<older)

4. Results from multiple stepwise regressions at 8 months indicate that maternal age was the best predictor of the mothers' communicative input as compared to maternal education or SES. Using the same statistical test at 2 years, none of these demographic variables accounted for a significant amount of the variance.

5. Differences in the children's speech at 2 years

a. Respond (kids of ad<kids of older, $p<.05$) but no significant differences in Contingency scores
b. Initiations (interaction: kids of ad>kids of older in teaching, $p<.05$)

Table 6. Children's Performance on Standardized Tests

Test	Adolescent	Older
8 months		
Bayley Scales of Infant Development (MDI)	mean=111.4, sd=10	mean=118.6, sd=14.2
2 years		
Mullen Scales of Early Learning		
-Language Receptive Score	mean=30.9, sd=2	mean=34.4, sd=2.6*
-Language Expressive Score	mean=30.4, sd=2.1	mean=34.5, sd=3.5*
3 years		
McCarthy Scales of Children's Abilities - verbal score	mean=58.2, sd=7.6	mean=60.2, sd=6.9
RI Test of Language Structure		
# of errors on 100 items	mean=32.2, sd=23	mean=23.6, sd=6.9

*Scores of adolescent and older are significantly different ($p<.005$)

Table 7. Correlations Between Maternal Input during Free Play and Children's Performance on Standardized Tests

	Bayley	Mullen		McCarthey		RITLS
	2 years	LRO	LEO	Verbal	Cognitive	
6 Month Maternal Variables						
ML5	NS	NS	NS	NS	NS	-.418 p<.05
Initiations	NS	NS	NS	-.425 p<.05	NS	NS
Contingency	NS	NS	NS	.395 p<.05	.420 p<.05	NS
Responds to Child's Utterance	NS	.447 p<.05	NS	NS	NS	NS
2 Year Maternal Variables						
MLU	.44 p<.05	NS	NS	NS	NS	NS
#Main Verbs	.45 p<.05	NS	NS	NS	NS	NS
Contingency	NS	NS	NS	.395 p<.05	.704 p<.05	NS
Responds to Child's Utterance	NS	NS	NS	NS	NS	-.471 p<.01
Responds to Child's Action	NS	NS	NS	NS	.495 p<.05	NS