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ABSTRACT

This study examined parental influence on children's cognitive skills by investigating characteristics of parent-child interaction in two tasks that required strategic activity and within which instruction in metacognition could occur. Subjects were 60 third and fourth grade girls and their mothers, who were divided into 2 experimental groups and a control group. Girls performed three trials in which they completed a task that involved planning a route and a memory task; the first and third trials comprised a pretest and posttest. In the second trial, girls in the experimental groups completed the tasks with their mothers, while girls in the control group worked independently. Mothers in one experimental condition taught their children general task-related skills that the children could use later in another task, while mothers in the other experimental condition taught skills specific to the task. Results revealed that, in a comparison of the posttest with the pretest, children in both experimental conditions showed improved performance, demonstrated and reported more sophisticated strategies and more varied study activities, and demonstrated better metacognitive understanding on both tasks. Children's performance on the posttest was related to their reported and actual use of strategies and their reports of the value of instruction by their mothers. Individual differences in mothers' teaching behavior did not predict improvements in their child's task performance. (MM)

Characteristics of Parent-Child Interactions: How Do They Affect Children's Acquisition of Metacognitive Skills?

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Abstract

Characteristics of parent-child interactions were examined in two tasks that required strategic activity and within which instruction in metacognition could occur. Two experimental groups of White, third- and fourth-grade girls (n = 21, n = 19) were paired with their mothers and asked to complete an errand route planning task and a memory task, while a control group (n = 20) was asked to work independently on the same tasks. Mothers in one experimental condition were told to teach their children general task-related skills that the children could use later in another task, while the mothers in the other experimental condition were told to teach skills specific to the task. Children in the experimental conditions showed improved performance, demonstrated and reported more sophisticated strategies and varied study activities, and demonstrated better metacognitive understanding on both tasks. Children's performance was related to their reported and actual use of strategies and their reports of the value of instruction by the mother. Individual differences in mother teaching behaviors, including managing and structuring behaviors, instruction of self-regulation, instruction of metacognitive knowledge, motivation, and error responses did not predict improvements in task performance of the child.

Characteristics of Parent-Child Interactions:

How Do They Affect Children's Acquisition of Metacognitive Skills?

Little is known about parents' roles as instructors of their children's cognitive skills. Initial efforts to look at parents as teachers simply involved demonstrating that parent characteristics such as parent expectations (Au & Harackiewicz, 1986; Holloway, 1986; Seginer, 1986), gender of the adult or child (Frankel & Rollins, 1983), and cognitive teaching style (Goldstein & Rollins, 1983) were related to the cognitive abilities of the child. More recent efforts have employed a Vygotskian framework and have focused on observing parent-child dyads engaging in some sort of problem-solving or planning task (Gauvain & Rogoff, 1989; Radziszewska & Rogoff, 1988; 1991; Rogoff, Ellis, & Gardner, 1984; Skeen, Rogoff, & Ellis, 1983). To date, however, few investigators have examined parent teaching styles and their influence on the child's skill use and performance.

The present study examined the influence parents have on their children's cognitive skills, by investigating characteristics of parent-child interactions in two tasks that required strategic activity and within which instruction in metacognition could occur. Two experimental groups of third- and fourth-grade girls were paired with their mothers and asked to complete an errand route planning task and a memory task, while a control group was asked to work independently on the same tasks. Within each of these groups, half of the participants were high achievers and the remainder, of a lower level of achievement. For each child assigned to one of the experimental groups, the first trial of each task consisted of a pretest in which the child worked independently. The second trial consisted of "training" in which the child worked together with her mother. During this trial, instructions to mothers were manipulated. Mothers of daughters in one experimental condition received instructions focusing on teaching task-related skills that could be generalized to new, similar tasks, while the mothers of daughters assigned to the other experimental condition received instructions focusing on teaching task-related skills for one specific task on which their daughters were working. The third trial consisted of a posttest in which the child worked independently on a new version of each task.

On both tasks it was expected that daughters in the experimental conditions would show greater improvements in performance, demonstrate and report more sophisticated strategies and varied study activities, and demonstrate better metacognitive understanding from pretest to posttest than would daughters in the control condition. On both tasks it was expected that high achievers paired with their mothers would show greater improvements in performance, demonstrate and report more sophisticated strategies and varied study activities, and demonstrate better metacognitive understanding than would lower level achievers. On both tasks it was expected that children of mothers who were instructed to teach general skills about completing the tasks successfully would show greater posttest performance than those children whose mothers were instructed to teach specific skills about completing the tasks successfully. On both tasks it was expected that parents of high achievers would instruct more effectively than parents of average achievers by demonstrating more managing and structuring behaviors, instructing self-regulation, and instructing metacognitive knowledge.

Method

Subjects

Research participants were 29 high-achieving and 31 average-achieving third- and fourth-grade girls and their mothers. Children were recruited through local private schools in a large, Southern city, serving middle to upper-middle class families. The third- and fourth-grade girls were assigned to achievement groups on the basis of their scores on their most recent standardized achievement test (high achievers = top tenth percentile, average achievers = below top tenth percentile), and randomly assigned to a general instruction condition ($n = 21$), a specific instruction condition ($n = 19$), or control condition ($n = 20$).

Tasks and Materials

Two tasks were used. One was Radziszewska's and Rogoff's (1988) errand route planning task. This task involved presenting the individual child or adult-child dyad with a shopping list and a map of an imaginary town with a number of store locations, and instructing them to produce

the most efficient shopping route for obtaining all the items from a subset of 14 stores. Three errand planning tasks were created, each with a different theme (Mardi Gras Party, School Play, Birthday Party). Appendix A shows an example of a map and shopping list.

The second task was a free recall task, which employed three sets of cards that contained words familiar to the child. Each set contained 16 cards consisting of high frequency words from four grammatical categories: nouns, verbs, adjectives, and adverbs. Appendix B shows the word lists.

Procedure

Mothers and daughters were tested in rooms at the child's school or at a university research site. Mothers were taken to another room to complete questions concerning their child's expected performance on the first task, while the child began working on the first task. Order of performing the errand route planning task and the memory task was counterbalanced across subjects. Performance on both tasks was videotaped. Three trials were presented for each task. The first trial served as a pretest in which the children worked independently. For the experimental conditions, the second trial involved the children working with their mothers; for the control condition, the second trial provided practice with the task. During the second trial, mothers of children in the control condition were present in the room while the child studied but did not interact with the child. For mothers in the two experimental conditions, instructions about the goal of their teaching were manipulated prior to the second trial. The third trial served as a posttest in which all the children worked independently with new materials in order to assess any improvements in performance from that shown on the pretest. Before the first and third trials of each task, each mother was told about what task the child would be asked to do and was asked questions concerning the child's expected performance on that task. After the first and third trials for both tasks, each daughter was asked questions concerning her own performance on that task. These questions were asked in order to assess specific strategy knowledge gained from instruction.

Measures

A number of measures was developed to investigate improvement in the child's performance, metacognitive instruction provided by the mother, and child metamemory and strategy use in the errand route task and in the memory task. Appendix C provides a detailed explanation of these measures as well as a full explanation of how these measures were scored.

Performance Measures

For the errand route planning task, planning efficiency was measured by the number of blocks used in the route. For the memory task, recall was assessed as the total number of items recalled at the end of a trial.

Metacognitive Instruction By Mothers

Metacognitive instruction was coded from the videotapes of parent-child interactions. Mothers' utterances and behaviors were scored during the mother-child interaction involved in the second trial on each task. Behaviors were coded in each 30-second interval. The coding instrument concerned five general aspects of instruction including two aspects of metacognitive instruction -- self-regulation and instructing specific metacognitive knowledge, two other aspects of instruction -- management and structuring behaviors and parental response to a child's error, and one set of categories assessing motivational instruction. Appendix C describes the categories.

Child Metamemory And Strategy Use on The Map and Memory Tasks

Each child was asked to respond to several questions about her performance on the map and memory tasks. For pre- and posttest trials of the map task, the child was asked about the degree to which she planned her route and about the length of her route. Additionally, after the third trial, the child was asked about which of her routes came out the shortest, her perceived value of her mother's instruction on the task, and about whether she used on Trial 3 some activity her mother had told her about during Trial 2. For pre-and posttest trials of the memory task, the child was asked about her strategy use, study activities and her recall readiness decision. After the third trial, each child was asked additionally, about whether she had adopted a different and better strategy on

Trial 3, about her perceived value of mother instruction on the memory task, and about which trial she recalled the most words.

Results

Task Performance

A repeated-measures analysis of variance, including Instruction Condition (general instruction, specific instruction, control), Achievement Level (high, average), and Task Order Presentation (memory-map, map-memory) as between-subject factors and Trials (pretest, training, posttest) as a within-subject factor, served as a model and was used on several different measures of performance.

As illustrated in Figures 1 and 2, children who worked with their mothers improved their performance from pretest to posttest on both the map task and memory task. Separate repeated-measures analyses of variance on the number of blocks needed to complete the shopping route (map task) and on the number of words recalled (memory task) yielded significant Condition x Trials interactions, $F(4,96) = 14.74$, $p < .001$ for map task; $F(4,96) = 6.12$, $p < .003$ for memory task. Children assigned to the specific and general instruction conditions created shorter, more efficient routes (map task) and recalled significantly more words (memory task) on the posttests than they had on the pretests, while children in the control group showed little change in the length of their routes on the map task or in the number of words recalled on the memory task.

Insert Figures 1 and 2 here

Children's Metacognitive Awareness on the Map Task

Separate analyses of variance, including Condition (3), Achievement (2), and Order (2) as between-subjects variables, were performed on scores reflecting the degree to which the child reported having planned the route, the child's accuracy in judging the length of the route she had produced, the perceived value of mother instruction on the map task, and whether the child was

observed using on Trial 3 some activity that her mother told her to use on Trial 2. Findings were as follows:

Children reported having planned their routes more on the posttest than on the pretest, and overall, children in the experimental conditions described more planning activities than did children in the control condition.

Children in the experimental conditions became more accurate on Trial 3 in judging the length of the routes they had produced than did children in the control condition, who became less accurate.

When asked about the routes they had drawn during the third trial, children in the experimental conditions reported that they had used ideas that their mothers had suggested to them during the second training trial, that it was helpful to work with their mothers, and that their second or third route was shorter as a result of working with their mothers. In contrast, children in the control condition did not attribute any changes in their routes to their mothers being present in the room.

Children in the experimental groups were observed to determine the extent to which they actually used on Trial 3 some activity that their mothers told them to use during Trial 2. An analysis of these scores showed no significant differences between the two experimental groups in the ideas the child actually implemented during the third trial.

Children's Metacognitive Awareness on the Memory Task

Separate analyses of variance, including Condition (3), Achievement (2), and Order (2) as between-subjects variables, were performed on scores from items measuring the child's verbalized strategy use/organization, study activity, and decision when to stop studying. Findings were as follows:

Children in the experimental conditions reported that they used more sophisticated strategies on the posttest than on the pretest, while children in the control condition reported continued use of less sophisticated strategies. Children in the general and specific conditions described using more

meaning-based strategies in Trial 3, while children in the control condition were less likely to report using organization.

A repeated-measures MANOVA was performed on scores reflecting the child's observed strategy use and study activity on the memory task. This analysis, which included Condition (3), Achievement (2), and Order (2) as between-subjects variables and Trials (2) as a within-subjects variable, yielded a significant multivariate Condition x Trials interaction, $F(4,94) = 4.28$, $p < .004$. Univariate ANOVA's reported below for each of the variables were used to explicate these effects.

As shown in Figure 3, children in the experimental conditions also displayed more sophisticated use of organizational strategies on the posttest than on the pretest, relative to children in the control condition, who continued to exhibited less sophisticated strategy use.

Insert Figure 3 here

Children in the experimental conditions reported adopting a different and better strategy on Trial 3 than children in the control condition who reported continued use of a previous strategy.

Children in the experimental conditions reported that they had gotten the idea for using a different strategy on Trial 3 from their mothers, and that it was helpful to work with their mothers, in contrast to children in the control condition who did not attribute any changes to their mothers' influence.

Child Achievement Level and Task Performance

Mothers of high- and average-achieving children in the general and specific conditions did not differ in the nature of their instruction to children on either task. A MANOVA, including Condition (2), Achievement (2), and Order (2) as between-subjects variables was conducted on self-regulation, instruction of metacognitive knowledge, error responses, and motivation behavior scores for the map task. No significant differences between the two experimental conditions or between mothers of high and average achievers were found. A similar MANOVA, including the

same between-subjects variables was conducted on the same behaviors for the memory task. Again, no significant differences were found.

Few significant differences between high and average achievers were found in this study. On the map task, high achievers assigned to the specific condition were more accurate in determining which of their three routes came out the shortest than were average achievers assigned to the same condition. On the memory task, high-achieving children were more accurate than average-achieving children in determining the trial on which they remembered the most words.

Discussion

Children who received instruction on a training trial from their mothers showed improved performance on later, similar trials of the tasks when they were asked to work independently. They demonstrated and reported more sophisticated skills and strategy use on these later trials, and demonstrated a better metacognitive understanding of the tasks by more accurately predicting their performances and attributing changes in performances to help and ideas provided by their mothers. In contrast, children in the control condition did not improve their performances on the tasks, did not demonstrate or report improvements in their approaches, remained inaccurate in predicting their performances, and were unable to suggest that having their mother present in the room while they worked was helpful in any way. Thus, mothers facilitate their child's cognitive skills not only by helping the child improve her performance, but by teaching the child skills and strategies which lead to good performance and by increasing the child's understanding of the task.

While children benefited from working with their mothers in a number of ways, it is still not clear how characteristics of different parent teaching styles relate to the child's performance. Although working with their mothers helped children's performance, expected relationships between parent metacognitive instruction and child performance were not seen. The mothers' use of particular teaching behaviors was not related to the child's performance, reported strategy use, actual strategy use, or the child's perceived value of mother instruction. Currently, additional efforts are being investigated in order to examine the quality of parent-child interactions, including

affective as well as cognitive and metacognitive components that may determine the extent to which the child accepts parent instruction.

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Appendix A:

Sample Map and Shopping Lists for

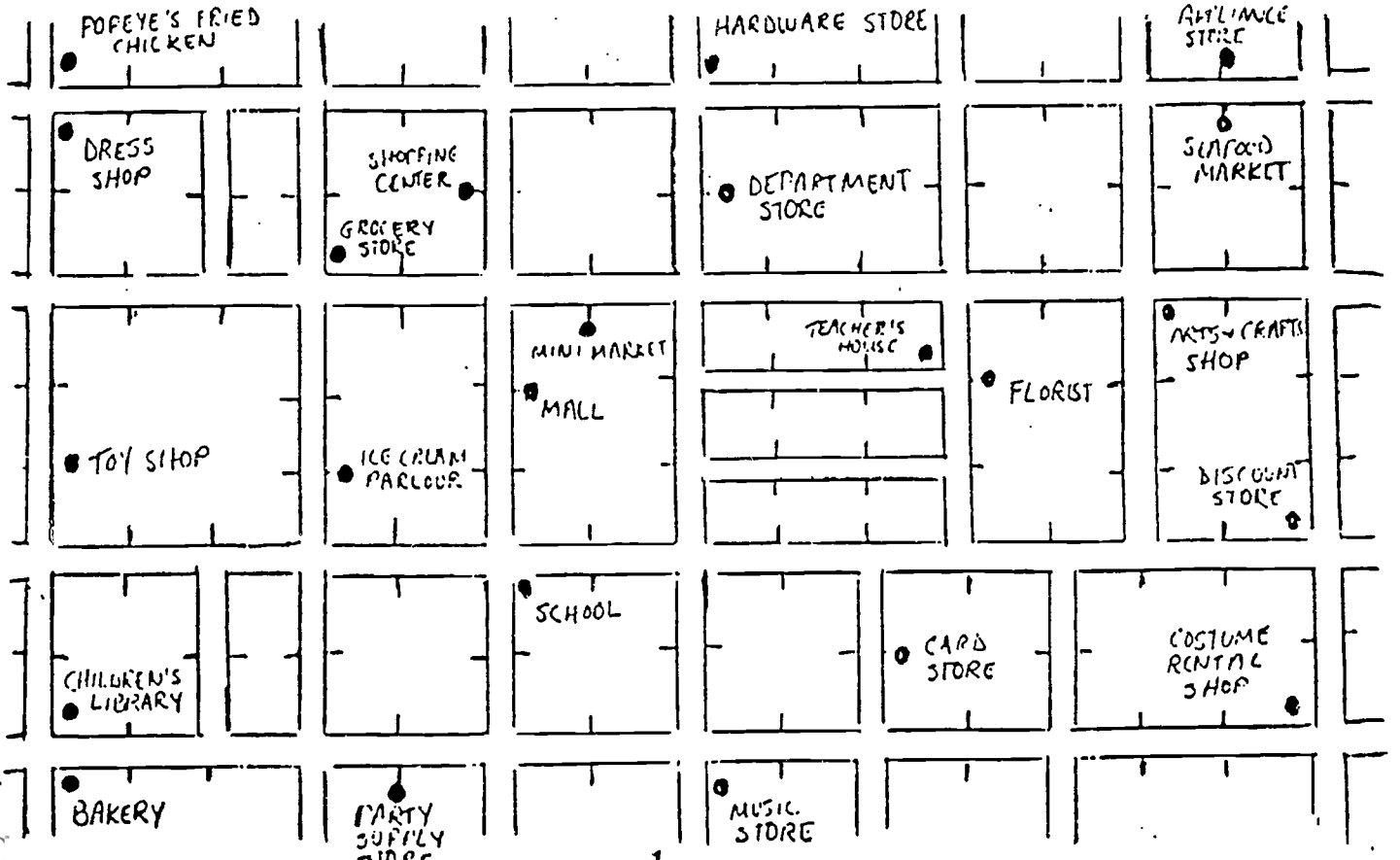
Errand Route Planning Task

List Errands for a Mardi Gras Party at School

1 Crawfish boil seasoning from the Seafood Market
King Cake from the Bakery
Face Paint from the Arts and Crafts Shop
Chips & Soda from the Mini Market or the Grocery Store
Costumes & Masks from the Costume Rental Shop or the Department Store

2 Pot & Burner for boiling crawfish borrowed from the Teacher's House
Mardi Gras Music from the Music Store
Gift Certificates from Popeye's Fried Chicken
Paper Goods (plates, napkins, cups etc.) from the Discount Store or the Mall
Balloons & Streamers from the Card Store or the Party Supply Store

Map for Mardi Gras Party



Appendix B: Word Lists Used for Memory Task

List 1	List 2	List 3
ball	boat	chair
bird	boy	king
girl	car	queen
water	dog	race
fly	drive	sit
give	ride	sleep
grow	sing	visit
play	try	win
black	blue	new
cold	hard	pretty
long	high	rich
strong	small	short
away	above	after
far	again	now
fast	almost	still
here	late	then

Appendix C:

Metacognitive Instruction By Mothers

Metacognitive instruction was coded from the videotapes of parent-child interactions. Mothers' utterances and behaviors were scored during the during the mother-child interaction involved in the second trial on each task. Behaviors were coded in each 30-second interval. The coding instrument concerned five general aspects of instruction including two aspects of metacognitive instruction -- self-regulation and instructing specific metacognitive knowledge, two other aspects of instruction -- management and structuring behaviors and parental response to a child's error, and one set of categories assessing motivational instruction.

Self-Regulation concerned the mother's ability to help the child learn to plan, monitor, and modify her behaviors in order to facilitate performance on the task. Self-regulating behaviors to be coded included: specifying the goal of the task; planning an approach to the task; helping the child to plan a sequence of activities; helping the child monitor progress toward the goal; evaluating the approach to the task; helping the child modify her approach; proposing an alternative approach; generalizing task approach; and evaluating progress toward the goal of the task. Reliability of this self-regulation scale was 0.97 for the memory task and 0.98 for the map task.

Instructing Metacognitive Knowledge involved the mother teaching the child about specific strategies that could facilitate the child's performance on the task. Behaviors coded included: describing or demonstrating a strategy the child could use in the task; indicating to the child how that strategy could be helpful; indicating to the child that a strategy had been helpful; generalizing strategy use; providing non-strategy metacognitive knowledge, prompting and supporting the child's strategy use, and indicating to the child that it is necessary to find a strategy, and indicating to the child that it is necessary to make a plan. Reliability of this metacognitive knowledge scale was 0.85 for the memory task and 0.99 for the map task.

Management and Structuring Behaviors concerned the degree to which the mother became involved in the task. At one extreme the mother could take over the task physically or verbally (Pellegrini, McGillicuddy-Delisi, Seigel, & Brody, 1986), while at the other extreme the mother could relinquish her involvement from the task (Diaz, Neal, & Vachio,1991). In between those extremes were a sequence of behaviors in which the mother gradually could become less directly involved in the task and more indirectly involved. These sequence behaviors included: directing the child's manipulation of the task materials (Pellegrini et al., 1986), working parallel to rather than interactive with the child, coordinating the effort of the parent and child, checking/inviting the child's involvement, stating the rules of the task, sensitive withdrawl, withdrawl of the parent from the task (Diaz et al., 1991). Reliability of this management and structuring behaviors scale was 0.85 for the memory task and 0.99 for the map task.

Motivational Instruction concerned how the mother drew the child's attention to the task. A mother could draw the child's attention to the task by praising the child or acknowledging actions involved in the task. Reliability of this motivation scale was 0.99 for the memory task and 0.95 for the map task.

The ***Error Response Category*** referred to what the mother did in response to a child's error or potential error on the task. A mother could inhibit the child's response to prevent the child from making an error, or she could provide explicit or indirect corrective feedback. Reliability of this error response scale was 0.94 for the memory task and 0.98 for the map task.

Scores obtained represented the proportion of 30-second intervals in which the behavior was observed. Summary scores for the self-regulation, instruction of metacognitive knowledge, error response, and motivation categories were obtained by summing the proportion scores for the individual items making up the category. A summary score for the managing and structuring category was obtained by taking the individual item proportions and multiplying them by a weight (withdrawl was omitted from this summary score). Weights were assigned on the basis of the positive quality of the behavior (takeover was multiplied by 1, directing by 2 ... sensitive

withdrawl by 7). A summary score for teaching generalization was obtained by adding the proportion scores for generalizing task approach, generalizing strategy use, finding a strategy, and making a plan. Reliabilities for these five scales were calculated by obtaining the correlation between scores obtained by two independent raters who coded a random set of 20 videotapes.

Appendix D:

Child Metamemory And Strategy Use

Map Task

Each child was asked to respond to several questions about her performance on the map task. For pre- and posttest trials of the map task, the child was asked about the degree to which she planned her route and about the length of her route. Additionally, after the third trial, the child was asked about which of her routes came came out the shortest, her perceived value of her mother's instruction on the task, and about whether she used on Trial 3 some activity her mother had told her about during Trial 2. Appendix E provides the series of questions children were asked.

Scoring. On the basis of the child's responses to the above questions, scores reflecting the child's metacognitive awareness were derived. Reliabilities of scores reflecting the child's responses to the metamemory questions on the map task were calculated by obtaining the correlation between scores obtained by two independent raters who coded a random set of 20 videotapes.

The *degree to which the child reported having planned the route* was scored by recording 3 points for extensive planning (involving several plans), 2 points for some planning (one good plan), 1 point for some minimal planning , and 0 for no planning. Reliability of this reported planning score was 0.96 for Trial 1 and 0.77 for Trial 3.

A score reflecting *the child's accuracy in judging the length of the route that she had produced* was obtained. Accuracy was determined by comparing the child's judgement of the route length to actual lengths of the routes produced by all children on three trials. The route lengths ranged from 46-137 blocks. A "short" route was considered to be between 46-52 blocks (21.11% of total routes produced); a "pretty short" route, between 53-60 blocks (19.44%); a "medium length" route, between 61-71 blocks (21.11%); a "pretty long" route, between 72-99

blocks (18.33%); and a "very long" route, between 100-137 blocks (20%). In order to obtain a score reflecting the child's accuracy in determining the length of her route for the first and third trials, both the actual route length and the child's responses were rated along a five-point scale from 1 = short route to 5 = very long route. A difference score (child's estimated length minus actual length index) indicated the accuracy of the child's judgements. Reliability of this accuracy in judging the length of the route score was 1.00.

A second score reflecting *the child's accuracy in determining which of her three routes came out the shortest* was obtained by recording a score of 1 if the child could accurately determine which of the three routes came out the shortest. A score of 0 was recorded if the child was inaccurate. Reliability of this accuracy in determining which route came out the shortest score was 1.00.

A summary score was obtained reflecting *the perceived value of the mother's instruction on the map task.* A score of 1 was recorded for each of the following: if the child indicated during the third trial that the idea of planning came from her mother, that the second or third route came out the shortest because of her mother's instruction, that it helped to work with her mother (for controls, to work with the mother in the room), and that her mother told her something during Trial 2 which helped her on Trial 3 (not asked to controls). The summary score was determined by adding the scores for each of the individual items together. Reliability of this perceived value of mother's instruction score was 1.00.

A score was obtained reflecting *whether the child was observed using on Trial 3 some activity that her mother told her to use during Trial 2* (not observed for controls). This last item was scored based on the what was observed in the videotape. A score of 1 was recorded for the item if the child displayed a strategy on Trial 3 that her mother had suggested on Trial 2. A score of 0 was recorded if the child did not demonstrate any use of the mother's recommendations. Reliability of this observed activity score was 0.93.

Memory Task

Similarly, each child was asked several questions about her own performance on the memory task. For pre-and posttest trials of the task, the child was asked about her strategy use, study activities and her recall readiness decision. After the third trial, each child was asked additionally, about whether she had adopted a different and better strategy on Trial 3, about her perceived value of mother instruction on the memory task, and about which trial she recalled the most words (see Appendix E).

Scoring. For Trial 1 and Trial 3, children received scores for Strategy Use/Organization, Study Activity, and Recall Readiness Determination (how the child determined when she should stop studying). Each child received a score based on the her verbalization of these activities and a score based on observed strategy use and study activities (as observed in the videotapes). For all categories, child received a score of 2 for full use of an activity, a score of 1 for partial use of an activity, and a score of 0 for the absence of an activity. Reliabilities of scores reflecting the the child's responses to the metamemory questions on the memory task were calculated by obtaining the correlation between scores obtained by two independent raters who coded a random set of 20 videotapes.

Strategy Use/Organization included three possible activities: making sentences or meaning-based associations, alphabetizing, or doing another activity (i.e. drawing pictures). Each of the individual scores was multiplied by a weight and summed for a total strategy score. Weights were assigned on the basis of sophistication of strategy use (3 points for meaning-based, 2 points for alphabetizing, 1 point for other). A total strategy score was obtained for verbal evidence of strategy use and a separate score for observed strategy use. Reliabilities of these strategy scores were 0.98 (verbal) and 1.00 (observed) for Trial 1 and 0.73 (verbal) and 0.89 (observed) for Trial 3.

Study Activity included three possible activities: rehearsing, moving the cards into groups, and doing some other specified activity (i.e. writing the words down, counting the words). Each

of the individual scores was summed to yield a total study activity score. Separate scores were obtained for verbalized study activity and observed activity. Reliabilities of these study activity scores were 0.80 (verbal) and 1.00 (observed) for Trial 1 and 0.70 (verbal) and 0.89 (observed) for Trial 3.

Recall Readiness Determination included two activities, self-testing and having a fixed plan (i.e. "I decided to stop studying after I said all the words three times"). A total recall readiness score was obtained by multiplying the individual score for each activity by a weight and then summing the weighted scores. Weights were assigned on the basis of sophistication of recall readiness determination (2 points for self-testing , 1 point for a fixed plan). Reliability of this recall readiness score was 0.92 for Trial 1 and 1.00 for Trial 3.

Additional questions concerned whether the child was able to adapt a better strategy on the third trial and to acknowledge the role of the mother. Summary scores were obtained after coding the following specific items. A score of 1 was recorded 1) if the child indicated that she used a strategy in Trial 3 that differed from the one she used in Trial 1, 2) if she indicated that the new strategy was better, 3) that the idea for the strategy came from her mother, 4) that it was helpful to study with her mother (or if controls reported that it was helpful to work with their mothers in the room) and, 5) that she used on Trial 3 a specific strategy or activity that her mother had recommended (this item was not scored for controls). A score of 0 was recorded for each item in other cases.

A summary score reflecting the *reported adoption of a different and better strategy* was obtained by totalling the scores for whether the strategies differed for Trial 1 and Trial 3 and whether the strategy used during Trial 3 was better than Trial 1. Reliability of this reported adoption of a different and better strategy score was 0.91.

Similarly, a summary score reflecting *perceived value of the mother's instruction on the memory task* was obtained by totalling the individual scores concerning whether the child reported that the idea for the strategy came from her mother, that it was helpful to study with the mother,

and that she used the strategy her mother recommended during the third trial. Reliability of this perceived value of mother's instruction score was 0.98.

A final score was recorded for the *child's accuracy in determining the trial on which she remembered the most words*. A score of 1 was recorded if the child was accurate, and a score of 0 was recorded if the child was inaccurate. Reliability of this accuracy score was 1.00.

Appendix E: Metamemory Questions for Children

Map Task

Daughters will be asked the following questions after the first and third trials:

Trial 1 - Pretest

1. Did you do anything before you started drawing the map? Tell me what you did?
2. Do you think you found: the shortest route, a pretty short route, a medium length route, a pretty long route, or a very long route?

Trial 3 - Posttest

1. Did you do anything before you started drawing the map? Tell me what you did.
2. Where did you get the idea to do that?
3. Of the three maps, which time did you make the shortest route?
4. Why do you think the route came out the shortest that/this time?
5. Do you think it helped to work with your mother? (...in the room? - asked to Controls)
6. How did it help? (If no, why not?)
7. When your mother helped you, did she tell you anything that helped you this last time? What was it?
8. This time, do you think you found: the shortest route, a pretty short route, a medium length route, a pretty long route, or a very long route?

Memory Task

Daughters will be asked the following questions after the first and third trials:

Trial 1

1. What did you do to remember the words? Tell me more about that.
2. Was it helpful?
3. How was it he'pful?
4. How did you decide when to stop studying?

Trial 3 - Posttest

1. What did you do to remember the words this time?
2. Did you do anything different this time to remember the words?
3. How did you get the idea to do that?
4. Was it helpful?
5. How was it helpful?
6. How did you decide when to stop studying?
7. Which time did you remember more words?
8. Why do you think you remembered the most words that/this time?
9. Do you think it helped to study with your mom? (...in the room? - asked to Controls)
10. How did it help?
11. When your mom helped you, did she tell you anything that helped you this last time? What was it? (This question was omitted for Controls)

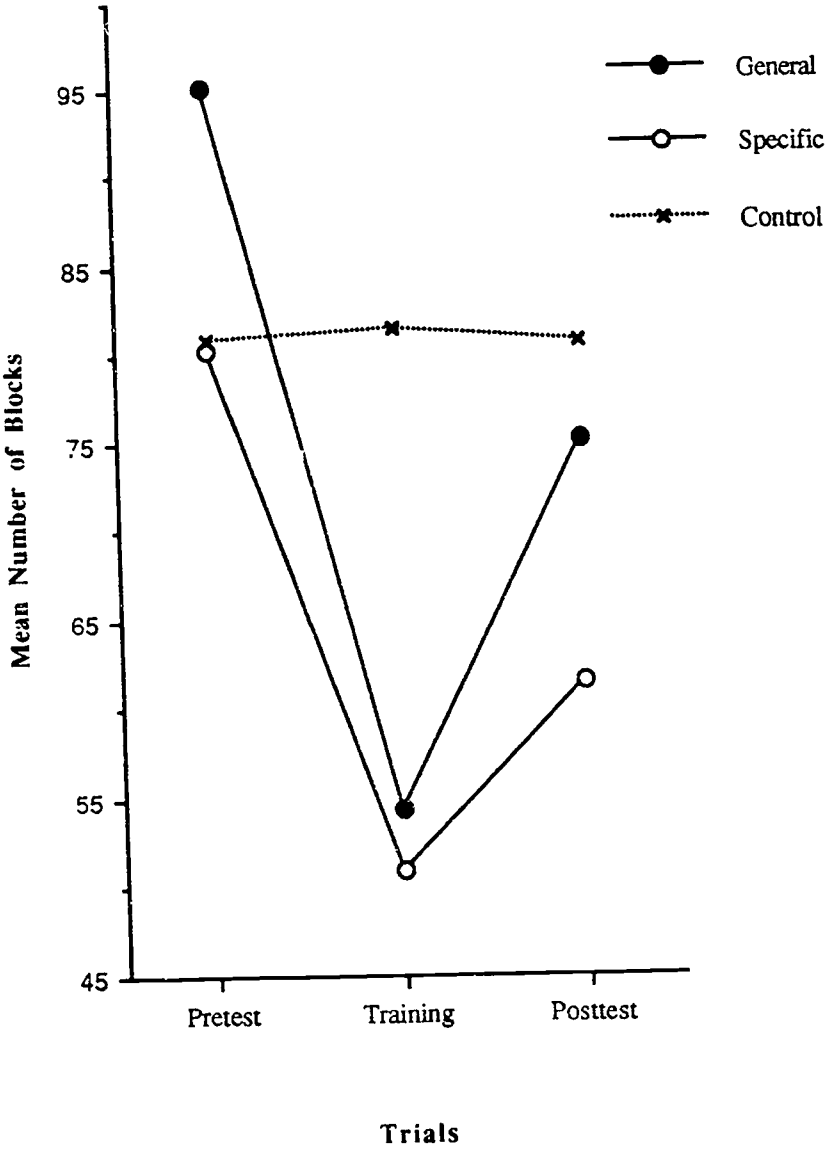


Figure 1. Mean number of blocks in routes created by children in the general, specific, and control conditions across trials.

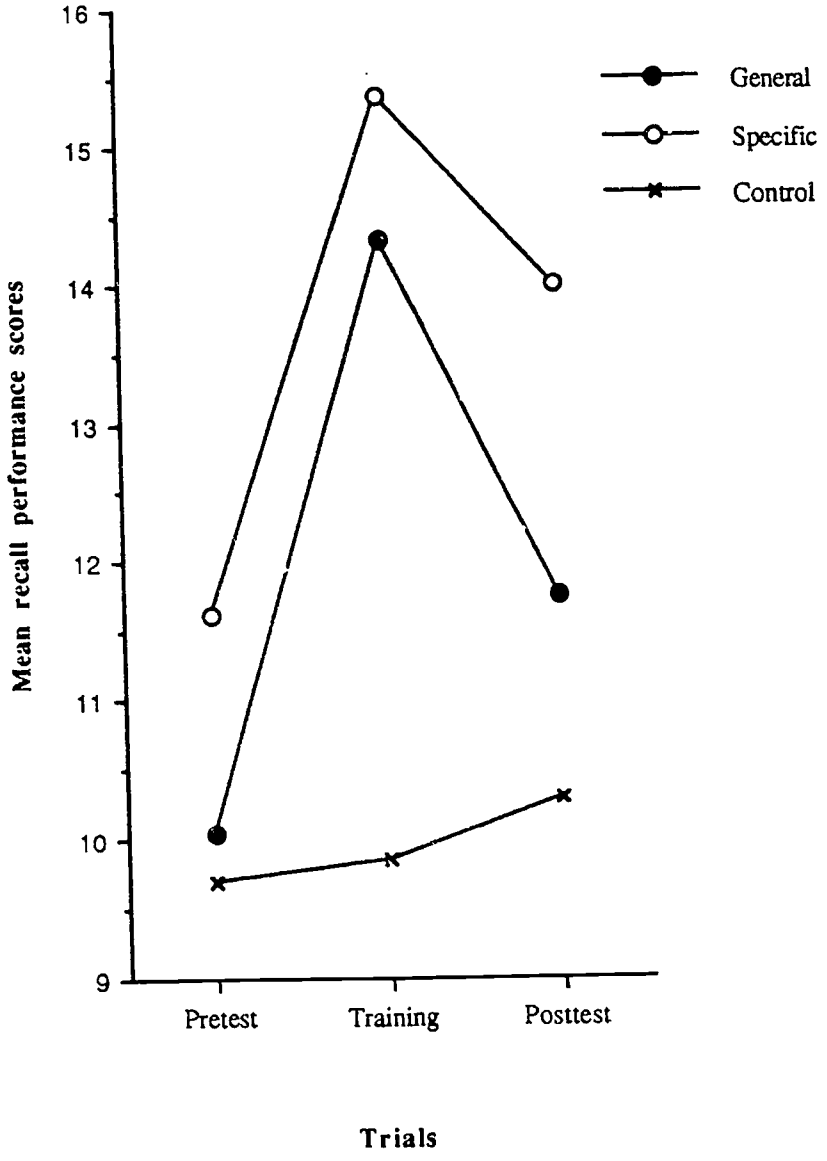


Figure 2. Mean recall performance of children in the general, specific and control conditions across trials.

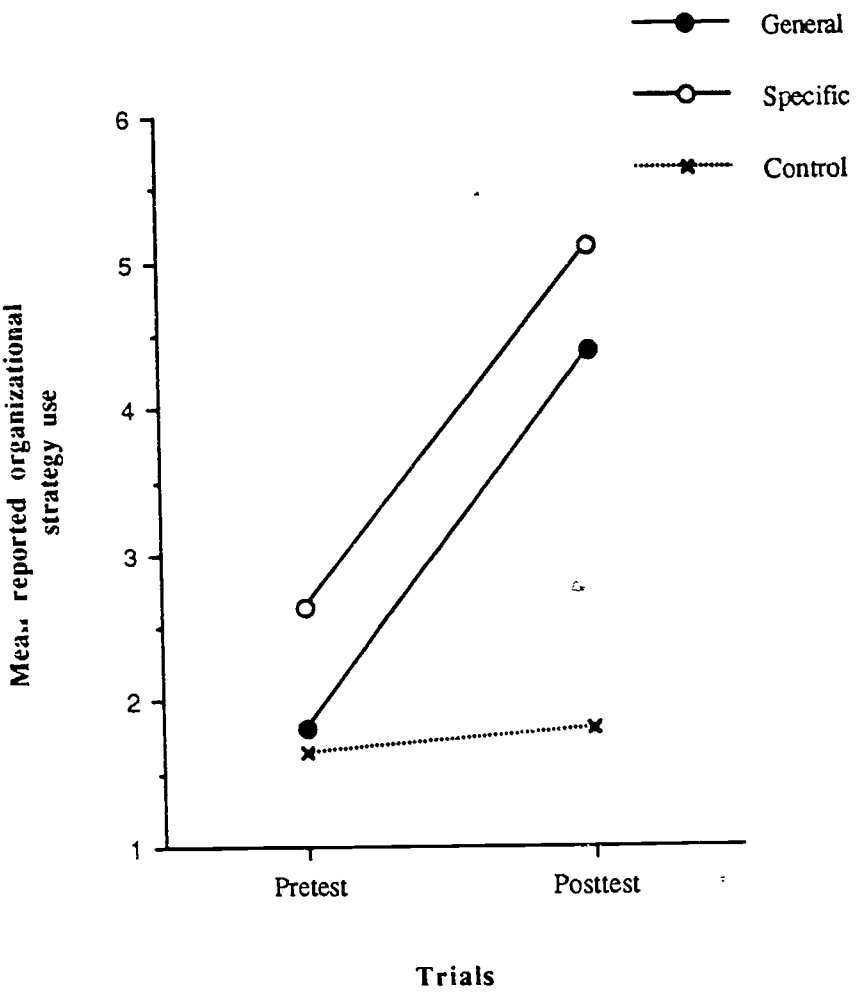


Figure 3. Mean reported organizational strategy use of children in the general, specific, and control conditions across trials.